Code to animate

Don’t know where to start? Start here! The Teacher Guide for Matatalab’s Animation Add-on has sixteen engaging lessons for you to do with your students. Written by expert K-8 robotics educators, these lessons are sure to engage and inspire as you Code to animate.

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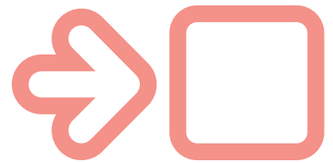
Animation Add-on

Teacher Guide

Animation

Animation Add-on

code to animate



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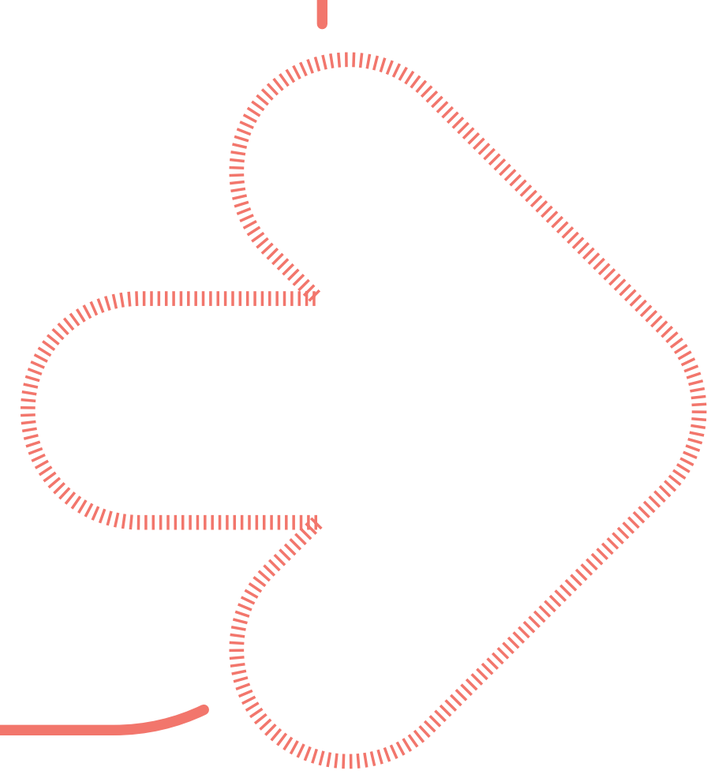

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Why Teach Coding?

By opening this book, you are taking the first step at the beginning of an exciting adventure. Thank you for coming.

Matatalab is a platform full of fun, excitement, and as an educator, potential. Throughout these 16 lessons you will see how robotics can be used to teach your students not just coding but math, science, art, music, and language as well, and all in ways that are sure to inspire. You will dance with your robot, you will light it up, you will have it navigate tricky situations, you will play games, and you may even bump into some things along the way! That's okay, bumping into things is a part of learning too. Matatalab is the perfect platform for your early learning students to experience a safe, even fun, place to make mistakes, learn from those mistakes, and carry on. We call that iteration and it is a critical part of learning.

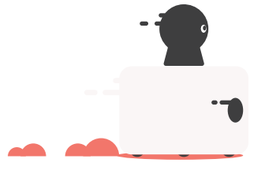
We iterate by making mistakes, evaluating them, revising our plans, and trying again. We continue to do that until we get it right. The value of this process cannot be understated. Iteration is not just how we learn to code, but how we learn. This constant state of failure and improvement though does not have to be painful. By using Matatalab, you can turn errors into opportunities for students to see not a mistake but a chance to try again. They will learn from these moments and savor their successes.

Also critical in this learning is what educators call "21st Century Skills". These are a core set of competencies educators believe modern students are going to need to have more than anything. They include Teamwork, Collaboration, Creativity, Imagination, Critical Thinking, and Problem Solving. The near future is fraught with complex issues that the current generation of K-8 students are going to have to resolve. The future also is likely to be filled with countless opportunities to, literally, do things that are out of this world. Many educators believe that the primary achievers of the future are going to have to be highly creative collaborators and problem solvers. Thankfully these skills are teachable and this book could be where a life of 21st-century skill use is first experienced.

We certainly live in interesting times. It is often hard to remember that humanity has, in fact, never been more forward-thinking, optimistic, and prepared for what is next than it is now. While our future is full of potential, a bright future is not necessarily assured. Teachers are working harder than ever to prepare students for the unknown. Educators are using amazing tools like Matatalab, and curriculum, like this book to deliver world-class programming and technology education. We are learning that failure is not the end of learning but just the beginning. When we iterate, we take on the challenge of learning from our mistakes, starting again, and getting it right the next time. 21st Century Skills are being developed to ensure our students are prepared for all the problems they will face. By taking this first step, you are meeting those challenges and seeking out those opportunities.

Your efforts will make you a better educator, and your students will thank you for it.

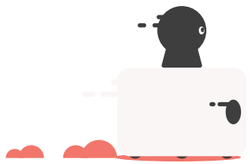
Let's Get Started!



How to Use This Book

Welcome! We've worked incredibly hard to make this book not only fun to read but easy to follow and understand. If you've written or delivered a lesson plan before, none of the sections of this guide should be unfamiliar to you. Each lesson has four sections: Introduction, Guided Practice, Independent Practice, and Wrap Up. By working this way, students are engaged right at the start with a fun conversation to prepare them for what is to come. Guided Practice gives you the opportunity to demonstrate a skill or technique you will be using in this lesson. Independent Practice is when we expect your students to take what they have observed and discussed and do it on their own. Finally, in Wrap Up, we summarize the learning experience, talk about successes and challenges, and what might be next in the learning process. We've taken the time to provide some ideas on how you can both modify and extend the learning. We've also added a rubric you can use for assessment. In the back of the book, we've aligned each lesson to Common Core, ISTE, CSTA and all the Canadian Provincial Learning Objectives that apply. We've also provided for you some great videos and resources you can use along the way. We hope you love these lessons as much as we do, and we can't wait to see all the great work you do!

Let's Go!



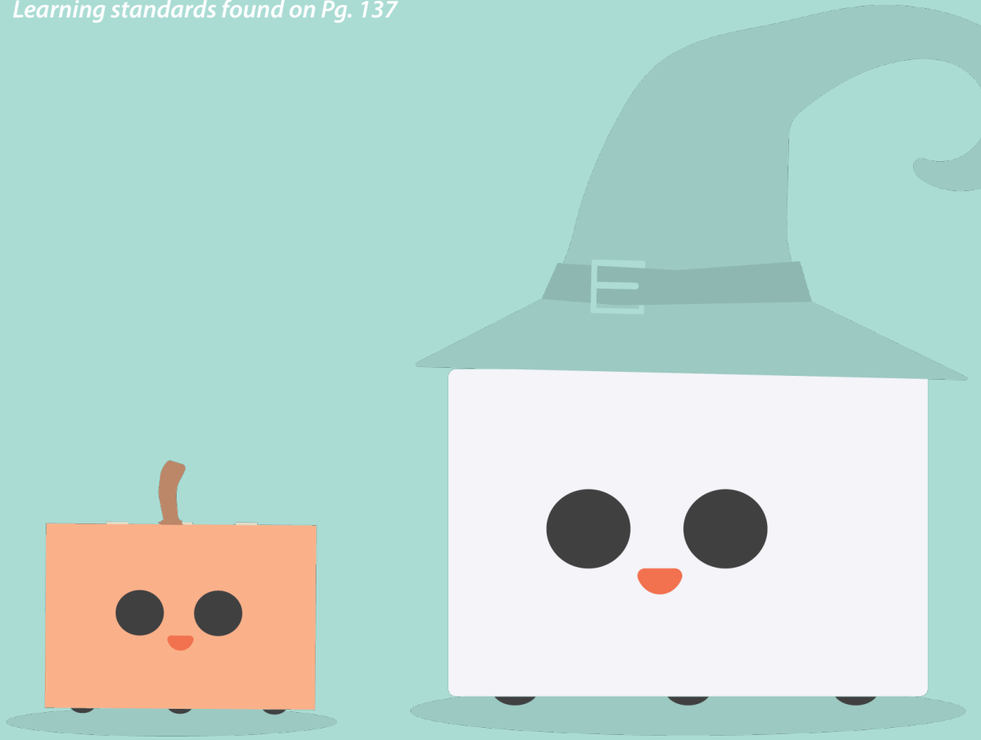
Costume Party

Lesson 01

Grades K - 3 *60 mins*

MatataBot makes a costume and brings a tune and dance moves to a costume party! Code and draw custom rectangular shells to wrap around MatataBot to create a spectacular costume. Then code a dance to your favourite tune and bring those moves to the party for a dance-a-thon.

Learning standards found on Pg. 137



Costume Party

Lesson 01

Grades K - 3

60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set along with a drawing area.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
Assign a designated area for the dance-a-thon.

Big ideas & essential questions

Students will experience a hands on geometric relationship between 2-D and 3-D objects. When they measure the circumference of MatataBot to customize the costume, they should conclude that unrolling the circumference of a circle, will result in the equivalent length of a line. They will also see that the side of a cylinder is a rolled up rectangle.

How can we create a custom fitted costume for MatataBot?
Considering standard and nonstandard units, how will you measure MatataBot to get a good fit? Students will be able to choose a unit of measure and apply their understanding of how to repeat the unit to measure around an object.

Measuring is an acquired skill that the students are still exploring and experiencing in a very direct way with this lesson.
Will the costume fit exactly once around MatataBot?
Which design did you choose and why: an overlapping costume or one that fits only partially around?
Due to MatataBot's unit length of a one second forward movement, students must decide if their costume design is best suited for a fit that is mostly around or have an overlap.

Learning outcomes

TSWBAT : the students will be able to:

1) Choose standard or nonstandard units to measure 3-D objects and 2-D shapes.
2) Recognize and apply the relationship between the properties of 3-D objects and 2-D shapes.
3) Code customized 2-D shapes to fit a 3-D object.
4) Code various movements to create a dance.

What you'll do

Each pair of students will investigate, measure and code together and will have MatataBot draw a custom rectangular shell that will wrap around MatataBot. Afterwards, they will decorate the costume by adding colour, legs, wheels, ears, other decorative materials, etc.. Choose the tune(s) that will be played at the dance-a-thon and have each group code a dance using animation movements and lights.

What you'll need

- Class set of Matatalab Pro Set and Animation Add-On set
- Markers for MatataBots
- Markers, stickers, glitter, stick-on gems, ribbons, etc for decorating
- Scissors
- Tape, glue
- Pencils
- Projector with tablet or computer
- Coloured construction paper or white copy paper for each group to create a costume shell
- Rulers
- String, pipe cleaners, twist ties for non-standard measurement of MatataBot circumference
- Prepare a sample costume for MatataBot that can easily be attached and detached from MatataBot

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students. Set up projector with tablet or computer.
- During the dance-a-thon, have an extra "DJ" board & command tower in the stage area where students can add their own music code for spot light performances or you can have a class song that you co-create for everyone to dance to at the same time.

Introduction

5 mins

1) Your MatataBots have been invited to a costume party today! You will help MatataBot dress up in a fantastic costume and code some dance moves for a dance-a-thon!

2) Let's take a good look at MatataBot to decide how we can create a costume. Any ideas?

3) Let's take a look at the shape of it. What shape is MatataBot? What size is MatataBot?

   a) Use these questions and student input to direct them to figure out that the shape is a 3-D cylinder and to identify the 2-D shapes they see on MatataBot (a circle on top and bottom).

4) How can you find out MatataBot's size to create the costume? Can we use a ruler to measure around MatataBot?

5) What would be a good way to measure around MatataBot? Lead a brief discussion on non-standard units.

6) Do you think a ruler is a good measuring tool for this situation? It is a standard unit of measurement. What are the units on a ruler?

Guided practice

10 mins

1) Show the students your sample costume and how it attaches to MatataBot. Make the costume so that it can unravel to reveal its rectangular shape and relate the circumference to the length of the long rectangular side of the shell.

2) Once they figure out the size (length of the long and short side of the rectangle) that the shell should/can be, guide their discussion on how they would use the **Angle**, **Set Speed**, **Stop Wheel** and **Wait** blocks to code and draw it. **Angle** blocks will allow for simple coding of 90 degree turns.

3) Model and review the different **Set Speed**, **Stop the Right** / **Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks) to vary the length of a line. The shortest length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block.

4) **You can also show the video clip How does it work Animation Add on... (series 2)** [1:38 - 3:35]
   Youtube- *http://bit.ly/wait-blocks*

5) How can we shorten our coding sequence? Review **Loop Begins** / **Ends blocks** and find and use the core pattern in the code sequence.

6) Review how to use the **Right** / **Left LED Color blocks**:
   How does it work Animation Add on... (series 3)
   Youtube- *http://bit.ly/light-blocks-1*

Independent practice

35 mins

Challenge 1 *15 mins*

> Challenge the students to measure, using non-standard units, MatataBot's circumference and use that information to code MatataBot to draw a rectangular shell.

> Test the code without the marker at first to make sure the code is correct and that MatataBot does not drive off the paper.

> They should cut out and decorate the shell and can even add ears, accordion arms/legs, wheels, etc.

Challenge 2 *20 mins*

> It's time to create a dance but first they need to choose music! Students can choose a song, from the Pro set (Preset Music block),or the students can create their own song using the Melody blocks, Alto Clef Music blocks, and/or Treble Clef Music blocks.

> If they will be performing individually, they can take their board with their coded song and Command Tower to the DJ area to play their request as their MatataBot dances.

> If you will co-create one song for everyone to dance to, then have the music playing on the DJ Control Board while they code dance moves for the dance-a-thon.

> Have students add **Right** / **Left LED Color** blocks to show expression while MatataBot is dancing! Change the intensity of the light sequence by using **Number** blocks.

> Enjoy the dance-a-thon or individual spotlight performances!

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Ask the following questions:

> What tool did you use to measure MatataBot's circumference?

> What did you do with that information?

> How did you code the costume shell/rectangle?

> What was difficult about this project?

> What was your favourite dance move?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (relating properties of 2-D figures to 3-D objects) as well as Science and Technology. This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

> Critical thinking
> Creativity
> Collaboration
> Communication
> Technology literacy
> Flexibility
> Leadership
> Initiative
> Productivity
> Social Skills

Modifications

For younger students, co-create coding of the rectangle shell and keep coding model available for students to copy and implement.

Students can use the square artist warm-up card and the **Directional** blocks from the Pro set to help them get started on coding the rectangle.

Accommodations

> Pair student heterogeneously to optimize co-teaching of prior knowledge.

> Place student in a group of 3.

> Allow student to work alone and independently experiment with animation blocks or the artist warm-up card.

> Student can code the song for the dance-a-thon or choose the song for the individual dance for their group.

Extension activities:

> Add another shape to the basic rectangular shell such as a triangle, circle, star, or students can create their own shape. Create a stage area for the dance-a-thon.

Supporting files & links

Wait Blocks, How does it work Animation Add on...(series 2) [1:38 - 3:35]
Youtube- *http://bit.ly/wait-blocks*

Light Blocks, How does it work Animation Add on...(series 3)
Youtube- *http://bit.ly/light-blocks-1*

Teaching Big Ideas in Math, Marion Small
Document- *http://bit.ly/big-ideas-1*

Guides to Effective Instruction in Mathematics Grades 1 to 3
Document- *http://bit.ly/math-guide-1-to-3*

Erikson Institute Early Math Collaborative, Big Ideas
Website- *http://bit.ly/early-learning-erikson*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Assessment

Student's work will be assessed in the following manner:

- Students are able to identify the critical thinking involved in determining how to measure the circumference of the MatataBot using non-standard units.
- Students are able to identify, using sufficient evidence of understanding and knowledge, the translation of the circumference of a cylinder to the length of the side of a rectangle.
- Students are able to identify, using mathematical vocabulary, the 2-D faces on 3-D objects.
- Students are able to communicate sufficient understanding and knowledge of their coding logic to create 2-D shapes.
- Students collaborated successfully with their partner(s) to complete the costume shell and dance.

Category/Level Criteria	*Level 1 Poor performance*	*Level 2 Needs improvement*	*Level 3 Adequate*	*Level 4 Excellent*
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

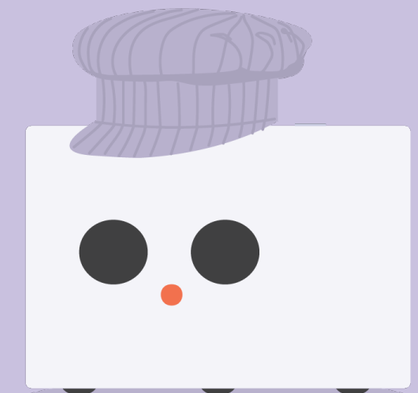
Working on the Railroad

Lesson 02

Grades K - 1 *60 mins*

Choo! Choo! Chugga, Chugga! All Aboard! Make a giant classroom train track! Create straight, curvy and turning railroad paths. Decorate the scenery and add mapping details - legend, compass rose, and landmarks to bring the scene to life. Then code all the MatataBots to chug along the path and see where it takes you!

Learning standards found on Pg. 141



Working on The Railroad

Grades K - 1

60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow a safe space for each group to work around a sheet of craft paper and their MatataBot set.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
Consider having this lesson in the gym so that the railroad track is free to meander in a large space.

Big ideas & essential questions

Transportation connects people to people and people/things to places. They not only move people but also the things we need to eat, build with and buy.
What is the purpose of a train?

Why is transportation important?

How is a railroad track constructed? Most students will have a familiar schema of what a track and train look like but will now be able to relate the purpose of materials and construction of a track.

Where do trains travel? Trains require land or bridges to travel on. They can travel through prairies, cities, mountains, forests, etc. Each area has a specific characteristic.

Learning outcomes

TSWBAT : the students will be able to:

1) Describe and identify different types of trains.

2) Understand the purpose of transportation.

3) Complete a map of a specific type of terrain that the railroad must travel through.

4) Identify parts of the railroad track.

What you'll do

Each group will create a section of the railroad track so that it begins and ends near the edge of the paper. This way, you will be able to connect each paper track together to create a large track!

Each group will code to create either a straight, curvy or turning railroad path. They will choose a specific landscape genre and decorate the scenery. Lastly, add mapping details - legend, compass rose, and landmarks to bring the scene to life. Then code all the MatataBots to chug along the path and see where it takes you!

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots
- Projector and display screen along with computer/tablet
- Roll of White Craft Paper, one sheet per student group
- Markers and/or crayons
- Pencils
- Scissors
- Extra white or scrap paper for sketching their ideas
- Rulers
- Lego people
- Lots of tape to tape down corners of the paper while MatataBot draws and to tape the sheets together at the end
- Prepare a basic sample showing only three different types of railroad track: curvy, turning and straight. It should also show how the track should begin near an edge and end near an edge (either a different edge or the same edge)

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions..
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- With the series of three MatataBot videos familiarize yourself with the series of three MatataBot videos located below in the External Resources so you can demonstrate straight, curvy or turning path codes.
- If using a roll of craft paper, precut one sheet per student group.

Introduction

5 mins

1) Show the image of the **My Big Train Book**, by Roger Priddy, and ask students which type of train have they been in.

2) **My Big Train Book**, by Roger Priddy
Book- *http://bit.ly/working-railroad-1*

3) What is the purpose of a train? How do you use one? How does it work?

4) Review the different parts of a railroad track (metal rails, wooden crossties, metal fasteners, ballast material) using this picture:
Definition of Basic Track Elements
Website- *http://bit.ly/working-railroad-2*

Guided practice

10 mins

1) While displaying your sample, model and review some guidelines for coding each type of railroad section - straight, turning or curvy.

2) Model and review the different **Set Speed**, **Stop the Right**/**Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks). The shortest line length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block. **Angle** blocks will allow for simple coding of turns.

3) You can also show the video clip, **How does it work Animation Add on... (series 2)** [1:38 - 3:35]
Youtube- *http://bit.ly/wait-block*

Independent Practice

40 mins

1) Each group will design a section of railroad track and decide on what kind of landscape/terrain their track is passing through by adding mapping details such as landmarks, compass rose, etc.

2) Use the extra paper to draw your sketch of what you are going to code MatataBot to draw. You can also use this paper for MatataBot drawing practice.

3) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first to make sure the shape will be drawn where you want it and so that MatataBot does not drive over the edge of the paper.

4) Experiment and practice coding different kinds of lines, curves and turns.

5) Once MatataBot draws the initial track line, they need to have MatataBot draw it again a few inches away from the first one so that it looks like a path that is wide enough for a MatataBot to traverse. They can use a ruler or freehand to draw the railroad crossties.

6) When their drawing is completed, students may code their MatataBot to travel their length of track. Add the Right/Left LED Color blocks and maybe a few Alto or Treble Clef music blocks for added animation.

7) Place each completed section of track end-to-end to create a large track around the gym or classroom. Tape them together.

8) When the conductor is ready, start your MatataBot train engines and watch all the trains travel their part of the track.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Why does a railroad track curve or turn sometimes?

3) Which type of track did you code?

4) What is the purpose of a train?

Interdisciplinary & 21st century connections

This lesson can be used in Science and Technology and Social Studies. This lesson could also be co-taught with another content area teacher so that student drawings are created to reflect relevant content on their maps.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology literacy

Modifications

Students can practice using the Animation coding blocks to observe their outputs and work towards creating a single line of railroad.

Have a small group of students co-create code with you at one MatataBot/ Control Board/Command Tower station. They can bring over their Control Board, copy the code and take the board back to their station.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place students in a group of 3.
- Allow the student to work alone and independently experiment with Animation blocks.

Extension activities:

- Each group will tell/write one or two sentences about their scenery as the MatataBot's chug through!
- Add building blocks to create a tunnel through a mountain or the sides of a bridge over a river.

Supporting files & links

My Big Train Book, by Roger Priddy
Book- *http://bit.ly/working-railroad-1*

Definition of Basic Track Elements
Website- *http://bit.ly/working-railroad-2*

Definition of Ballast
Wikipedia- *http://bit.ly/working-railroad-3*

Firmware Upgrade:
Matatalab- http://bit.ly/upgrade-firmware

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Wait Blocks, How does it work Animation Add on... (series 2) [1:38 - 3:35]
Youtube- *http://bit.ly/wait-block*

Light Blocks, How does it work Animation Add on... (series 3)
Youtube- *http://bit.ly/light-blocks-1*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithm of coding blocks to draw various lines, curves and turns.
- Students are able to communicate the purpose of this type of transportation.
- Students showed evidence of completing at least one line of the railroad path.
- Students demonstrated their knowledge of the components of a map.

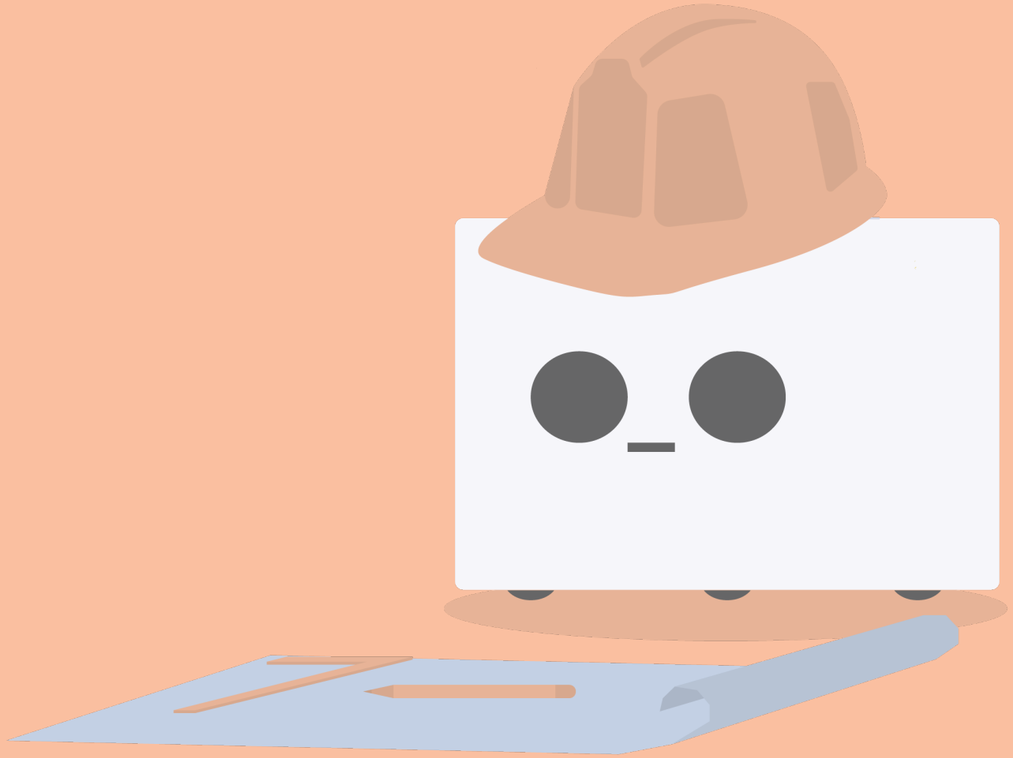
Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Lesson 03

City Planner

Grades 2 - 3 ***60 mins***

Matata Town is a new city that you create! With each group creating a section of a town, they will take into consideration the impact on the environmental features of that land.
Test out the new infrastructure and drive Lego people on MatataBot cars through the town using proper signaling and stopping to get through a typical MatataBot day.
Learning standards found on Pg. 144



City Planner

Lesson 03

Grades 2 - 3

60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow a safe space for each group to work around a sheet of craft paper and their MatataBot set.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
Consider having this lesson in the gym so that the Matata Town map is free to meander in a large space.

Big ideas & essential questions

Planning a city is not just about building houses and roads, it is about trading resources of the natural environment for our own purposes and needs.
How can we minimize our impact on the natural environment while also meeting our needs?
What environmental features must we consider when planning a new town?

Sometimes natural features of the land dictate how and where we live (oceans, mountains, deserts, etc). Sometimes, the way we live dictates how we change the natural features to accommodate our needs. How can we balance our needs and respect the natural environment?

Learning outcomes

TSWBAT : the students will be able to:

1) Describe and identify different types of environmental features and natural resources.
2) Understand the purpose and impact of infrastructure.
3) Create a map showing specific environmental features.
4) Describe how urban areas affect those environmental features.

What you'll do

Each group will create a section of a town with consideration of the environmental features of that land and drive their MatataBot and driver through the town using proper signaling and stopping to get through a typical MatataBot day.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots
- Projector and display screen along with computer/tablet
- Extra white paper or scrap paper to sketch a plan
- Markers and/or crayons
- Pencils
- Scissors
- Roll of white craft paper, one sheet per student group
- Rulers
- Lego people
- Lots of tape to tape down corners of the paper while MatataBot draws and to tape the sheets together at the end
- Prepare a sample showing an environmental feature and how people create infrastructure around that feature or change that feature to accommodate the infrastructure. It should also show how the road should begin near an edge and end near an edge (either a different edge or the same edge).

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up Projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- With the series of three MatataBot videos Familiarize yourself with the series of three MatataBot videos located below in the External Resources so you can demonstrate straight, curvy or turning path codes.
- If using a roll of craft paper, precut one sheet per student group.
- Remove the amber half globe of MatataBot's magnetic top to reveal the Lego connectors.

Introduction

5 mins

1) In our province/state, what are the natural resources and environmental features (climate, terrain, water, etc?).

2) What do humans need to live on the land?

3) What must be considered when deciding on the best place for homes or industry?

4) How do these decisions impact the environment?

Guided practice

10 mins

1) While displaying your sample, model and review some guidelines for coding each type of road section - straight, intersecting, turning or curvy.

2) The roads should stop just shy of the edge of the paper so that MatataBot does not draw on the floor, yet, you will still be able to connect each paper together to create a large town.

3) Model and review the different **Set Speed**, **Stop the Right** / **Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks).

4) The shortest length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block.
Angle blocks will allow for simple coding of turns.

5) You can also show the video clip, **How does it work Animation Add on... (series 2)** [1:38 - 3:35] Youtube- *http://bit.ly/wait-blocks*

Independent Practice

40 mins

1) Using sketch paper to formulate their design ideas, each group must first decide on the environmental features that existed before the town, like mountains, rivers, lakes, forests, marshland, prairies, farms, etc.

2) Next decide on the infrastructure (homes, roads, stores, industry, farms, parks, schools, etc) that the town needs to serve the people that will live there.

3) To begin to create the city map, it should show the environmental features (that they can draw themselves) and consider how that preexisting land is going to be transformed into urban development.

4) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first to make sure the line will be drawn where you want it and so that MatataBot does not drive over the edge of the paper. Experiment and practice coding different kinds of lines, curves and turns.

5) Then each group will code to create either a straight, curvy, intersecting or turning two-way street. It should include cross walks, stop signs and traffic lights. Lastly, add mapping details - legend, compass rose, and landmarks to bring the scene to life.

6) They will then program the MatataBot to drive a Lego person through their section of the new community watching for traffic lights, stop signs and pedestrians, even stopping at stores or restaurants!

7) Add the **Right/Left LED Color** blocks for added animation.

8) Place each completed section of road end-to-end to create a large town around the gym or classroom. Tape them together.

9) When the sun rises in the morning, the new town will be ready to greet its MatataBot inhabitants as they start their day.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Describe the natural resources or features of your section of town and how they were impacted after the infrastructure was put in place.

3) What surprised you the most about city planning?

Interdisciplinary & 21st century connections

This lesson can be used in Social Studies (environmental impact of communities). This lesson could also be co-taught with another content area teacher such as Science.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Technology literacy
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills

Modifications

Students can practice using the Animation coding blocks to observe their outputs and work towards creating a single line of road.
Have a small group of students co-create code with you at one MatataBot/Control Board/Command Tower station. They can bring over their Control Board, copy the code and take the board back to their station.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow student to work alone and independently experiment with animation blocks.

Extension activities:

- Add 2 stand up building fronts in 2-D (homes, roads, stores, industry, farms, parks, schools, etc) that represent part of their community streetscape map.
- If iMovie is accessible, record and edit clips and add narration. Present iMovies to the class at the end, something like a showcase.

Supporting files & links

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Wait Blocks, How does it work Animation Add on... (series 2)
Youtube- *http://bit.ly/wait-blocks*

Light Blocks, How does it work Animation Add on... (series 3)
Youtube- *http://bit.ly/light-blocks-1*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithm of coding blocks to draw various lines, curves and turns.
- Students are able to describe the environmental impact of city planning.
- Students describe a variety of environmental features and resources.
- Students have an understanding of human needs .
- Students demonstrated their knowledge of the components of a map.

Category/Level Criteria	*Level 1 Poor performance*	*Level 2 Needs improvement*	*Level 3 Adequate*	*Level 4 Excellent*
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Lesson 04

Expressive Stories

Grades K - 1 ***60 mins***

MatataBot had a busy day! Help retell the story of MatataBot's day and the many emotions he felt by coding and drawing three emotion faces to go with the story.

Learning standards found on Pg. 147

Expressive Stories

Lesson 04

Grades K - 1

60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
During the presentations, seat students altogether or if other instructors are available, split the students into two or three groups to keep the total presentation time to a reasonable length.

Big ideas & essential questions

Emotions permeate our being, guide our ability to learn and have relationships, and help us maintain a healthy mental state. Teaching students the RULER skills and providing visual context (*ttps://www.naeyc.org/resources/pubs/yc/mar2017/teaching-emotional-intelligence*) will go a long way in their emotional and overall development.

What are you feeling? What does a feeling "look" like? How can we represent that?

Expressing and sharing feelings in a healthy way can help us feel better and feel acknowledged. Storytelling can help us do that. What are the parts of a story? What does a good story have to include?

Learning outcomes

TSWBAT : the students will be able to:

1) Identify and describe a variety of human emotions

2) Use **Set Speed**, **Wait**, **Stop the Right** / **Left Wheel** and **Number** blocks to code circles.

3) Create and share a 3 part story.

What you'll do

MatataBot had a busy day! Help retell the story of MatataBot's day and the many emotions he felt by coding and drawing three emotion faces to go with the story.
Using a graphic organizer, students write/draw a short story of MatataBot's experience in a day and include a different emotion in each part: beginning, middle, and end.
Code the face circle and two eyes. Challenge students to code other facial features!

What you'll need

- Class set of Matatalab Pro set and Animation
- Add-On set
- Markers for MatataBots
- Roll of white craft paper
- Markers, crayons
- Tape
- Scissor for cutting the craft paper
- Graphic organizer: Beginning, Middle, End
- Projector and instructor computer/tablet
- Wifi or pre downloaded computer files or printed pages of reference pictures of Emotions faces from the List of Supporting Files

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions..
- Set up Projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper for each student group.
- Create a sample story and 3 emotion faces.
- Create, label and display the options for creating emotion faces as shown in:
  Interactive Printable Emotions Face Autism & Social Skills Tool:
  Images- *http://bit.ly/print-emotions*

Introduction

10 mins

1) Begin by telling/reading your story sample and ask students which emotions you expressed in the story.

2) What other emotions do we experience? (happy, sad, angry, anxious, disappointed, excited, afraid)

3) How do we react when we feel angry or happy? How do other people know we are angry or happy?

4) Show and explain the **Mood Meter Image:**
Image- *http://bit.ly/mood-meter-1*

5) Model where the emotions in your story would be categorized on the mood meter.

6) MatataBot would like you to help him tell a story about his day and learn about expressing his emotions. What are some examples of what might have happened to MatataBot today?

7) How do we organize a story? What do we have to tell the audience?

8) Show graphic organizer. They can write one or two sentences per part or draw a picture.

9) What do we tell the audience in the beginning? Characters, setting, what they are doing

10) What do we tell the audience in the middle? Problem.

11) What do we tell the audience in the end? Solution and ending.

Guided practice

10 mins

1) Show and name the different **Set Speed** blocks and use them to collaboratively model a simple code for a large circle. Don't forget to mention the importance of the **Stop the Right** / **Left Wheel** blocks.

2) Show and explain how to place **Number** blocks. Allow Students to experiment to determine how these **Number** blocks affect the code and MatataBot output.

3) To help coding a large circle, show video clip, **How does it work Animation… (series1)** [3:25 - 4:50]
Youtube- *http://bit.ly/set-wheel-blocks*

4) To help coding the eyes (2 tangent circles), show video clip, **Wait** Blocks, **U-turn** and 2 **tangent circles** **How does it work Animation Add on… (series 2)** [4:35 - 5:29]
Youtube- *http://bit.ly/wait-blocks*

Independent practice

35 mins

1) Challenge students to first write their story. Think about where MatataBot is and what he is doing to get them started.

2) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first. As young engineers, they should test their code to make sure that MatataBot's wheels and marker hole stay completely on the paper. They should use their problem solving skills to find a solution if MatataBot drives off the paper or the wheels get caught on the edge of the paper.

3) Then code and draw three large circles.
Next, code and draw the 2 tangent circles for the eyes of each face.
If there is time, some students may want to code and draw the expressive mouth, others may want to just draw it by hand.

4) Have students present their stories while displaying the three emotion faces that go with it.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) What strategies did you use to help you code the circles?

3) How did you represent the emotion (sad, happy, angry, etc.) on the emotion face you drew?

4) How do the Number blocks change MatataBot's motion?

5) How many parts are there in a story?

Interdisciplinary & 21st century connections

This lesson can be used in Language to help teach topics within the Communication and Writing strand and Science and Technology. This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Technology literacy
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills

Modifications

Students can use artist warm-up cards and the **Directional** blocks from the Pro set to help them get started on coding 2-D shapes.

Have a small group of students co-create code for the face circle with you at one MatataBot/Control Board/Command Tower station. They can then bring over their Control Board, copy the code and take the board back to their station.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow student to work alone and independently experiment with animation blocks or the artist warm-up cards.

Extension activities:

- What other features can MatataBot add to your facial expressions (a mouth, hair, eyebrows, etc.)? Colour and decorate the drawing.

Supporting files & links

Mood Meter Image
Image- *http://bit.ly/mood-meter-1*

Interactive Printable Emotions Face Autism & Social Skills Tool
Website- *http://bit.ly/print-emotions*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1) [3:25 - 5:29]
Youtube- *http://bit.ly/set-wheel-blocks*

Wait Blocks, U-turn and 2 tangent circles How does it work Animation Add on... (series 2) [4:35 - 5:29]
Youtube- *http://bit.ly/wait-blocks*

Three Part Story Graphic Organizer
Image- *http://bit.ly/story-graphic-organizer*

Inside Out Teaching Emotions
Article- *http://bit.ly/emotional-intelligence-1*

Firmware Upgrade:
MatataBot- *http://bit.ly/upgrade-firmware*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate the critical thinking involved in determining how to code various sized circles.
- Students are able to show evidence of organizational writing of their short story using the graphic organizer.
- Students were able to clearly communicate and share their story.
- Students were able to apply the correct emotions for the events in their story.
- Students successfully completed coding three large face circles.

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
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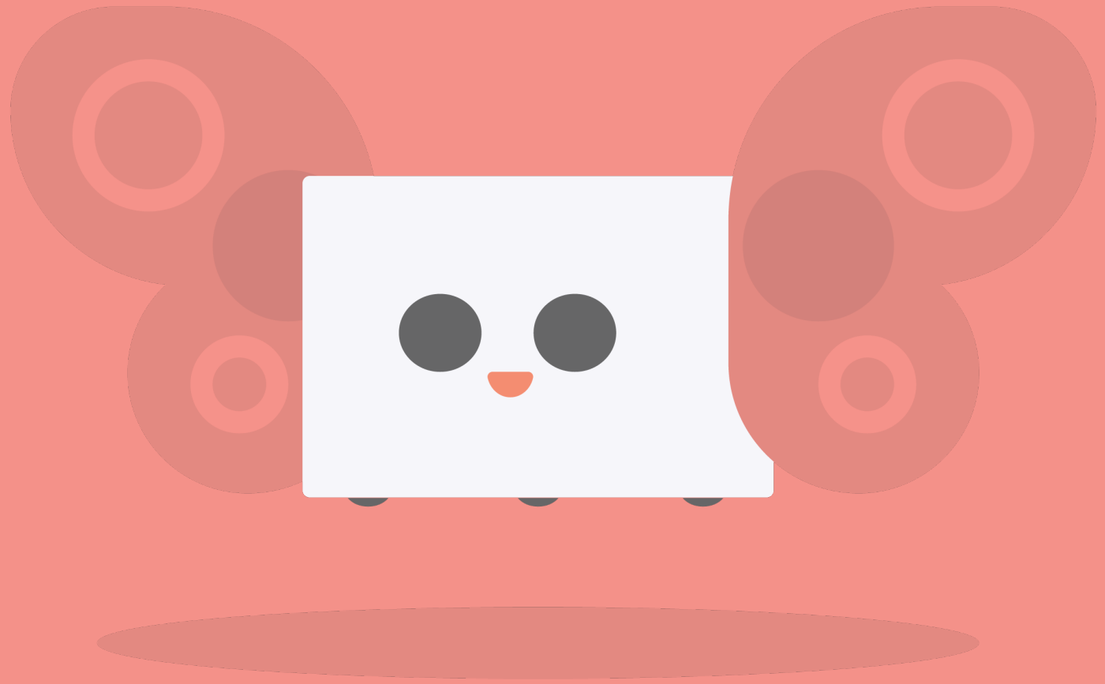
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Metamorphasis

Grades 2 ***60 mins***

From beast to beauty, the life cycle of the butterfly is fascinating! Code and draw a sine wave caterpillar and a beautifully metamorphosed butterfly with the help of MatataBot.
Learning standards found on Pg. 149



Metamorphasis

Lesson 05

Grades 2
60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.

Big ideas & essential questions

The differential motion of MatataBot's two wheels will require students to experiment with the **Set Speed** blocks in order to draw the sine wave to represent the caterpillar body. This experience will enforce their spatial sense of rotation, left, right, clockwise, and counterclockwise movements. They will also gain an understanding of the relationship between the **Number** blocks, wheel speed and circle diameter.

Throughout the life cycle of the butterfly, the physical characteristics of each stage has both many differences and many similarities. Describe the physical characteristics of the larvae, caterpillar and butterfly stages?
How are they the same or different?

The properties of the 2-D shapes include sides and vertices. What 2-D shapes best represent the physical features of the butterfly?

Learning outcomes

TSWBAT : the students will be able to:

1) Understand and recognize the properties of 2-D shapes .
2) Represent real life objects with compositions of 2-D shapes.
3) Identify the stages of the butterfly life cycle.
4) Identify and compare physical characteristics of a larvae, caterpillar and butterfly.

What you'll do

From beast to beauty, the life cycle of the butterfly is fascinating! Code and draw a sine wave caterpillar and a beautifully metamorphosed butterfly.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots
- Roll of white craft paper
- Markers, crayons
- Tape
- Scissors to cut craft paper
- Projector and instructor computer/tablet
- Wifi or pre-downloaded computer files or printed pages of reference pictures of Metamorphic stages from the List of Supporting Files

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper for each student or each group of 2 students.

Introduction

5 mins

1) As we study animals and their environment, we will also will discover that animals, like people, go through different stages as they grow.

2) One animal that goes through very big changes is the butterfly. This picture shows the different life cycle stages (metamorphosis) of the butterfly.

3) Review each stage using:
Metamorphosis Butterfly Life Cycle Stages
Image- *http://bit.ly/metamorphosis-pic-1*

4) Point out two pictures in particular: the caterpillar and the butterfly.

   a) What are the characteristics of each?

   b) Ask the students what is similar and what is different and why.

Guided practice

10 mins

1) We are going to use our MatataBots to draw a caterpillar and a butterfly using lines and 2-D shapes. How can you represent a caterpillar using 2-D shapes and lines? A butterfly?

2) Three ways to code:
One way to code, is to draw individual circles next to each other as per this clip: **Set Wheel Blocks**, **Drawing Circles** **How does it work Animation Add on... (series 1)** [3:25 - 4:50]
Youtube- *http://bit.ly/set-wheel-blocks*

3) Or code a simple sine wave to represent the caterpillar as per this clip:
Sine wave coding: Matatalab STEAM CodingRobot Animation add-on (story version) **Draw Circle & Make a U-turn** [1:10 - end]
Youtube- *http://bit.ly/circle-uturn*

4) Or a couple of sets of tangent circles: **Wait** Blocks, **U-turn** and **2 tangent circles** **How does it work Animation Add on... (series 2)** [4:35 - 5:50]
Youtube- *http://bit.ly/wait-blocks*

5) Students can add detailed characteristics such as antennae, eyes, etc. by hand.

6) Guide a discussion on how they might use the **Set Speed**, **Stop Wheel**, and **Number blocks** to code the butterfly.
What 2-D shapes can we use to represent the butterfly? Oval and triangles.

7) They can use the u-turn example from this clip to create the body:
Wait Blocks, **U-turn** and **2 tangent circles** **How does it work Animation Add on... (series 2)**
Youtube- *http://bit.ly/wait-blocks*

8) Collaboratively model a simple code for a half circle. Don't forget to mention the importance of the **Stop the Right** / **Left Wheel** blocks.

9) Show and explain how to place **Number** blocks. Allow Students to experiment to determine how these **Number** blocks affect the code and MatataBot output.

Independent practice

40 mins

1) Challenge the students to code and draw the caterpillar as well as a butterfly.

2) Add physical characteristics of each stage.

3) Colour and decorate to complete your drawings!

4) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first. Students should test their code to make sure that MatataBot's wheels and marker hole stay completely on the paper. They should use their problem solving skills to find a solution if MatataBot drives off the paper or the wheels get caught on the edge of the paper.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Why did you choose to represent the caterpillar with those shapes/lines?

3) How do the **Number** blocks change MatataBot's motion?

4) How does metamorphosis work?

Interdisciplinary & 21st century connections

This lesson can be used in Science and Technology Growth and Changes in Animals as well as Mathematics to help teach topics within Geometry and Spatial sense (creating 2-D compositions and relating properties of 2-D figures). This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Students can use the artist warm-up card and Directional blocks from Pro set to help them get started on coding triangles for their group's butterfly wings.

Have a small group of students co-create code with you at one MatataBot/Control Board/Command Tower station. They can then take turns having MatataBot draw the caterpillar and butterfly body or bring over their Control Board, copy the code and take it back to their station.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow students to work alone and independently experiment with animation blocks or the artist warm-up cards.

Extension activities:

- Create the wing coding using half/whole hearts. Label the characteristics of the caterpillar and the butterfly. Add detail and colors of a specific species.

Supporting files & links

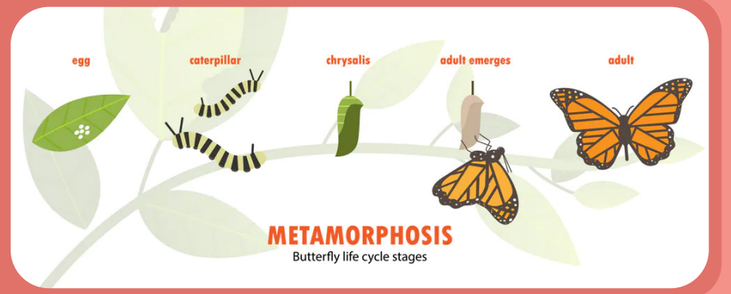
Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1) [3:25 - 4:50]
Youtube- *http://bit.ly/set-wheel-blocks*

Heart & Dancing, Matatalab Cross-Curricular Arts&Music Drawing&Dancing
Youtube- *http://bit.ly/heart-dancing*

Sine wave coding, Matatalab STEAM CodingRobot Animation add-on (story version)
Draw Circle & Make a U-turn [1:10 - end]
Youtube- *http://bit.ly/circle-uturn*

Wait Blocks, U-turn and 2 tangent circles How does it work Animation Add on... (series 2) [4:35 - 5:50]
Youtube- *http://bit.ly/wait-blocks*

Metamorphosis Butterfly Life Cycle Stages
Image- *http://bit.ly/metamorphosis-pic-1*



Marian Big Ideas K-3
Document- *http://bit.ly/big-ideas-2*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate their choices of lines and 2-D shapes to compose drawings.
- Students are able to communicate, using science and technology vocabulary, the physical characteristics of a caterpillar and a butterfly.
- Students are able to communicate sufficient understanding and knowledge of their coding logic to create 2-D shapes.
- Students collaborated successfully with their partner(s) to complete the coding and drawing of the two butterfly stages.

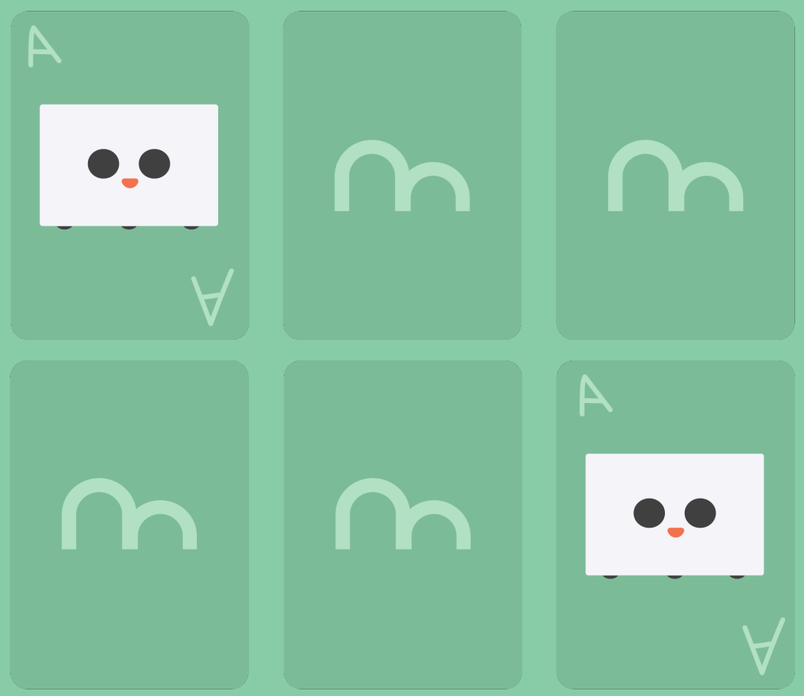
Category/Level Criteria	*Level 1 Poor performance*	*Level 2 Needs improvement*	*Level 3 Adequate*	*Level 4 Excellent*
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Memory Matching Game

Grades K - 1 ***60 mins***

An old game made new again! Memory Games can be played in so many different ways but have you ever played it using a robot? Use MatataBot to both draw the memory cards and play a game with you and your friends.

Learning standards found on Pg. 151



Memory Matching Game

Grades K - 1

60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
During the games, there should be enough space for groups of up to 8 students to gather to play a Memory Game.

Big ideas & essential questions

The algorithm or the set of rules that the students code to draw a square with MatataBot uses the ordered properties of the shape, edges and vertices, in a repetitive pattern.

As they play the Memory Game in a group they will encounter pairing, sorting and shuffling. How many pairs of cards did your group have? How many pairs did you collect? How many other ways can they be sorted?

Learning outcomes

TSWBAT : the students will be able to:

1) Describe the properties of a square.
2) Code an algorithm to produce a square driving pattern.
3) Extract the core pattern in their coding algorithm.
4) Sort objects in various ways.
5) Count by 2's.

What you'll do

Using Animation Add-on blocks, each pair of students codes and has MatataBot draw two squares for each student. Each student should decorate both squares with the same design, then cut them out. Group students into groups of 6-8 students and have them combine, shuffle and layout their squares to play a memory matching game.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Projector with tablet or computer
- Markers for MatataBots
- Markers, crayons
- Scissors
- Prepare a sample pair of cards
- White copy paper, 2 pieces for each student to create a pair of cards, although they should be able to draw both squares on one sheet (card stock will be more sturdy for handling during the games)
- Tape to tape down corners of the paper while MatataBot draws

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Clear as many areas as needed for groups of 6 to 8 students to gather to play the Memory Game.
- Set up projector with tablet or computer

Introduction

5 mins

1) What card games have you played? How do you play Memory? What do you need to play the game? What is a pair of objects? What makes them a pair? Give me an example of other pairs of things.

2) We are going to learn how to use MatataBot to help us make our own memory cards so we can play the Memory Game with the cards you create.

Guided practice

5 mins

1) Ask the students to stand up and walk as if they were tracing a square on the floor. Have them describe the algorithm, or set of rules they used to complete the square.

2) If you write the algorithm on the board as they recite it to you and read it together as a class, ask what they notice about the algorithm. They will find that there is a pattern. What is the core pattern? How many times does it repeat?

3) Model and review the different **Set Speed**, **Stop the Right** / **Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number blocks** (ask students about the relevance of these blocks) to vary the length of a line. The shortest length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block.

4) You can also show the video clip **How does it work Animation Add on... (series 2)** [1:38 - 3:35] Youtube- *http://bit.ly/wait-blocks*

5) Using **Angle** blocks will allow for simple coding of 90 degree turns.

Independent practice

45 mins

1) Challenge the students to code the MatataBot to draw two squares per student using the Animation Add-on blocks as indicated above.

2) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first. Choose a spot near one corner of the paper for MatataBot to start at. As young engineers, they should test their code to make sure that MatataBot's wheels and marker hole stay completely on the paper. They should use their problem solving skills to find a solution if MatataBot drives off the paper or the wheels get caught on the edge of the paper.

3) Once they have the two squares drawn, they should decorate only one side of each pair in the same manner so that they have a pair of the same card design. Cut out the squares. Each student should decorate their pair differently from their partner's pair.

4) Begin to gather the students who have finished into groups of 6 to 8 students. They should carefully and respectfully handle the cards when they shuffle and arrange the cards face down.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) How many ways can you sort these cards?

3) What strategies did you use to help you collect a pair of cards?

4) How big was the square that MatataBot drew?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Geometry and Spatial Sense strand (creating and understanding properties of 2-D figures) and Patterning strand (sorting) as well as Science and Technology. This lesson could also be co-taught with another content area teacher so that student drawings are created to reflect relevant content on their cards.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Students can use the artist warm-up card and the **Directional** blocks from Pro set to help them get started on coding a single square.
Have a small group of students co-create code with you at one MatataBot/Control Board/Command Tower station. They can then take turns having MatataBot draw their two square cards or bring over their Control Board, copy the code and take the board back to their station.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place students in a group of 3.

- Allow students to work alone and independently experiment with animation blocks or the artist warm-up cards.
- Use another student's coding to draw the 2 squares. Student can now decorate the 2 squares.

Extension activities:

- Challenge students to use the **Loop Begins** / **Ends** blocks to shorten their code. Explain that it is important to keep the code short so that less mistakes are made and it is easier to read and edit.
- Another way to play the Memory Game is to have students evenly place their shuffled cards in two lines with their cards faced down. Ideally, each row should contain one of each card. One group of 6-8 students should split up into two teams. With one set of MatataBot, Command Tower and Control Board, each student can take a turn to code MatataBot to drive from one card in line 1 to a card in line 2. Turn each of those cards over to see if they match!

Supporting files & links

Wait Blocks, How does it work Animation Add on... (series 2)
Youtube- *http://bit.ly/wait-blocks*

Marian Big Idea K-3
Document- *http://bit.ly/big-ideas-2*

Firmware Upgrade:
MatataBot- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithm of coding blocks required to draw a square.
- Students are able to communicate, using mathematical vocabulary, the 2-D properties such as vertices, edges and faces.
- Students collaborated successfully with their partner(s) to complete the two Memory Game cards.
- Students were able to share their thinking for a sorting rule.

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Olympic Rings

Grades 1 - 2 ***60 mins***

MatataBot is getting dizzy as it draws the Olympic Rings logo! Why do we have logos anyway? Do you know what MatataBot's logo is?
Learning standards found on Pg. 153

Olympic Rings

Grades 1 - 2
60 mins

Create student groups of 2 or 3 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.

Big ideas & essential questions

The differential motion of MatataBot's two wheels will require students to experiment with the **Set Speed** blocks in order to draw the circles for the Olympic Rings. This experience will enforce their spatial sense of rotation, left, right, clockwise, and counterclockwise movements. They will also gain an understanding of the relationship between the **Number** blocks, wheel speed and circle diameter.

As students create code for art, they are unpacking what they already know about geometric shapes and properties and in this case, specifically, circles. What are the properties of a circle?

Media takes many forms and we are constantly subjected to it whether it is a poster, logo, commercial, or tv show. Logos hold a unique purpose for a company. What is the purpose of a logo? What elements are important in the creation of a logo?

Learning outcomes

TSWBAT : the students will be able to:

1) Understand that each of MatataBot's wheels can be separately set to a different speed and direction.

2) Code MatataBot to compose a drawing of the Olympic Rings.

3) Understand the origin of the Olympic Rings.

4) Understand and identify logos as a form of media.

What you'll do

MatataBot is getting dizzy as it draws the Olympic Rings logo! Why do we have logos anyway? Do you know what MatataBot's logo is?

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots, be sure to have multiples of the Olympic Colors, black, red, green, yellow, and blue
- Roll of white craft paper
- Tape
- Scissors
- Projector and instructor computer/tablet
- Wifi or pre downloaded computer files or printed pages of reference pictures of the Olympic Rings from the List of Supporting Files

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper for each student group.

Introduction

10 mins

1) Display the following image of common logos:
   Logos - Custom Design - Turbo Printers
   Image- *http://bit.ly/olympic-rings-1*

2) Which of these are familiar? Why do companies produce logos?
   What do you think are important elements in producing a good logo?

3) While displaying the Olympic Rings image, assess the students' knowledge of the symbol and the event.

4) **Olympic Rings Image**
   Image- *http://bit.ly/olympic-rings-2*

5) The logo was designed in 1912 by Baron Pierre de Coubertin. The 5 rings symbolized the number of active participating countries at the time. The colors symbolize all the colors in the flags of those countries: white, black, red, blue, green and yellow.

6) You will code to draw a replica of the Olympic Rings with MatataBot today.

Guided practice

10 mins

1) What do we need to know about the coding blocks to be able to code the rings?

2) Model and review the different **Set Speed**, **Stop the Right**/**Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks) to vary the length of a line. The shortest line length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block.

3) You can also show the video clip **How does it work Animation Add on... (series 2)** [1:38 - 3:35]
   Youtube- *http://bit.ly/wait-blocks*

4) For drawing circles, review this video: **Set Wheel** Blocks, **Drawing Circles** **How does it work Animation Add on... (series 1)**
   Youtube- *http://bit.ly/set-wheel-blocks*

Independent practice

35 mins

1) What details do we have to consider to copy this logo image? Colors, overlapping
   Experiment to find the right size circle for your logo image. Take turns with your partner to share ideas. How will you plan your drawing so that all five circles fit easily on the paper?

2) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first to make sure the circle will be drawn where you want it and so that MatataBot does not drive over the edge of the paper.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Why did you choose the circle sizes in your drawing?

3) What strategies did you use to help you code the circles?

4) How do the **Number** blocks change MatataBot's motion?

5) What did the different colors of the Olympic Rings originally represent?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Geometry and Spatial Sense strand (creating and understanding properties of 2-D figures), Language (media) and Science and Technology. This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Have a small group of students co-create code with you at one MatataBot/Control Board/Command Tower station. They can bring over their Control Board, copy the code and take the board back to their station.

Accommodations

- Provide a black and white image of the Olympic Rings and have the student color the rings with the correct colors.

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow the student to work alone and independently experiment with Animation blocks.

Extension activities:

- Code and draw the outline of a rectangle around the rings and cut out the Olympic Flag.
- Set MatataBot on the first ring and program it to drive from one ring to the other while changing the **Right**/**Left LED Color** light blocks to match the ring color as it drives through it!

Supporting files & links

Logos - Custom Design - Turbo Printers
Image- *http://bit.ly/olympic-rings-1*

Olympic Rings Image
Image- *http://bit.ly/olympic-rings-2*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Wait Blocks, How does it work Animation Add on... (series 2)
Youtube- *http://bit.ly/wait-blocks*

What Do The Olympic Rings and Flame Represent?
Article- *http://bit.ly/olympic-rings-3*

Firmware Upgrade:
MatataBot- *http://bit.ly/upgrade-firmware*

Light Blocks, How does it work Animation Add on... (series 3)
Youtube- *http://bit.ly/light-blocks-1*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithm of coding blocks to draw a circle.
- Students are able to communicate, using mathematical vocabulary such as clock-wise, counterclockwise, left and right.
- Students can identify the purpose of company logos.
- Students collaborated successfully with their partner(s) to complete the coding and drawing of the five Olympic rings.

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
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Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Concentric Shapes

Grades 2 - 3 ***60 mins***

Let MatataBot mesmerize you by coding it to draw 3 concentric shapes! Then get creative and change the code so that the original shape becomes a slightly different shape [eg. circle becomes two different sized ovals, equilateral triangle becomes two other types of triangle (obtuse, acute, isosceles, right), square becomes a rectangle, rhombus, parallelogram, or 2 triangles, a triangle becomes a prism, etc]. Shapeshifting!
Learning standards found on Pg. 155

Concentric Shapes

Lesson 08

Grades 2 - 3
60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table.
Allow a safe space for each group to work around a sheet of craft paper and their MatataBot set.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials and to facilitate a gallery walk.

Big ideas & essential questions

As students create code and draw, they are unpacking what they already know about geometric shapes and their properties. What are the similarities or differences of the concentric geometrical shapes?

Look at shapes differently. Students will decompose and reassemble a 2-D shape by changing one or more of its attributes. For example, how can I change a square into a parallelogram? Which attribute(s) should be changed and how should they be changed?

How many shapes or partial shapes can you identify in a familiar object? Everyday objects may have the attributes of more than one partial or whole shape (eg, a 2-D Santa hat is composed of a pom-pom circle at the top, a red triangle in the middle and a long oval of fur at the bottom).

Learning outcomes

TSWBAT : the students will be able to:

1) Identify and describe a variety of polygons.
2) Use **Directional**, **Set Speed** and **Angle** blocks to code a 2-D shape.
3) Modify the shape code to create concentric polygon shapes.
4) Modify the shape code to create other shapes.

What you'll do

Students will code MatataBot to draw 3 concentric shapes. They will choose one shape then code and draw it in 3 different sizes.
For the shapeshifting challenge, students will choose one shape but change one or two aspects of the code that directly correlate to shape properties so that it becomes a slightly different shape. They should try to create two variations of the original shape [eg. a circle becomes two different sized ovals, equilateral triangle becomes two other types of triangle (obtuse, acute, isosceles, right), square becomes a rectangle, rhombus, parallelogram, or becomes 2 triangles, a triangle becomes a prism, etc].

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Artist warm-up cards from Pro set
- Projector/Display Screen along with Computer/Tablet
- Markers for MatataBots
- Pencils
- Roll of white craft paper
- Scissor to cut craft paper
- Tape
- Rulers
- Visual models of different sizes of the same shape, concentric shapes or PowerPoint slides

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- If using a roll of craft paper, precut two sheets (approx 24 inches x 24 inches) per group. One sheet for each challenge.

Introduction

5 mins

1) Show a picture of the **3 Pyramids of Giza, Egypt**
   Image- *http://bit.ly/concentric-shapes-1*
   Image- *http://bit.ly/concentric-shapes-2*

2) Ask, "What do you observe about these 3 shapes?", "What are the similarities or differences of these three pyramids?

3) Ask, "What 2-D shapes are combined to create a 3-D pyramid?"

4) Explain the word "concentric" then, for inspiration, show and discuss the sample of Wassily Kadinsky's **Color Study. Squares with Concentric Circles for inspiration:** *http://bit.ly/concentric-shapes-3*

5) For our mural today, we are going to code MatataBot to draw three concentric shapes. Then, as a second challenge, we are going to use that same shape code to create a whole new shape, like a shapeshifter!

Guided practice

10 mins

1) Review the shape coding sheets that used **Directional** blocks to code a shape.

2) Today we are going to replace some of the **Directional** blocks with **Set Wheel** blocks to give us more flexibility. Keeping the **Angle** blocks will allow for simple coding of turns.

3) Show and name the different **Set Wheel** blocks and use them to collaboratively model a simple code for a triangle. Don't forget to mention the importance of the **Stop Wheel** blocks.

4) Model and explain **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks) to vary the length of the line. You can show the video clip **How does it work Animation Add on... (series 2)** [1:38 - 3:35]
   Youtube- *http://bit.ly/wait-blocks*

5) How can we shorten our coding sequence? Introduce **Loop Begins** / **Ends** blocks and have students find the core pattern in the code sequence. **Loop** blocks are used on the artist warm-up cards.

6) How do you think you can change the size of this triangle to make a bigger/smaller one? "Good predictions!" Now it is time for you to experiment!

Independent practice

35 mins

Challenge 1 *15 mins*

- Challenge students to choose a shape and code MatataBot to draw 3 sizes of the same shape, one inside the other to create 3 concentric shapes.

- Test the code without the marker at first to make sure the code is correct and that MatataBot does not drive off the paper.

> How do you think you can change the size of this triangle to make a bigger/smaller one? Good predictions! Now it is time for you to experiment!

Challenge 2 *20 mins*

> Using one group's shape drawing and code as a model, explain that the shape can be changed into another shape by changing/adding a few blocks.

> Collaboratively brainstorm what changes would need to be made if, for example,they were to change the equilateral triangle into an obtuse triangle.

> Collaboratively brainstorm what changes would need to be made if a square were to change to a different rhombus shape or a circle was changed into an oval.

> Challenge students to create two new shapes by modifying their original code.

Wrap up

10 mins

Students will carefully put away all MatataBot components.

Ask the following questions:

1) Students will carefully put away all MatataBot components and other materials.
2) What part of the code did you change to create the concentric shapes?
3) What attribute did that affect?
4) What was similar or different about your concentric shapes?
5) What new shape did you create and what blocks did you change/add to do it?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (recognizing and describing 2-D shapes) as well as Science and Technology. This lesson could also be co-taught with the Visual Arts teacher. It can be tied in to Visual Arts with a reference to Squares With Concentric Rings by Wassily Kadinsky.

21st Century Skills include:

> Critical thinking
> Creativity
> Collaboration
> Communication
> Flexibility
> Leadership
> Initiative
> Productivity
> Social Skills
> Technology Literacy

Modifications

Students can use Shape coding sheets and **Directional** blocks from Pro set to code the concentric shapes.

Accommodations

> Pair student heterogeneously to optimize co-teaching of prior knowledge.

> Place student in a group of 3.

> Allow student to work alone and independently experiment with animation blocks.

> If you have a Controller from the Sensor Add-on set, connect a Controller in Control Mode to their MatataBot and model how to use the various buttons. Scaffold to Coding Mode and challenge student according to their progress.

Extension activities:

> Code more complex shapes by finding the right combination of angles and number of sides, like pentagons or hexagons.

Supporting files & links

Pyramids of Giza, Egypt:
Image- *http://bit.ly/concentric-shapes-1*
Image- *http://bit.ly/concentric-shapes-2*

Colour Study
Image- *http://bit.ly/concentric-shapes-3*

Wait Blocks, How does it work Animation Add on... (series 2) [0:00 - 4:35]
Youtube- *http://bit.ly/wait-blocks*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Firmware Upgrade:
MatataBot- *http://bit.ly/upgrade-firmware*

Guides to Effective Instruction in Mathematics Grades 1 to 3
Document- *http://bit.ly/math-guide-1-to-3*

Erikson Institute Early Math Collaborative, Big Ideas
Website- *http://bit.ly/early-learning-erikson*

Assessment

Student's work will be assessed in the following manner:

- Able to communicate, using mathematical vocabulary, the similarities and differences of concentric shapes.
- Able to identify, using mathematical vocabulary, the attributes of various geometrical shapes.
- Able to communicate sufficient understanding and knowledge of their coding logic to create 2-D shapes.
- Collaborated successfully with their partner(s) to complete at least 2 concentric shapes.

Category/Level Criteria	*Level 1 Poor performance*	*Level 2 Needs improvement*	*Level 3 Adequate*	*Level 4 Excellent*
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

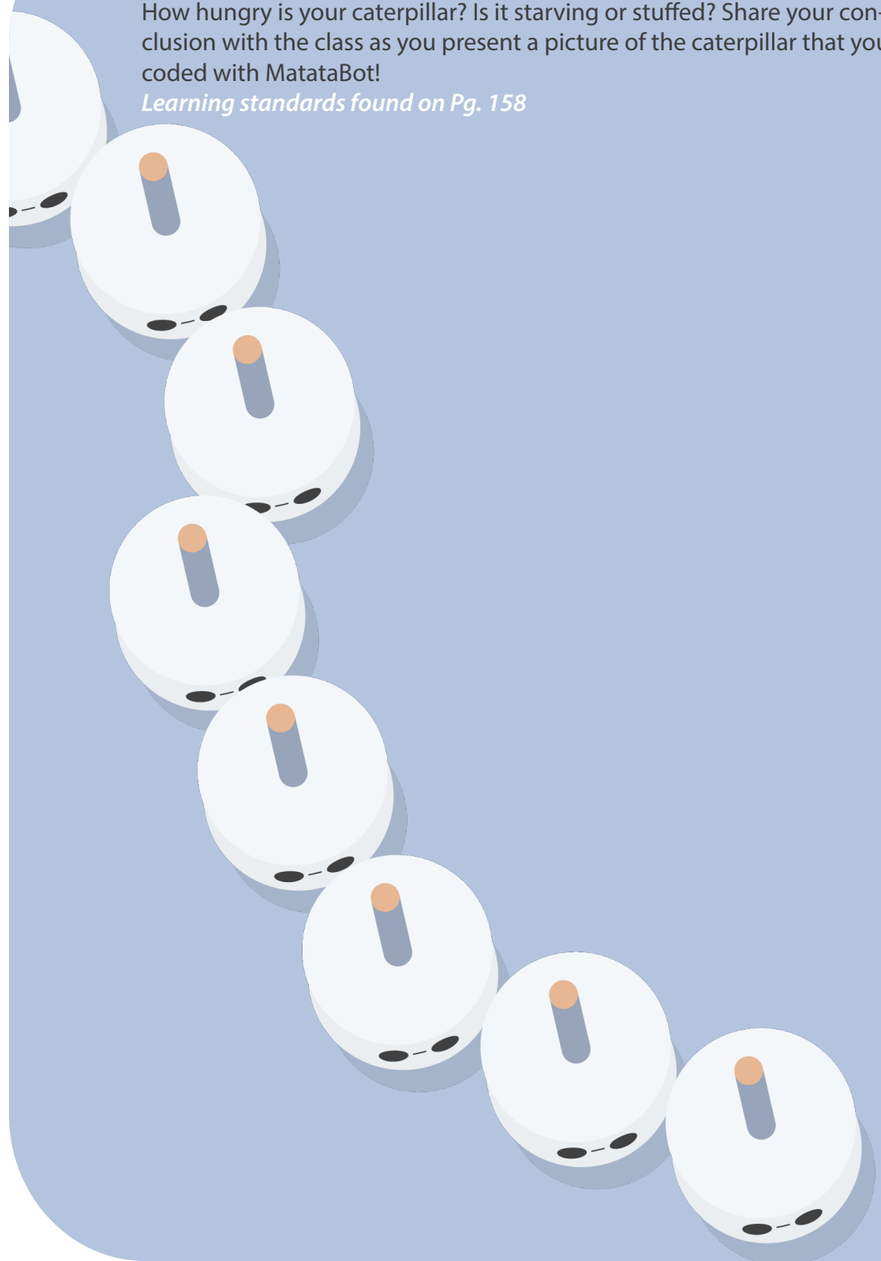
Lesson 09

Caterpillar

Grades 1 - 2 ***60 mins***

How hungry is your caterpillar? Is it starving or stuffed? Share your conclusion with the class as you present a picture of the caterpillar that you coded with MatataBot!

Learning standards found on Pg. 158



Caterpillar

Lesson 09

Grades 1 - 2

60 mins

Create student groups of 1 or 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
During the presentations, seat students altogether or if other instructors are available, split the students into two or three groups to keep the presentation time to a reasonable length.

Big ideas & essential questions

The differential motion of MatataBot's two wheels will require students to experiment with the **Set Speed** blocks in order to draw the circles for the caterpillar body. This experience will enforce their spatial sense of rotation, left, right, clockwise, and counterclockwise movements. They will also gain an understanding of the relationship between the **Number** blocks, wheel speed and circle diameter. What was their strategy to code the circle sizes they had MatataBot draw?

How did they represent the eating stage of their caterpillar? What might be the difference in representing a young caterpillar or one that is close to its pupa stage?

Learning outcomes

TSWBAT : the students will be able to:

1) Understand that Differential Motion means that each wheel can be separately set to a different speed and direction.

2) Code MatataBot to draw contiguous circles of various diameters using **Set Speed blocks**, **Stop the Right** / **Left Wheel** blocks and **Number** blocks.

3) Choose the size of the circles to represent the stage of the caterpillar.

What you'll do

Discuss the different stages/sizes of a caterpillar. Students will determine which stage they want to draw and should reflect their decision in the size of their drawn caterpillar. This is a good introduction to drawing curves and circles. Code and have MatataBot draw 3 to 5 contiguous circles and understand how differential motion contributes to achieving that shape. Students will colour and add detail to complete the caterpillar then present and explain their drawing.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots
- Roll of white craft paper
- Markers, crayons
- Tape
- Scissors to cut craft paper
- Projector and instructor computer/tablet
- Wifi or pre-downloaded computer files or printed pages of reference pictures of the metamorphic stages from the List of Supporting Files

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up Projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper for each student or each group of 2 students.

Introduction

5 mins

1) As we study animals and their environment, we will also discover that animals, like people, go through different stages as they grow. One animal that goes through very big changes is the caterpillar. This picture shows us the different stages of the metamorphic) caterpillar. Review each stage.
Metamorphosis Butterfly Life Cycle Stages
Image- *http://bit.ly/metamorphosis-pic-1*

2) Point out the two pictures of the caterpillar and ask the students what is similar and what is different and why.

3) If you have extra time (at this stage or after the class), share the reading of the famous book that illustrates what happens to a young caterpillar as it grows and changes, **Eric Carle Reads The Very Hungry Caterpillar**
Youtube- *http://bit.ly/hungry-caterpillar*

Guided practice

10 mins

1) We are going to use our MatataBots to help us draw a caterpillar.
Code and draw individual circles of various/same sizes next to each other as per this clip:
Set Wheel Blocks**,** Drawing Circles **How does it work Animation Add on... (series 1)** [3:25 - 4:50]
Youtube- *http://bit.ly/set-wheel-blocks*

2) Guide a discussion on how they might use the Set Speed, Stop Wheel, and Number blocks to code and draw the circles.

3) Demonstrate the movement of MatataBot's wheels by holding it up so students can see the wheels. Use a Set Speed block and show how one wheel moves and the other doesn't. This difference in wheel speed is called Differential Motion.

4) Show and name the different Set Speed blocks and use them to collaboratively model a simple code for a circle. Don't forget to mention the importance of the Stop the Right / Left Wheel blocks.

5) Show and explain how to place Number blocks. Allow Students to experiment to determine how these Number blocks affect the code and MatataBot output.

Independent practice

40 mins

1) Challenge the students to choose a stage of the caterpillar and to choose which circle sizes best represent it. They should draw 3 to 5 circles next to each other to create their caterpillar.

2) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first. Choose a spot near one end of the paper for MatataBot to start at. As young engineers, they should test their code to make sure that MatataBot's wheels and marker hole stay completely on the paper. They should use their problem solving skills to find a solution if MatataBot drives off the paper or the wheels get caught on the edge of the paper.

3) Once they have their caterpillar coded and drawn, they can add details with crayons or markers.

4) Spend the last 10 minutes having students present their drawings and communicate why they chose the specific circle sizes and how that relates to the stage of the caterpillar (young or close to its pupa stage?).

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Why did you choose the circle sizes in your drawing?

3) What strategies did you use to help you code the circles?

4) How do the Number blocks change MatataBot's motion?

5) How does MatataBot use Differential Motion?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Geometry and Spatial Sense strand (creating and understanding properties of 2-D figures) and Science and Technology (identifying animals, life cycles and movement). This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Students can practice using the Animation coding blocks to observe the outputs and work towards creating a circle.
Have a small group of students co-create code with you at one MatataBot/ Control Board/Command Tower station. They can then bring over their Control Board, copy the code and take the board back to their station.

Accommodations

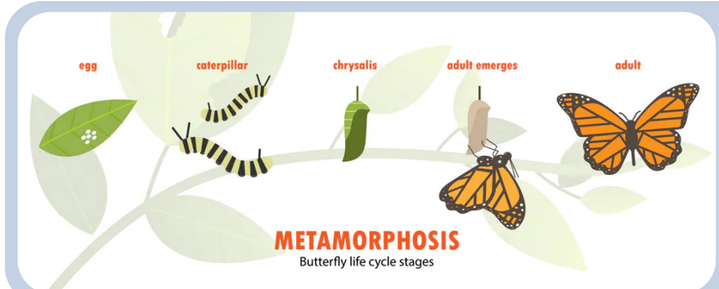
- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow the student to work alone and independently experiment with Animation blocks.

Extension activities:

- Another way to draw circles is to examine the code used in this clip:
  Wait Blocks, U-turn and 2 tangent circles How does it work Animation Add on... (series 2) [4:35 - 5:29]
  Youtube- *http://bit.ly/wait-blocks*
- Draw a second picture of the caterpillar at a different stage. Create other drawings such as a snowman - colour and decorate it!
- Experiment with the Random Number block and try to guess which size circle MatataBot will draw.

Supporting files & links

Metamorphosis Butterfly Life Cycle Stages
Image- *http://bit.ly/metamorphosis-pic-1*



Eric Carle Reads The Very Hungry Caterpillar
Youtube- *http://bit.ly/hungry-caterpillar*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1) [3:25 - 4:50]
Youtube- *http://bit.ly/set-wheel-blocks*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Wait Blocks, U-turn and 2 tangent circles How does it work Animation Add on...(series 2) [4:35 - 5:29]
Youtube- *http://bit.ly/wait-blocks*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithm of coding blocks to draw a circle.
- Students are able to communicate, using mathematical vocabulary such as clockwise, counterclockwise, left and right.
- Students collaborated successfully with their partner(s) to complete the coding and drawing of a series of three to five contiguous circles.
- Students were able to share their thinking for their chosen life cycle stage of the caterpillar.

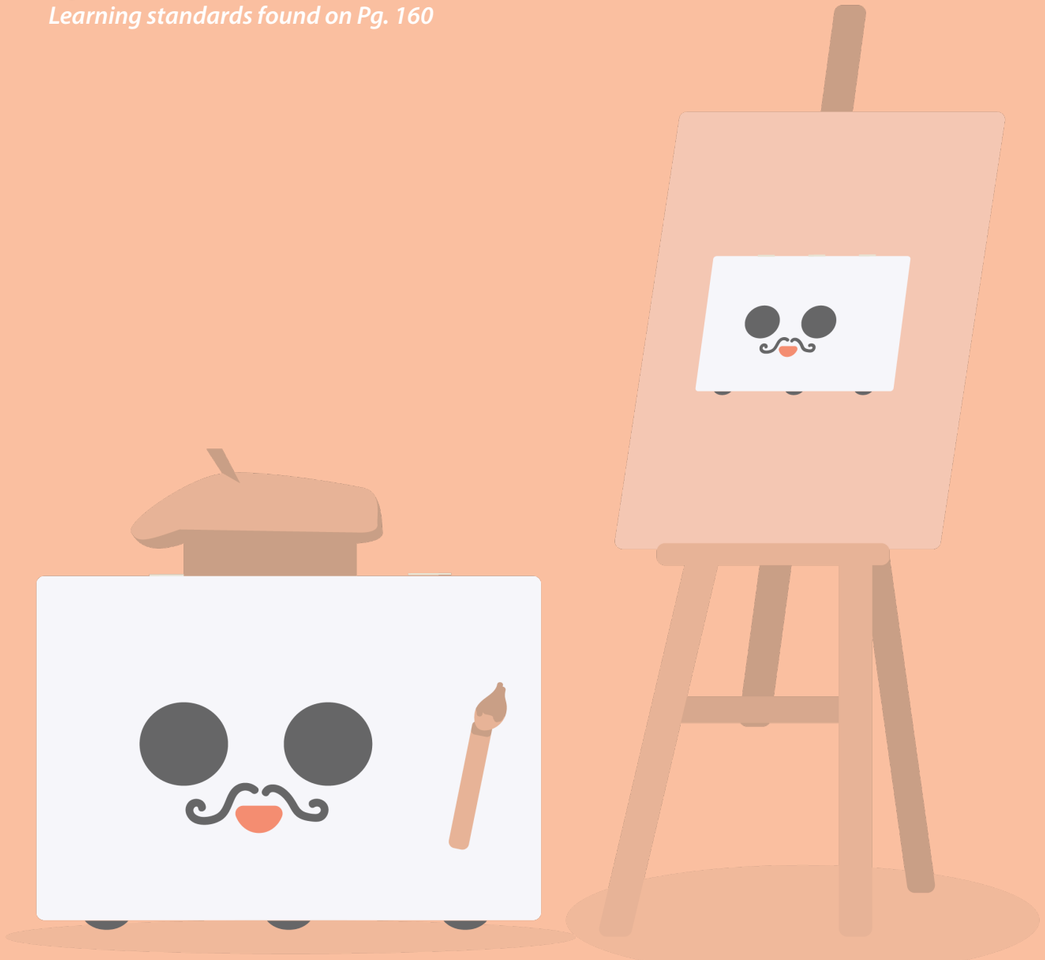
Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

All About Me

Grades 1 - 2 ***60 mins***

A self portrait, robot style! Students code and draw themselves with MatataBot using a circle for a head and a triangle or square for the body. Add legs, arms and other details and see if MatataBot created a good likeness of you!

Learning standards found on Pg. 160



All About Me

Lesson 10

Grades 1 - 2

60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow a safe space for each group to work around a sheet of craft paper and their MatataBot set.
To keep students engaged and productive, while one student is coding a shape or line, their partner can be preparing the coding blocks they need for their own next design element.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.

Big ideas & essential questions

As students create code and draw, they are unpacking what they already know about geometric shapes and properties. What are the similarities or differences of 2-D geometrical shapes?

When students code, they must disassemble and reassemble the 2-D shapes with consideration of all of their attributes. What are the similarities and differences of the shapes you drew?

This is also an opportunity to exercise spatial sense by choosing the ratios of the two main shapes. Why is the head larger than the body? How realistic is this picture?

Learning outcomes

TSWBAT : the students will be able to:

1) Identify and describe the properties of a variety of 2-D shapes.

2) Use **Directional**, **Set Speed**, **Wait**, **Stop the Right** / **Left Wheel** and **Angle** blocks to code a variety of shapes.

3) Code and draw various linear lengths.

4) Apply knowledge of proportion to body parts.

What you'll do

A self portrait, robot style! Students code and draw representations of themselves with MatataBot using two 2-D shapes for the head and body (eg. circle for a head and a triangle or square for the body). Add legs, arms and other details and see if MatataBot created a good likeness of you!

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Artist warm-up cards from Pro set
- Projector with tablet or computer
- Roll of white craft paper
- Extra white paper or scrap paper to sketch a plan
- Markers for MatataBots
- Markers, crayons
- Pencils
- Scissors
- Tape to tape down corners of the paper while MatataBot draws
- Prepare a basic sample showing the head, body, arms, legs

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or Computer.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper per student.

Introduction

5 mins

1) What is your best feature? Explain in more detail and write responses on the board.

2) MatataBot is going to create a portrait (picture) of you today but he needs a little help.

3) Show your sample and explain your choices of shape and size of shape/lines.

3) Set up projector with tablet or compute

Guided practice

10 mins

1) Review the artist warm-up cards that used **directional** blocks to code a shape.

2) Today we are going to replace the **Move Forward** blocks with **Set Speed** blocks. **Angle** blocks will allow for simple coding of turns.

3) Model and review the different **Set Speed**, **Stop the Right** / **Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks) to vary the length of a line or draw a circle. The shortest line length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block.

4) You can also show the video clip, **How does it work Animation Add on... (series 2)** [1:38 - 3:35]
Youtube- *http://bit.ly/wait-blocks*

Independent practice

40 mins

1) MatataBot is going to be the artist today but he needs your help to show him your best features.

2) You will code and draw two, 2-D shapes - one to represent your head and another to represent your body. You can also code to draw lines for limbs. Use the extra paper to draw a sketch of what you are going to code MatataBot to draw. You can also use this paper for MatataBot drawing practice.

3) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first to make sure the shape will be drawn where you want it and so that MatataBot does not drive over the edge of the paper.

4) Experiment and practice with different shapes and sizes of shapes. Organize your picture so that it completely fits on the 8.5 x 11 paper.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) What was similar or different about the shapes you chose?

3) Which was the easiest shape to code?

4) What is your best feature?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Geometry and Spatial Sense strand (creating and understanding properties of 2-D figures) and Science and Technology. This lesson could also be co-taught with a Literacy strand that includes a written component.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Students can use artist warm-up card and only the **Directional** blocks from the Pro set to help them get started on coding 2-D shapes.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow student to work alone and independently experiment with animation blocks or the artist warm-up card.

Extension activities:

- What other features can MatataBot add to your portrait? If the student created a large enough head, then they can program eyes, a mouth, hair, etc. Colour and decorate the drawing of yourself to make it as realistic as possible!

Supporting files & links

Wait Blocks, How does it work Animation Add on... (series 2)
Youtube- *http://bit.ly/wait-blocks*

Marian Big Idea K-3
Document- *http://bit.ly/big-ideas-2*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithm of coding blocks to draw various 2-D shapes.
- Students are able to identify, using mathematical vocabulary, the 2-D properties such as vertices, edges and faces.
- Students successfully completed coding at least the two main 2-D body parts.

Category/Level Criteria	*Level 1 Poor performance*	*Level 2 Needs improvement*	*Level 3 Adequate*	*Level 4 Excellent*
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

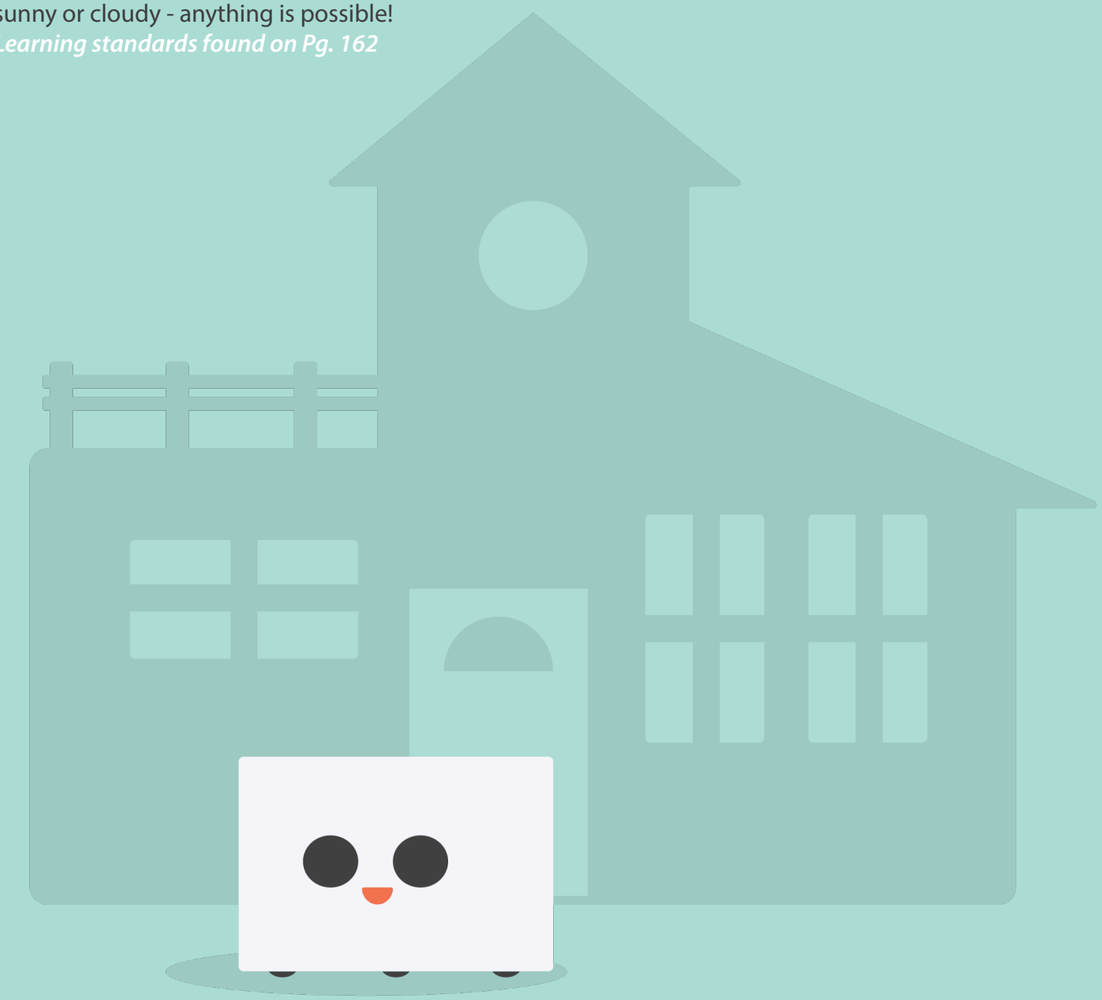
Lesson 11

Home Sweet Home

Grades 2 - 3 ***60 mins***

Cozy or cool, your house is your home! Create a landscape drawing that includes your house using MatataBot's talents. Mountains or grassland, sunny or cloudy - anything is possible!

Learning standards found on Pg. 162



Home Sweet Home

Grades 2 - 3

60 mins

Create student groups of 1 or 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow a safe space for each group to work around a sheet of craft paper and their MatataBot set.
To keep students engaged and productive, while one student is coding a shape or line, their partner can be preparing the coding blocks they need for their own next design element.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.

Big ideas & essential questions

As students create code and draw, they are unpacking what they already know about geometric shapes and properties. What are the similarities or differences of 2-D geometrical shapes?

When students code, they must disassemble and reassemble the 2-D shapes with consideration of all of their attributes. What are the similarities and differences of the shapes you drew?

This is also an opportunity to exercise spatial sense by choosing the shape size and location with respect to the whole design layout. How much space should the house take up? What is a good size for the sun if I want to also draw a flower?

Learning outcomes

TSWBAT : the students will be able to:

1) Identify and describe the properties of a variety of 2-D shapes.

2) Use **Directional**, **Set Speed**, **Wait**, **Stop the Right** / **Left Wheel**, **Number** and **Angle** blocks to code a variety of shapes and lines.

3) Compose a landscape drawing.

What you'll do

Discuss the different stages/sizes of a caterpillar. Students will determine which stage they want to draw and should reflect their decision in the size of their drawn caterpillar. This is a good introduction to drawing curves and circles. Code and have MatataBot draw 3 to 5 contiguous circles and understand how differential motion contributes to achieving that shape. Students will colour and add detail to complete the caterpillar then present and explain their drawing.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Artist warm-up card from Pro set
- Projector and display screen along with computer/tablet
- Markers for MatataBots
- Roll of white craft paper, one sheet per student
- Extra white or scrap paper for sketching their ideas
- Markers, crayons
- Pencils
- Scissors
- Tape to tape down corners of the paper while MatataBot draws
- Prepare a basic sample showing a square house with upside down V roof, horizon line, sun, window(s), door, chimney, etc.

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper peer student.

Introduction

5 mins

1) What are important considerations when designing a landscape drawing? Point out some elements that MatataBot could draw - keep it simple! - from these inspirational pictures:

2) **Elements of Art Space in a Landscape- Art Projects for Kids**
Image- *http://bit.ly/home-sweet-home_1*

3) **Schulton Landscape Painting**
Image- *http://bit.ly/home-sweet-home_2*

4) **How to Draw Perspective Landscape**
Image- *http://bit.ly/home-sweet-home_3*

5) Show students your MatataBot landscape sample picture. They will be drawing a landscape of their house and adding other elements of their choice.

Guided practice

10 mins

1) Review the artist warm-up cards that used directional blocks to code a shape. Today we are going to replace the **Move Forward** blocks with **Set Speed** blocks. **Angle** blocks will allow for simple coding of 90 degree turns.

2) Model and review the different **Set Speed**, **Stop the Right** / **Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks) to vary the length of a line or draw a circle. The shortest line length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block. **Angle** blocks will allow for simple coding of turns.

3) You can also show the video clip, **How does it work Animation Add on... (series 2)** [1:38 - 3:35]
Youtube- *http://bit.ly/wait-blocks*

4) Model and discuss relative placement of shapes, shape size and horizon line on the drawing paper.

Independent practice

40 mins

1) Challenge students to code and draw their own idea of a landscape.

2) Code various 2-D shapes and lines to complete the landscape with MatataBot. Use the extra paper to draw your sketch of what you are going to code MatataBot to draw. You can also use this paper for MatataBot drawing practice.

3) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first to make sure the shape will be drawn where you want it and so that MatataBot does not drive over the edge of the paper.

4) Experiment and practice with different shapes and sizes of shapes. Organize your picture so that it completely fits on the paper.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) What was similar or different about the shapes you coded?

3) Which was the easiest shape to code?

4) Which was most challenging?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Geometry and Spatial Sense strand (creating and understanding properties of 2-D figures), Art and Science and Technology. This lesson could also be co-taught with a Literacy strand that uses a written or oral presentation component.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Technology Literacy
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills

Modifications

Students can use artist warm-up cards and only **Directional** blocks from Pro set to help them get started on coding the 2-D shapes.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow students to work alone and independently experiment with animation blocks or the artist warm-up card.

Extension activities:

- If the student created the house large enough, they can code a door, window(s), chimney, flower, snowman, etc. Colour and decorate the drawing.
- Have students present their composition.

Supporting files & links

Wait Blocks, How does it work Animation Add on... (series 2)
Youtube- *http://bit.ly/wait-blocks*

Elements of Art Space in a Landscape- Art Projects for Kids
Image- *http://bit.ly/home-sweet-home_1*

Schulton Landscape Painting
Image- *http://bit.ly/home-sweet-home_2*

How to Draw Perspective Landscape
Image- *http://bit.ly/home-sweet-home_3*

Marian Big Idea K-3
Document- *http://bit.ly/big-ideas-2*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithm of coding blocks to draw various 2-D shapes and lines.
- Students are able to identify, using mathematical vocabulary, the 2-D properties such as vertices, edges and faces.
- Students showed evidence of producing a landscape drawing and determined its layout by using elements from the example drawings.

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
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Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

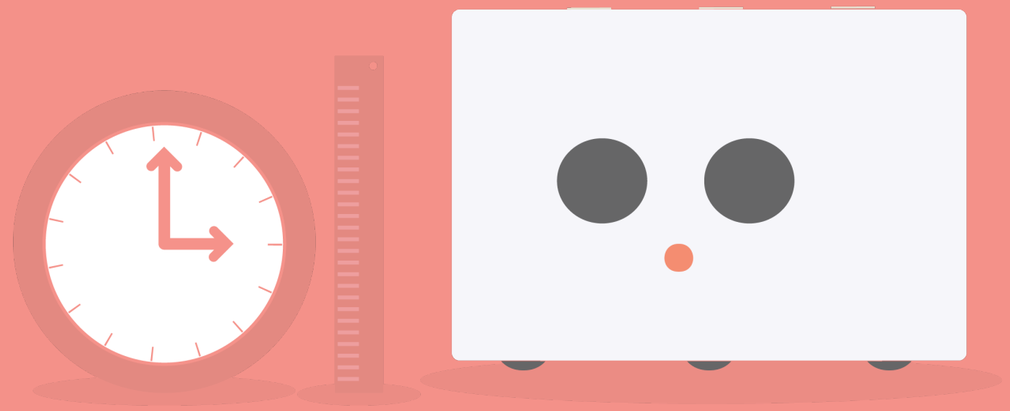
Lesson 12

Length of Time

Grades K - 3 ***60 mins***

How "long" is time? Code and draw different line lengths that directly correspond to the amount of time you code MatataBot to keep drawing! Can you draw them from shortest to longest? Show what you know by measuring and recording the length of each line.

Learning standards found on Pg. 165



Length of Time

Grades K - 3

60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.

Big ideas & essential questions

We understand time as a standard unit to describe daily events. Time can also determine the outcome of a function. For example, a Christmas tree light timer allows the lights to glow for a set amount of time. In this lesson time determines the length of a line.

Students will explore measurement and make connections about process times.

Learning outcomes

TSWBAT : the students will be able to:

1) Time can directly affect an outcome like linear length.

2) Use standard measurement to record a variety of lengths

Lesson 12

What you'll do

How "long" is time? Code and draw different line lengths that directly correspond to the amount of time (determined by the **Number** block value) you code MatataBot to keep drawing! Can you draw them from shortest to longest?
Show what you know by measuring and recording the length of each line.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots
- Roll of white craft paper
- Scissor
- Pencils
- Tape to secure corners of the drawing paper
- Rulers and/or paperclips to measure the lines
- Projector and instructor computer/tablet
- Wifi or pre downloaded computer files or printed pages of reference pictures of coding examples from List of Supporting Files

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper for each group.

Introduction

5 mins

1) How long is time? How long does it take you to put on your coat? Eat your lunch? Let's look at time in a different way now. How many steps can you take in 5 seconds? Have a few volunteers model as the class counts seconds or you can use a timer on the projection screen. We are going to code MatataBot to do the same thing!

Guided practice

10 mins

1) Model and review the different **Set Speed**, **Stop the Right/Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks) to vary the length of a line.

2) The shortest line length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block.

3) You can also show the video clip **How does it work Animation Add on... (series 2)** [1:38 - 3:35] Youtube- *http://bit.ly/wait-blocks*

Independent practice

40 mins

1) Initially, have students experiment with MatataBot as they practice coding a variety of lines.

2) After determining the algorithm, they should test the code without the marker at first to make sure the code is correct and that MatataBot does not drive off the paper. They should now give MatataBot a marker and have him draw the line.

3) Challenge them to code and draw at least 3 lines. They could draw a total of 6. At the bottom of each line, they can indicate the numeral of the **Number** block they used in their code to achieve that particular line length.

4) Afterwards, use a ruler (cm) or non-standard object like a paperclip to measure the lines and to record the measurement sideways, along the line.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Take a quick survey of all the lines lengths that were created with a "2" **Number** block under the **Wait** block.

3) Discuss results and reasons for any variation.
How do the **Number** blocks change MatataBot's motion?
How would you describe the relationship between time and line length?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Measurement strand (measuring with standard units) and Science and Technology (movement). This lesson could also include data collection and analysis of **Number** blocks used and measured line length.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Students can practice using the Animation coding blocks to observe their outputs and work towards creating a line.
Have a small group of students co-create code with you at one MatataBot/Control Board/Command Tower station. They can bring over their Control Board, copy the code and take the board back to their station.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow students to work alone and independently experiment with animation blocks.

Extension activities:

- Code and draw a circle at the top of each line. Smallest circle on shortest line, medium circle on medium line, etc.
- Experiment with the random **Number** block and try to guess which size line MatataBot will draw.

Supporting files & links

Wait Blocks:
Youtube- *http://bit.ly/wait-blocks*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the relationship between time and line length with respect to coding MatataBot.
- Students collaborated successfully with their partner(s) to complete the coding and drawing of at least 3 different line lengths.
- Students demonstrated their ability to measure and record the length of each line using a ruler or non-standard unit of measure.
- Students compared and evaluated the different line lengths they achieved through coding.
- Students correctly and effectively used mathematical vocabulary such as longer, shorter, centimeters, length and distance.

Category/Level Criteria	*Level 1 Poor performance*	*Level 2 Needs improvement*	*Level 3 Adequate*	*Level 4 Excellent*
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
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Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
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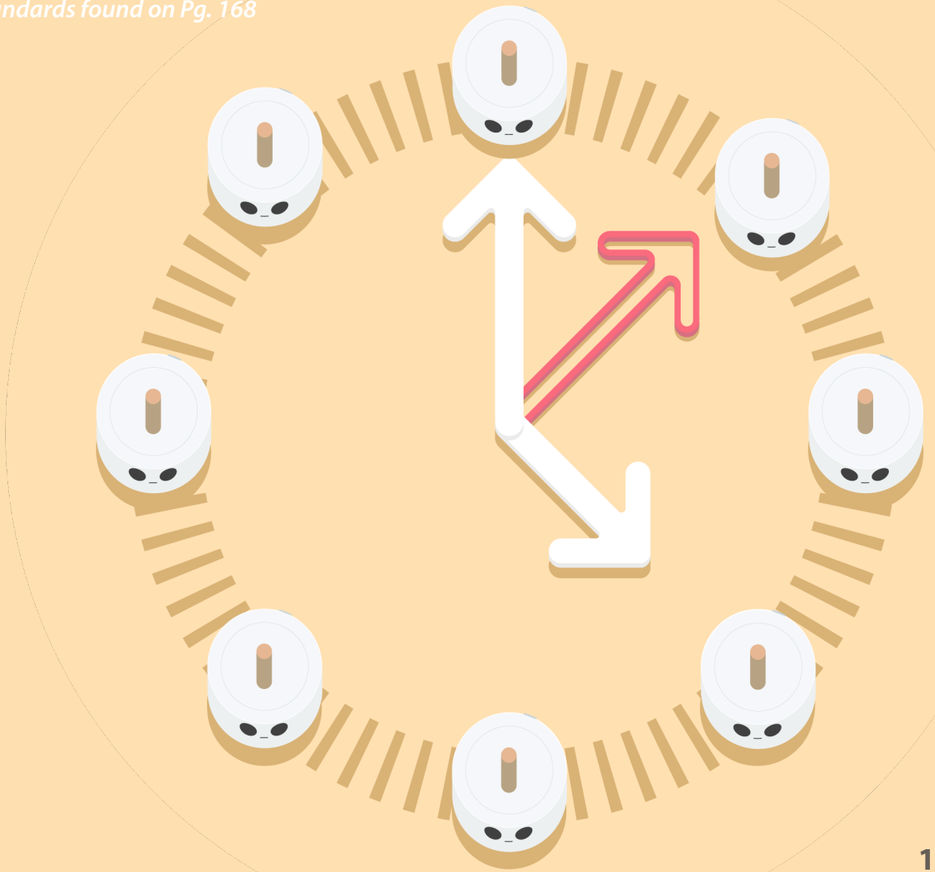
Lesson 13

What Time is it, MatataBot?

Grades 2 - 3 *60 mins*

What do clocks and differential motion have in common? Circles, of course! Students will determine how to code MatataBot's two wheels using **Set Wheel** blocks and have it draw a large circle to represent the clock face. Given an assigned time, they will determine the positions and lengths of the hour hand and minute hand and have MatataBot draw them as well. Students will gallery walk to other group's clocks and practice reading different times.

Learning standards found on Pg. 168



What Time is it, MatataBot?

Lesson 13

Grades 2 - 3

60 mins

Educators should provide visual examples and modelling of reading the time on a clock.
Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table.
Allow a safe space for each group to work around a sheet of paper and their MatataBot set.
Consider how student groups should be placed to allow students to walk back and forth to gather their materials and to facilitate a gallery walk.

Big ideas & essential questions

Time is used to help us organize our day to the fullest and communicate around the world! Students are familiar with their various daily activities and should be able to express the approximate time of day that they occur in a variety of ways or expressions. What is their favorite time of day?

Students should be able to describe their thinking when reading an analogue clock. How would they teach a younger student to read the classroom analogue clock?

The differential motion of MatataBot's two wheels will require students to experiment with the **Set Speed** blocks in order to draw the clock face circle. This experience will enforce their spatial sense of rotation, left, right, clockwise, and counterclockwise movements. They will also gain an understanding of the relationship between the **Number** blocks, wheel speed and circle diameter. What was their strategy to code the biggest circle that MatataBot could draw? Have students describe how they discovered the "biggest" circle.

Learning outcomes

TSWBAT : the students will be able to:

1) Understand that Differential Motion means that each wheel can be separately set to a different speed and direction.

2) Code MatataBot to draw circles and investigate circles of various diameters using **Set Speed blocks**, **Stop the Right** / **Left Wheel** blocks and **Number** blocks.

3) Represent time by drawing hour and minute hands on a clock face.

4) Understand that clock hands move in a clockwise rotation.

5) Connect daily activities with various times of day.

6) Read time by determining the position of the hour and minute hand.

What you'll do

Assign each group of 2 or 3 students a time on the hour (eg. one o'clock, four o'clock, etc.). Have each group determine the code for a large circle representing the clock face circle and have MatataBot draw it. Students should determine the positions and lengths of the hour hand and minute hand for the time assigned to them. They will then code MatataBot to draw the two clock arms accordingly. Students will gallery walk to other group's clocks and practice reading time.

What you'll need

- Class set of Matatalab Pro Set and Animation Add-On Set
- Projector/Display Screen along with Computer/Tablet
- Markers for MatataBots
- Pencils
- Roll of white craft paper
- Tape to secure corners of the drawing paper
- Rulers
- Scissor to cut the craft paper
- Visual models of clocks with movable minute and hour hands. Either physical model or **Interactive Clock online Tool-** *http://bit.ly/what-time-is-it-1* (which will require wifi)

Prior to lesson

- MatataBots, Command Towers should be updated with the latest MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer.
- Lay out MatataBot Pro and Animation add-on sets and other materials so they are easily accessible for students.
- Pre-cut one sheet per group, approximately 24 x 24 inches.
- Prepare a sample clock face that was drawn by MatataBot.

Introduction

5 mins

1) What time did the school bell ring this morning? When is the school day finished?

2) Why is using time important? How does it help us get through our day?

3) What are the different ways that time is represented?

4) Display a visual clock model that shows time on the hour or project the **Interactive Clock online** Tool- *http://bit.ly/what-time-is-it-1* ; Ask students how they would tell the time by looking at this clock? In which direction do the clock hands move?

5) Today we are going to use MatataBot to draw our own clock faces and learn to read different times.

Guided practice

10 mins

1) Have students stand up and ask them to walk in a very small circle.

2) Then have them observe what happens when they allow one of their feet to move with a larger step while allowing the other one to only rotate in the same spot.

3) Compare what the students just experienced with MatataBot's wheels and movement when it is required to move in a circle. This difference in foot speed and in MatataBot's case, wheel speed, is called differential motion.

4) Show and name the different **Set Speed** blocks and use them to collaboratively model a simple code for a circle. Don't forget to mention the importance of the **Stop the Right** / **Left Wheel** blocks.

5) Show and explain how to place **Number** blocks. Allow students to experiment to determine how these **Number** blocks affect the code and MatataBot output.

6) Show video clip, **How does it work Animation…(series1)**[3:25 - 4:50] to reinforce how to code different sized circles
Youtube- *http://bit.ly/set-wheel-blocks*

7) Review video clip, **Wait Blocks** **How does it work Animation Add on... (series 2)** [2:40 - 3:36] to remember how to code different line lengths
Youtube- *http://bit.ly/wait-blocks*

Independent Practice

35 mins

1) Challenge students to code MatataBot to draw a clock face circle. Try different coding block configurations to find the largest circle that can be coded on their piece of paper.

2) Check the code first without the marker to make sure that the robot stays on the paper. Using the markers, have MatataBot draw the largest circle that will fit on the piece of paper. Paper corners may need to be taped down to avoid shifting while MatataBot draws.

3) Show students how to space and write the numbers around the clock face. They should write all 12 numbers on the clock face.

4) Educator will then write an hourly time on the top of each group's paper, eg. "one o'clock", "seven o'clock", etc.

5) Challenge students to code MatataBot to draw the hour hand (2 lengths) and minute hand (one length) on the clock in the correct position such that they represent the hourly time they were assigned. They should place MatataBot in the center of the clock and position the robot face to "look" towards the number it will move towards as it draws a straight line.

6) When they complete the task, they can gallery walk and read the other groups' clocks or begin the Extension challenges.

Wrap up

10 mins

1) Students will carefully put away all MatataBot components and other materials.

2) What is the purpose of a clock? How are they used to help us each day?

3) How did you use differential motion to code MatataBot today?

4) What is the purpose of the **Number** block? How does it change the output?

5) What code made the largest circle?

6) What skills do you use to read the time on an analogue clock?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Measurement strand (to relate time to everyday events and to estimate and relate the standard units of time) as well as Science and Technology.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Technology Literacy
- Leadership
- Initiative
- Productivity
- Communication
- Flexibility
- Social Skills

Modifications

If students are having difficulty gauging the placement of MatataBot to draw the hour hand or minute hand, have them use a ruler as a straight edge guide to line up the MatataBot. Or, they can use a ruler to find the center of the circle and draw the two clock hands.

As students are challenged to code to draw a large circle, consider stopping after 10 min and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow student to work alone and independently experiment with animation blocks.

Extension activities:

- Assign one or more challenging times and have students use a different colored marker to draw the new hour and minute hands to represent those times on the same clock face.

Supporting files & links

Physical visual models of clocks with movable minute and hour hands or Interactive Clock online Website- *http://bit.ly/what-time-is-it-1*

Set Wheel Blocks, Drawing Circles, How does it work Animation…(series1) [3:25 - 4:50]
Youtube- *http://bit.ly/set-wheel-blocks*

Wait Blocks, How does it work Animation Add on... (series 2) [2:40 - 3:36]
Youtube- *http://bit.ly/wait-blocks*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Assessment

Student's work will be assessed in the following manner:

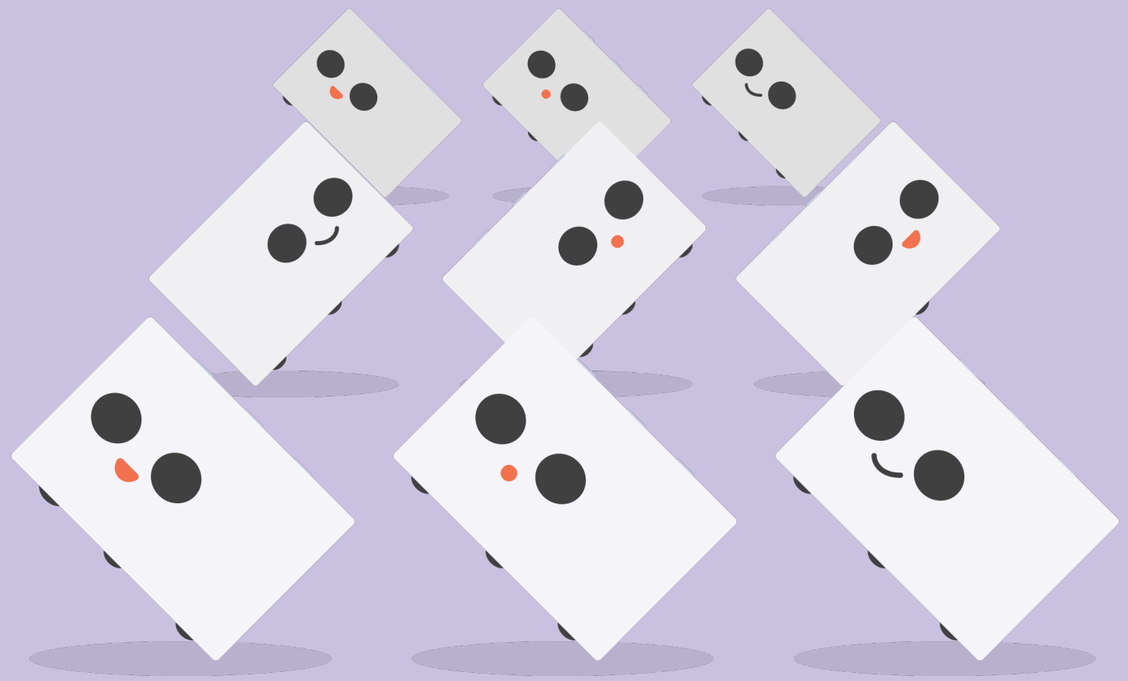
- Able to communicate an understanding of their critical thinking in determining how to code the largest perimeter circle.
- Able to communicate, using sufficient evidence of understanding and knowledge of how to figure out where to place the minute and hour hands to represent the assigned time.
- Collaborated successfully with their partner(s) to complete the drawing of the clock face

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Synchronized Dancing

Grades 1 - 3 ***60 mins***

Square dancing or Dragon dancing, have fun coding a synchronized dance! Add cultural significance, a variety of movement and lights and you have a Dancing with the MatataBots show!
Learning standards found on Pg. 170



Synchronized Dancing

Lesson 14

Grades 1 - 3
60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for two groups to work with their MatataBot sets and coordinate their dance.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
Assign a designated area for the dance show.

Big ideas & essential questions

Most cultures express themselves through dance. What do these dances mean? How are they the same or different?

Dance is an expression that we communicate through movement. What type of dance movements can we code? How would you compose the movement if you have a partner?

Varying the **Number** block under the **Right** / **Left LED Color** blocks will change the intensity of the lights. How can MatataBot's LED eye lights show expression?

We use a type of non-standard measurement when we dance called steps. Students will need to decide on the number of steps, direction and motion they will code to keep MatataBot moving to the music.

Learning outcomes

TSWBAT : the students will be able to:

1) Compare various cultural dance forms.
2) Apply movement to music.
3) Code coordinating movement patterns using two MatataBots.
4) Use non-standard measurement to choreograph movements.

What you'll do

Square dancing or Dragon dancing, have fun coding a synchronized dance! Add cultural significance, a variety of movement and lights and you have a Dancing with MatataBots show!
A group of 4 students will code 2 MatataBots to dance using a variety of movement, animation, lights. Add ribbon sticks! Code a cultural or familiar dance representation like a Dragon dance, powwow dance, waltz, hokey pokey or square dance.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Projector and display screen along with computer/tablet
- Markers for MatataBots
- Pencils
- Coloured Construction Paper for adding cultural significance
- Markers, ribbons, etc for decorating
- Stir sticks or dowels will work well for ribbon dancing (or capped markers)
- Scissors
- Tape, glue
- Prepare a sample dance for MatataBot

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Familiarize yourself with the series of three of MatataBot videos located below in the External Resources so you can demonstrate straight, curvy or turning path codes, lights and dance.
- Create a varied music list of several/few culturally traditional dance songs for students to choose from (a waltz, polka music, dragon dance, hokey pokey (one verse), etc.).

Introduction

5 mins

1) What kind of dances are part of your family's tradition? When have you or your family participated in them?

2) **20+ Dances Around the World with Mickela Mallozzi** (Bare Feet® Season One Reel)
Youtube- *http://bit.ly/sync-dance-1*

3) What are some of the things that the dances had in common?

4) Now show how students can code 2 MatataBots to dance together.
Matatalab Cross Curricular Arts & Music, Drawing & Dancing [1:09 - 1:40]
Youtube- *http://bit.ly/heart-dancing*

5) Encourage use of added animation blocks for curves, straight and circles/spin

Guided practice

10 mins

1) Show the students your sample dance and guide a discussion on how they would use the **Set Speed**, **Stop Wheel**, **Number**, **Right**/**Left LED Color**, and **Wait** blocks to code their own. **Angle** blocks will allow for simple coding of turns.

2) Discuss non-standard measurement so that each MatataBot moves the correct number of steps.

3) What kind of dance expression or movement can we code MatataBot to perform? How can you code a spin? One way is to use repeated Angle blocks, or use animation blocks

4) You can also show coding video clips from the External Resources section below.

Independent practice

40 mins

1) Independent Practice (40 minutes)
Each student group of 2 should choose one of the precompiled songs. They can then choose to synchronize with another group that has also chosen the same song.

2) Students will code the 2 MatataBots to expressively dance using a variety of movement and lights. Add ribbon sticks or other relevant costume addition. Code a cultural or familiar dance representation like a Dragon dance, powwow dance, waltz, hokey pokey or square dance.

3) Have a Dancing with MatataBots around the world show!

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) What patterns or expressions did you use in your dance?

3) How did you code MatataBot to spin around?

4) What was your favorite part of your dance?

5) Can you name some of the dances we saw/discussed?

Interdisciplinary & 21st century connections

This lesson can be used in Art as Dance to explore cultural connections and Mathematics to relate movement using non-standard measurement, as well as Science and Technology. This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Provide a written (words or symbols) list of already choreographed dance steps that the student can code.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow students to work alone and independently experiment with **Right**/**Left LED Color**, **Preset Dancing**, and **Preset Music** blocks and adding modifying them with the **Number** blocks.

Extension activities:

- Choreograph a dance presentation with 3-4 MatataBots, a circle dance or you can synchronize your own dance moves along with your MatataBot!

Supporting files & links

20+ Dances Around the World with Mickela Mallozzi (Bare Feet® Season One Reel)
Youtube- *http://bit.ly/sync-dance-1*

Matatalab Cross Curricular Arts & Music, Drawing & Dancing [1:09 - 1:40]
Youtube- *http://bit.ly/heart-dancing*

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/set-wheel-blocks*

Wait Blocks, How does it work Animation Add on... (series 2) [1:38 - 3:35]
Youtube- *http://bit.ly/wait-blocks*

Light Blocks, How does it work Animation Add on... (series 3)
Youtube- *http://bit.ly/light-blocks-1*

Heart & Dancing Matatalab Cross Curricular Arts & Music Drawing & Dancing [1:09 - 1:40]
Youtube- *http://bit.ly/heart-dancing*

Assessment

Student's work will be assessed in the following manner:

- Students showed sufficient understanding of coordinating dance through the use of non-standard units of dance steps.
- Students are able to communicate their knowledge of various cultural dances and their significance or attributes.
- Students are able to communicate sufficient understanding and knowledge of their coding logic to create various movements.
- Students coded movement and light intensity to communicate expression.
- Students collaborated successfully with their partner(s) to complete the dance code.

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
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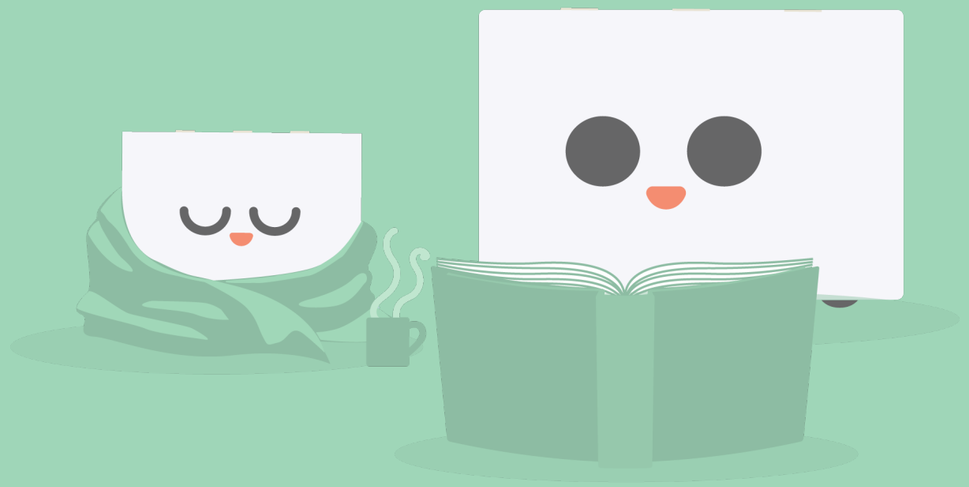
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Storytelling

Grades 2 - 3 ***60 mins***

Produce a story in which MatataBot is the star! Write and code a short story and have MatataBot perform it!
Learning standards found on Pg. 174



Storytelling

Lesson 15

Grades 2 - 3
60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
During the presentations, seat students altogether or if other instructors are available, split the students into two or three groups to keep the presentation time to a reasonable length.

Big ideas & essential questions

Storytelling was the way to pass down and preserve cultural history and tradition. Now, we also use stories to entertain and document. Storytelling helps us to communicate with others. What are the parts of a story? What does a good story have to include?

Organization and sequential thinking are essential when both story writing and coding. Creating an appropriate algorithm can be a challenge. Understanding the goal of the algorithm is the first step. Using our schema about coding and investigating new coding combinations will determine the individual steps. What is the goal of the first act? How can MatataBot be coded to express it?

Learning outcomes

TSWBAT : the students will be able to:

1) Create and share a 3 part story.

2) Use the Pro set and Animation Add-on set to code an algorithm for each part of the story.

What you'll do

Produce a story in which MatataBot is the star! Write and code a short story and have MatataBot perform!

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots
- Roll of white craft paper
- Markers, crayons
- Tape
- Scissors
- Graphic organizer: Beginning, Middle, End
- Prop objects, construction paper, blocks, animals, Lego people, Lego, etc
- Projector and instructor computer/tablet
- Wifi or pre downloaded computer files or printed pages of reference pictures from the List of Supporting Files

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper for each student group.
- Create a sample story.

Introduction

5 mins

1) Writing and coding are very similar. They both require some organization like using an algorithm, a set of rules to be followed, in a specific sequence.
   What are the elements of a short story?
   What do we have to tell the audience?

2) Show graphic organizer. They can write two sentences per part or draw a picture.
   What do we tell the audience in the beginning? Characters, setting, what they are doing.
   What do we tell the audience in the middle? Problem.
   What do we tell the audience in the end? Solution and ending.

3) Read your sample story one act at a time and have MatataBot act each scene after each narration. Can students identify the who, what, where, problem and solution in your story?

Guided practice

10 mins

1) Show and name the different **Set Speed** blocks and use them to collaboratively model a simple code for a circle. Don't forget to mention the importance of the **Stop the Right**/**Left Wheel** blocks.

2) Show and explain how to place **Number** blocks. Allow Students to experiment to determine how these **Number** blocks affect the code and MatataBot output.
   Remind them that **Loop** and **Function** blocks might be helpful tools.

3) Ask students how MatataBot can be coded to act out the beginning of your story. The middle? The end?

4) They should be able to provide ideas such as go straight then, turn on red eye lights to show anger or fear, turn in a circle to express something exciting, move in a sine wave to show meandering, add sounds, music, etc.

5) Adding **Wait** blocks between acts allows you time to narrate the next act.

Independent practice

40 mins

1) Challenge students to first write their story. They should think about where MatataBot is and what he is doing to get them started.

2) Then code MatataBot to act out the story. Add props to make the setting interesting.

3) Have students present their stories to the class.

Wrap up

5 mins

1) Students will carefully put away all MatataBot components and other materials.

2) What strategies did you use to help you code parts of your story?

3) How did you represent the emotion/expression (sad, happy, angry, etc.) with your code?

4) How do the **Number** blocks change MatataBot's motion?

5) What are the important components of a short story?

Interdisciplinary & 21st century connections

This lesson can be used in Language to help teach topics within the Communication and Writing strand and Science and Technology. This lesson could also be co-taught with another content area teacher such as Social Studies.

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Help write down the story for students who are unable to write or pair them with a student with successful writing skills.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow students to work alone and independently experiment with animation blocks.

Extension activities:

- Provide context, a topic, or genre for the story writing.
- A group could use a second MatataBot/Command Tower/Control Board set to create a second character.
- Use iMovie to record and edit the story to turn it into a short film production.

Supporting files & links

Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1) Youtube- *http://bit.ly/set-wheel-blocks*

Wait Blocks, How does it work Animation Add on... (series 2)
Youtube- *http://bit.ly/wait-blocks*

Light Blocks, How does it work Animation Add on... (series 3)
Youtube- *http://bit.ly/light-blocks-1*

Assessment

Student's work will be assessed in the following manner:

- Students are able to communicate evidence of their critical thinking to determine the algorithms of coding blocks for their story.
- Students are able to show evidence of organizational writing of their short story using the graphic organizer.
- Students were able to clearly communicate and share their story.

Additional teaching materials

Three part story graphic
Image- *http://bit.ly/story-graphic-organizer*

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
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Collaboration	Demonstrates limited ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group due to disruptive behavior.	Demonstrates some ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group (some disruptive behavior).	Demonstrates considerable ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Friendly and is somewhat a leader.	Demonstrates exceptional ability to: • Work with other group members. • Share materials, devices, and time appropriately. • Complete tasks in a group • Extremely friendly and acts as a leader.
Coding challenges	Demonstrates limited ability to: • Complete identified coding challenges. • Stay on task (cannot stay on task). • Complete extension activities as time permits.	Demonstrates some ability to: • Complete identified coding challenges. • Stay on task most of the time. • Complete extension activities as time permits.	Demonstrates considerable ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges.	Demonstrates exceptional ability to: • Complete identified coding challenges. • Stay on task • Complete extension activities as time permits. • Find other ways to complete challenges. • Going over and beyond, creatively, in completing challenges.
Independent Practice	Demonstrates limited ability to: • Work with their partner (very disruptive behaviour). • Stay focused on completing tasks (cannot focus).	Demonstrates some ability to: • Work with their partner (some disruptive behaviour). • Stay focused on completing tasks (some focus).	Demonstrates considerable ability to: • Work with their partner (little disruptive behaviour). • Focus on completing tasks. Somewhat engaged in tasks.	Demonstrates exceptional ability to: • Work with their partner (no disruptive behaviour). • Focus on completing tasks. Fully engaged in tasks.

Tic-Tac-Go!

Grades 2 - 3 ***60 mins***

New age tic-tac-toe! Code your MatataBot to draw the "X" or "O" for your team. Play rock, paper, scissors to see who plays first!
Learning standards found on Pg. 177

Tic-Tac-Go!

Lesson 16

Grades 2 - 3
60 mins

Create student groups of 2 except where groups of 3 are required or beneficial to the student.
Groups will work on a flat surface - floor or table. Allow ample space for each group to work with their MatataBot set and added materials for drawing.
Students groups should be placed considerately to allow students to walk back and forth to gather their materials.
There should be multiple spaces for 2 groups to gather to play a game either on the floor or at a table.

Big ideas & essential questions

When students code, they must disassemble and reassemble the 2-D shapes with consideration of all of their attributes. What are the similarities and differences of the shapes you drew?

This is also an opportunity to exercise spatial sense by measuring and choosing the ratios of the grid design to the shape sizes. What were the considerations that determined the game grid size?

Why do we need robots anyway? Humanity is constantly driven forward by an innate nature to create and learn. Robots are one of those outcomes that are going to continue to be a part of our lives.

Learning outcomes

TSWBAT : the students will be able to:

1) Measure the width of 2-D shapes and circle diameter using centimeters.
2) Determine the length of a line with respect to its application.
3) Identify and describe the properties of a variety of 2-D shapes .
4) Use **Directional**, **Set Speed**, **Wait**, **Stop the Right** / **Left Wheel** and **Angle** blocks to code a variety of shapes.

What you'll do

New age tic-tac-toe! Code your MatataBot to draw the "X" or "O" for your team. Play rock, paper, scissors to see who plays first!

Each group will code and draw at least one game board to start with. Then you can assign which groups will be "X" and which will be "O" so that they can code this shape. Students will find a group from the opposite team to play with.

What you'll need

- Class set of Matatalab Pro set and Animation Add-On set
- Markers for MatataBots
- Roll of white craft paper for board game grids (eg., a large grid would be 30x30cm)
- Markers, crayons
- Tape
- Scissor
- Projector and instructor computer/tablet
- Wifi or pre downloaded computer files or printed pages of reference pictures from the List of Supporting Files

Prior to lesson

- MatataBots and Command Towers should be updated as per MatataBot Firmware Upgrade.
- Refer to User Guide for MatataBot and Command Tower on/off and connection instructions.
- Set up projector with tablet or computer.
- Download videos and pictures ahead of time.
- Lay out MatataBot Pro and Animation add-on sets, and other materials so they are easily accessible for students.
- Cut one sheet of paper for each student group.

Introduction

5 mins

1) What are robots? What are they used for? What do they look like? They can perform tasks that are too dangerous, complex, or time consuming. They are used in hospitals, manufacturing, farming, and some are made to interact with humans and entertain them. They often don't look like MatataBot.

2) Let's take a look at this video for a different perspective:
Different Types of Robots for Future
Youtube- *http://bit.ly/tic-tac-go-1*

3) And of course there are robots like MatataBot that we can play with and learn with. Playing games like tic-tac-toe is fun but even better when MatataBot plays with you. Review how to play and win a game.

Guided practice

5 mins

1) What do we need to play tic-tac-toe?
A three by three grid, "X's" and "O's"

2) How can we code MatataBot to draw all three of those things?

3) Model and review the different **Set Speed**, **Stop the Right** / **Left Wheel** blocks along with **Wait** blocks and how to combine them with **Number** blocks (ask students about the relevance of these blocks) to vary the length of a line. The shortest line length will have no **Number** blocks (one second), but the drawn line gets longer as you place a 2, 3, 4, or 5 **Number** block under the **Wait** block.

4) You can also show the video clip **How does it work Animation Add on... (series 2)** [1:38 - 3:35]
Youtube- *http://bit.ly/wait-blocks*

5) **Angle** blocks will allow for simple coding of turns. Experiment with different **Number** blocks to find the best angle for drawing an "X".

6) For drawing circles, review this video: **Set Wheel Blocks**, **Drawing Circles** **How does it work Animation Add on... (series 1)**
Youtube- *http://bit.ly/set-wheel-blocks*

Independent practice

40 mins

1) You and your partner will code MatataBot to draw a 3x3 grid that will be large enough for a MatataBot to draw the "X's" and "O's" when you are playing the game.

2) Let's think about that for a second. So what do you think you should code and test first?
They should code and test the "X's" and "O's" first and measure the widest shape to decide the size of the grid lines.

3) Allow students time to experiment and investigate on their own. (for a basic "X" and "O", the "O" is the larger shape at about 5.25cm diameter) (A large enough grid will be about 25cm to 30cm long.)

4) Do not put back the coding blocks for the grid sequence - they may want to draw more grids to play more games.

5) Tape down the corners of the drawing paper to keep it in place as MatataBot draws. Practice without the MatataBot marker first to make sure the line will be drawn where you want it and so that MatataBot does not drive over the edge of the paper.
Experiment and practice coding different circles.

6) Choose a group to challenge and play a game! Then go challenge another group. As each group has drawn a grid, each group should be able to play 2 games.

Wrap up

10 mins

1) Students will carefully put away all MatataBot components and other materials.

2) Take a quick survey of the lengths of the grid lines they coded and drew.

3) How did you come up with that measurement?

4) Which **Number** block gave you the best angle to draw an "X"?

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within the Measurement strand (measuring with standard units) and Science and Technology (movement).

21st Century Skills include:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills
- Technology Literacy

Modifications

Have a small group of students co-create code with you at one MatataBot/Control Board/Command Tower station. They can bring over their Control Board, copy the code and take the board back to their station.

Accommodations

- Pair student heterogeneously to optimize co-teaching of prior knowledge.
- Place student in a group of 3.
- Allow the student to work alone and independently experiment with Animation blocks.

Extension activities:

- Additionally, when students move to a spot on the board, illuminate both LED colour lights, play a tune, or do a dance. Keep score as they play multiple times!

Supporting files & links

Different Types of Robots for Future
Youtube- *http://bit.ly/tic-tac-go-1*

Set Wheel Blocks, Drawing Circles, How does it work Animation Add on... (series 1)
Youtube- *http://bit.ly/wait-blocks*

Wait Blocks, How does it work Animation Add on... (series 2)
Youtube- *http://bit.ly/set-wheel-blocks*

Sciencing
Article- *http://bit.ly/tic-tac-go-2*

> Firmware Upgrade:
Matatalab- *http://bit.ly/upgrade-firmware*

> Light Blocks How does it work Animation Add on... (series 3)
Youtube- *http://bit.ly/light-blocks-1*

Assessment

Student's work will be assessed in the following manner:

> Students are able to communicate evidence of their critical thinking to determine the algorithms of coding blocks to draw the game grid and playing shapes.

> Students are able to identify, using mathematical vocabulary, the 2-D properties such as vertices, edges and faces.

> Students collaborated successfully with their partner(s) to complete the game grid.

> Students showed appropriate game winning and losing etiquette.

Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates some ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates considerable ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)	Demonstrates exceptional ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the problem. (Algorithms) • Describe the solution and apply lessons to future solutions. (Abstraction)
Communication	Demonstrates limited ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates some ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates considerable ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.	Demonstrates exceptional ability to: • Share thoughts and ideas with co-workers in order to solve problems. • Share with the teacher their learning through explanation and demonstration.
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Appendix

01.Costume Party

COMMON CORE

KINDERGARTEN MATHEMATICS GEOMETERY

CCSS.MATH.CONTENT.K.G.A.2

Correctly name shapes regardless of their orientations or overall size.

CCSS.MATH.CONTENT.K.G.A.3

Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

CCSS.MATH.CONTENT.K.G.B.5

Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

KINDERGARTEN MATHEMATICS MEASUREMENT & DATA

CCSS.MATH.CONTENT.K.MD.A.1

Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

Grade 1 MATHEMATICS Geometry

CCSS.MATH.CONTENT.1.G.A.1

Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

Grade 2 MATHEMATICS Geometry

CCSS.MATH.CONTENT.2.G.A.1

Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

ISTE

EMPOWERED LEARNER

1d - Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

INNOVATIVE DESIGNER

4b - Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

4c - Students develop, test and refine prototypes as part of a cyclical design process.

4d - Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

COMPUTATIONAL THINKER

5a - Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

5c - Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.

5d - Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

GLOBAL COLLABORATOR

7c - Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02

K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).

1A-CS-03

K - 2 Describe basic hardware and software problems using accurate terminology.

1A-AP-09

K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.

1A-AP-10

K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.

1A-AP-11

K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

1A-AP-12

K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.

1A-AP-14

K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

1A-AP-15

K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS:

BRITISH COLOMBIA

APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3

https://curriculum.gov.bc.ca/curriculum/adst/k

MATHEMATICS K

Direct Comparative Measurement

Single Attributes

https://curriculum.gov.bc.ca/curriculum/mathematics/k

MATHEMATICS 1

Direct Measurement

https://curriculum.gov.bc.ca/curriculum/mathematics/1

MATHEMATICS 2

Direct Measurement

2D Shapes and 3D objects

https://curriculum.gov.bc.ca/curriculum/mathematics/2

MATHEMATICS 3

Standard Units

3D objects

https://curriculum.gov.bc.ca/curriculum/mathematics/3

ALBERTA

KINDERGARTEN MATHEMATICS SHAPES AND SPACE

Specific Outcome 3

Build and describe 3D objects

GRADE 1 MATHEMATICS SHAPES AND SPACE

Specific Outcome 3

Compare 2D shapes to parts of 3D objects in the environment

GRADE 2 MATHEMATICS SHAPES AND SPACE

Specific Outcome 2

Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).

Specific Outcome 4

Measure length to the nearest nonstandard unit by: using multiple copies of a unit, using a single copy of a unit (iteration process).

Specific Outcome 7

Describe, compare and construct 3-D objects, including: cubes, spheres, cones, cylinders, and pyramids.

Specific Outcome 8

Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.

Specific Outcome 9

Identify 2-D shapes as parts of 3-D objects in the environment.

Grade 3 MATHEMATICS Shapes and Space

Specific Outcome 3

Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents for the units cm and m, modelling and describing the relationship between the units cm and m, estimating length, using referents, and measuring and recording length, width and height.

Specific Outcome 6

Describe 3-D objects according to the shape of the faces and the number of edges and vertices.

SASKATCHEWAN

MATHEMATICS KINDERGARTEN SHAPE AND SPACE

SSK.3b - Describe a 3-D object using words such as big, little, round, like a box, and like a can.

MATHEMATICS GRADE 1 SHAPE AND SPACE

SS1.4 - Compare 2-D shapes to parts of 3-D objects in the environment. [C, CN, V]

MATHEMATICS GRADE 2 SHAPE AND SPACE

SS2.1 Demonstrate understanding of nonstandard units for linear measurement by describing the choice and appropriate use of nonstandard units, estimating, measuring and comparing and analyzing measurements.

[C, CN, ME, R, V]

SS2.3a - Identify examples of cubes, spheres, cones, cylinders, and pyramids as found in the classroom, home, and community.

SS2.4a Identify examples of triangles, rectangles, squares, and circles as found in personal experiences.

SS2.4f Create a model to represent a 2-D shape.

SS2.5c Describe the faces of a personally relevant 3-D object by comparing the faces to 2-D shapes (such as triangles, squares, rectangles, or circles).

MATHEMATICS GRADE 3 SHAPE AND SPACE

SS3.3d Pose and solve situational questions that involve the estimating or measuring of length (including perimeter) using cm or m.

SS3.3j Create a picture of a 2-D shape with specified length and width (or length and height) and explain whether the 2-D shape was constructed using estimates or actual lengths.

SS3.3k Measure and record the perimeter of regular 2-D polygons and circles located on 3-D objects, and explain the strategy used.

SS3.3n Estimate the perimeter of a given 2-D shape (cm,

m) using personal referents and explain the strategies used.
SS3.3o Critique the statement "perimeter is a linear measurement".
SS3.4a Observe and describe the faces, edges, and vertices of given 3-D objects, including cubes, spheres, cones, cylinders, pyramids, and prisms
SS3.4b Critique the statement "the face of a 3-D object is always a 2-D shape".
SS3.4c Observe and describe the 2-D shapes found on a 3-D object.
SS3.4e Determine the number of faces, edges, and vertices of a given 3-D object and explain the reasoning and strategies.

MANITOBA
MATHEMATICS KINDERGARTEN SHAPE AND SPACE
K.SS.3. Build and describe 3-D objects. [CN, PS, V]
MATHEMATICS GRADE 1 SHAPE AND SPACE
1.SS.1. Demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared [C, CN, PS, R, V]
MATHEMATICS GRADE 2 SHAPE AND SPACE
2.SS.2. Relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight). [C, CN, ME, R, V]
2.SS.4. Measure length to the nearest nonstandard unit by using multiple copies of a unit, using a single copy of a unit (iteration process) [C, ME, R, V]
2.SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles
[C, CN, R, V]
MATHEMATICS GRADE 3 SHAPE AND SPACE
3.SS.3. Demonstrate an understanding of measuring length (cm, m)
3.SS.5. Demonstrate an understanding of perimeter of regular and irregular shapes

ONTARIO
KINDERGARTEN
16.2 - investigate strategies and materials used when measuring with non-standard units of measure.
17.3 Investigate and explain the relationship between two-dimensional shapes and three dimensional figures in objects they have made
GRADE 1 MATHEMATICS MEASUREMENT
Demonstrate an understanding of the use of non-standard units of the same size
Construct, using a variety of strategies, tools, for measuring lengths, heights, and distances in non-standard units.
Describe through investigation using concrete materials, the relationship between the size of a unit and the number of units needed to measure length.

GRADE 1 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Identify and describe common 2-D shapes.
Identify and describe common 3-D figures.
Trace and identify the 2-D faces of three-D figures, using concrete models.
GRADE 2 MATHEMATICS MEASUREMENT
Select and justify the choice of a standard unit or a non-standard unit to measure length
Estimate, measure and record the distance around objects, using non-standard units.
GRADE 2 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Identify and describe various 3-D figures.
GRADE 3 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Identify and describe the 2-D shapes that can be found in a 3-D figure.
GRADE 3 MATHEMATICS MEASUREMENT
Estimate, measure, and record length, height, and distance, using standard units

QUEBEC
MATHEMATICS
GEOMETRY, B. SOLIDS
GRADE 1-2
3. Identifies the main solids (e.g. spheres, cones, cubes, cylinders, prisms, pyramids)
C. PLANE FIGURES
GRADE 1-2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
3. Describes plane figures (square, rectangle, triangle and rhombus)
GRADE 3
5. Identifies and constructs parallel lines and perpendicular lines
6.Describes quadrilaterals (e.g. parallel segments, perpendicular segments, right angles, acute angles, obtuse angles)
MEASUREMENT, A.LENGTHS
GRADE 1-2
1. Compares lengths
2. Constructs rulers
3. Estimates and measures the dimensions of an object using unconventional units
GRADE 3
6. Calculates the perimeter of plane figures

NEW BRUNSWICK
MATHEMATICS SHAPE AND SPACE
KINDERGARTEN
SS3 Build and describe 3-D objects.
GRADE 1
SS4 Compare 2-D shapes to parts of 3-D objects in the environment.

GRADE 2
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).
SS4 Measure length to the nearest non-standard unit by: using multiple copies of a unit; using a single copy of a unit (iteration process).
SS7 Describe, compare and construct 3-D objects, including: cubes, spheres, cones, cylinders, pyramids.
SS8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.
SS9 Identify 2-D shapes as parts of 3-D objects in the environment
GRADE 3
SS5 Demonstrate an understanding of perimeter of regular and irregular shapes by: estimating perimeter, using referents for cm or m;
SS6 Describe 3-D objects according to the shape of the faces, and the number of edges and vertices.

NOVA SCOTIA
MATHEMATICS
GEOMETRY 3-D OBJECTS
GRADE 1
Outcome G03: Students will be expected to identify 2-D shapes in 3-D objects. [C, CN, V]
GRADE 2
Outcome G02: Students will be expected to recognize, name, describe, compare, and build 3-D objects, including cubes and other prisms, spheres, cones, cylinders, and pyramids. [C, CN, R, V]
Outcome G04: Students will be expected to identify 2-D shapes as part of 3-D objects in the environment. [C, CN, R, V]
GRADE 3
Outcome G01: Students will be expected to describe 3-D objects according to the shape of the faces and the number of edges and vertices. [C, CN, PS, R, V]
GEOMETRY 2-D SHAPES
GRADE 1
Outcome G03: Students will be expected to identify 2-D shapes in 3-D objects. [C, CN, V]
GRADE 2
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles. [C, CN, R, V]
MEASUREMENT
GRADE 2
Outcome M02: Students will be expected to relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass. [C, CN, ME, R, V]
Outcome M04: Students will be expected to measure length to the nearest non-standard unit by using multiple copies of a unit and using a single copy of a unit (iteration process). [C, ME, R, V]
GRADE 3
Outcome M03: Students will be expected to demonstrate an understanding of measuring length (cm, m) by selecting and justifying referents for the units centimetre or metre (cm, m) modelling and describing the relationship between the units centimetre or metre (cm, m) estimating length using referents, measuring and recording length, width, and height [C, CN, ME, PS, R, V]

PRINCE EDWARD ISLAND
MATHEMATICS
SHAPES AND SPACE
GRADE 1
SS1 Demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared, ordering objects, making statements of comparison, filling, covering or matching.
SS4 Compare 2-D shapes to parts of 3-D objects in the environment.
GRADE 2
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).
SS4 Measure length to the nearest non-standard unit by: using multiple copies of a unit; using a single copy of a unit (iteration process).
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SS9 Identify 2-D shapes as parts of 3-D objects in the environment
GRADE 3
SS6 Describe 3-D objects according to the shape of the faces, and the number of edges and vertices.

NORTHWEST TERRITORIES
MATHEMATICS
KINDERGARTEN
11.9 Use direct or indirect measurement to solve problems. (Math GLO3a)
11.11 Describe characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them. (Math GLO3b)
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
MATHEMATICS KINDERGARTEN THROUGH GRADE 3
Please refer to the Alberta Curriculum

YUKON TERRITORIES
MATHEMATICS KINDERGARTEN THROUGH GRADE 3
Please refer to the British Columbia Curriculum

02.Working Railroad

ISTE

EMPOWERED LEARNER

1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

INNOVATIVE DESIGNER

4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

4c Students develop, test and refine prototypes as part of a cyclical design process.

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1A-AP-11

K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

1A-AP-12

K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.

1A-AP-14

K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

1A-AP-15

K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

NCSS

2. Time, Continuity, Change
3. People, Places and Environments
7. Production, Distribution, and Consumption
8. Science, Technology, and Society

NGSS

KINDERGARTEN

K-ESS3-3 Earth and Human Activity

Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

K-ESS3-1

Use a model to represent the relationship between different plants and animals (including humans) and the places they live.

PROVINCIAL STANDARDS

BRITISH COLOMBIA

APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3

https://curriculum.gov.bc.ca/curriculum/adst/k

SOCIAL STUDIES

KINDERGARTEN

People, places and events in the local community, and in local First Peoples communities

Needs and wants of individuals and families

GRADE 1

Characteristics of the local community that provide organization and meet the needs of the community

Relationships between a community and its environment

SCIENCE

KINDERGARTEN

Properties of familiar materials

GRADE 1

Specific properties of materials allow us to use them in different ways

ALBERTA

GRADE 1 SOCIAL STUDIES

MY WORLD: HOME, SCHOOL AND COMMUNITY

1.1.5 distinguish geographic features in their own community from other communities by exploring and reflecting upon the following questions for inquiry:

What are some familiar landmarks and places in my community? (CC, TCC)

Why are these landmarks and places significant features of the community? (CC, I, TCC)

What are some differences between rural and urban communities? (CC, LPP)

Where is my community on a map or on a globe? (LPP)

SKILLS AND PROCESSES FOR GRADE 1

1.S.3 Develop skills of geographic thinking:

use a simple map to locate specific areas within the school and community

Ask geographic questions, such as asking for directions

understand that globes and maps are visual representations of the world

Locate Canada on a globe or map

1.S.4 demonstrate skills of decision making and problem solving:

Collaborate with others to devise strategies for decision making and problem solving

Apply ideas and strategies to contribute to decision making and problem solving

SASKATCHEWAN

KINDERGARTEN SCIENCE

MOK.1 Investigate observable characteristics of familiar objects and materials in their environment.

GRADE 1 SCIENCE

OM1.1 Investigate observable characteristics and uses of natural and constructed objects and materials in their environment.

GRADE 1 SOCIAL STUDIES

DR1.4 Recognize globes and maps as representations of the surface of the Earth, and distinguish land and water masses on globes and maps.

MANITOBA

KINDERGARTEN SOCIAL STUDIES

0-KE-025 Give examples of basic needs. Examples: food, clothing, shelter...

0-KL-013 Give examples of how the natural environment influences daily life. Examples: work, play, clothing...

0-KL-015 Identify familiar places and landmarks. Examples: parks, statues, buildings, natural landmarks...

0-KL-016 Recognize globes, maps, and models as representations of actual places.

0-KG-020 Recognize that people all over the world have the same basic needs. Examples: food, clothing, shelter...

GRADE 1 SOCIAL STUDIES

1-KI-008 Identify characteristics of communities.

1-KL-014 Recognize globes and maps as representations of the surface of the Earth.

1-KL-015 Distinguish land and water masses on globes and maps.

1-KL-016 Identify and locate landmarks and significant places using relative terms. Examples: the statue is in the park beside the river...

1-KE-027 Give examples to distinguish needs from wants.

GRADE 1 SCIENCE

1-3-01 Use appropriate vocabulary related to their investigations of objects and materials.

1-3-02 Explore and describe characteristics of materials using their sensory observations.

1-3-04 Identify materials that make up familiar objects.

ONTARIO

KINDERGARTEN EXPECTATIONS

24.2 state problems and pose questions as part of the process of creating and designing

24.3 make predictions and observations as part of the process of creating and designing

28.2 recognize places and buildings within their community, both natural and human-made, and talk about their functions (e.g., farm, church, hospital, mosque, sweat lodge, arena, mine, cave)

31.3 explore different elements of design (e.g., colour, line, shape, texture, form) in visual arts

GRADE 1 SOCIAL STUDIES

B2.3 analyse maps, and construct simple maps using appropriate elements, as part of their investigations into the interrelationship between people and significant natural and built features in their community

B2.6 communicate the result of their inquiries using appropriate vocabulary

B3.4 demonstrate an understanding

GRADE 1 SCIENCE AND TECHNOLOGY

3.4 Describe the function/purpose of the observable characteristics of various objects and structures, using information gathered through their senses

3.5 identify the materials that make up objects and structures

QUEBEC

GEOGRAPHY, HISTORY, CITIZENSHIP EDUCATION

Knowledge Related to the Organization of a Society in its Territory

GRADE 1 TO 2 A.TODAY

1. Location in Space and Time

Orients himself/herself in space, a simple drawing, an illustration or a scale model

2. Human Elements:

b. Names needs satisfied by economic activities (e.g. food, entertainment)

c. Names means of transportation and transportation routes (e.g. car, train, airplane; highway, road, railway)

3. Natural elements

a. Names types of relief (e.g. plain, valley, plateau, hill, mountain chain)

b. Names elements of climate (e.g. precipitation, temperature)

c. Names bodies of water (e.g. river, lake)

d. Names natural resources (e.g. forest, water, fertile soil, minerals)
Knowledge Related to Change in a Society and its Territory
GRADE 1 TO 2 PAST AND PRESENT
c.Names changes in means of transportation and transportation routes

NEW BRUNSUICK
KINDERGARTEN TO GRADE 2 SOCIAL STUDIES
Unit 1 Students as Individuals
K 1.3 identify needs and wants that are common to all children;
K 1.5 recognize that families (local, national, and global) have varied traditions, rituals and celebrations;
K 1.6 identify and describe groups to which they belong
Unit 4 Place and Community
K 4.1 describe and locate some of the natural and constructed features of their community;

NOVA SCOTIA
SOCIAL STUDIES
GRADE 1
Learners will implement age-appropriate actions for responsible behaviour in caring for the environment.
Learners will analyse the difference between needs and wants.
SCIENCE PRIMARY
Learners will investigate materials through the senses.
SCIENCE GRADE 1
Learners will analyse interconnectedness of living things and the environment.

PRINCE EDWARD ISLAND
SOCIAL STUDIES
Primary Unit 3
E.3.1 begin to develop an awareness of their community
E.3.3 begin to develop an awareness of maps
GRADE 1
Unit 2 Environments
1.2.1 recognize that environments have natural and constructed features
1.2.2 describe how people depend upon and interact with different natural environments
1.2.3 take age-appropriate action to practise responsible behaviour in caring for the environment
Unit 3 Place and Time
1.3.1 demonstrate an understanding that signs, symbols, direction, and scale are used to represent landmarks and locations
1.3.2 demonstrate an understanding that the way people live in their community evolves over time
Unit 4 Needs and Wants
1.4.1 recognize that all people have needs and wants 1.4.2 demonstrate an understanding of the factors that influence how needs and wants are met 1.4.3 demonstrate an understanding of how communities depend on each other for the exchange of goods and services
SCIENCE
GRADE 1
PS-2 Evaluate the suitability of materials for a specific purpose

NORTHWEST TERRITORIES
SOCIAL STUDIES
KINDERGARTEN
1.9 Recognize familiar places and landmarks in the community and their connection to family and community history. (SS 3.1)
2.1 Identify basic common human needs and explore various ways in which those needs may be met. (SS.1.2)
3.1 Recognize the personal actions that can be taken to support the environment. (SS 3.2)
3.2 Describe characteristics of the local physical environment. (SS 3.2)
3.3 Give examples of how the natural environment influences daily life. (SS 3.2)
3.4 Appreciate the beauty and importance of the natural environment. (SS 3.2)
GRADE 1
KCC-008 Identify characteristics of communities.
KL-012 Recognize that people depend on the environment for survival.
KL-014 Recognize globes and maps as representations of the surface of the Earth.
KL-015 Distinguish land and water masses on globes and maps.
KL-016 Identify and locate landmarks and significant places using relative terms.
VL-007 Appreciate the beauty and benefits that the natural environment brings to their lives.
KE-027 Give examples to distinguish needs from wants.
SCIENCE
GRADE 1
Demonstrate awareness that structures have distinctive characteristics;
Explain the function of different structures

NUNAVUT
SOCIAL STUDIES GRADE 1 TO GRADE 3
Please refer to the Northwest Territories curriculum
SCIENCE KINDERGARTEN TO GRADE 3
Please refer to the Northwest Terretories curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

03.City Planner

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

NCSS

2. Time, Continuity, Change
3. People, Places and Environments
7. Production, Distribution, and Consumption
8. Science, Technology, and Society

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
SOCIAL STUDIES
GRADE 2
How people's needs and wants are met in communities
Relationships between people and the environment in different communities
Rights and responsibilities of individuals regionally and globally
GRADE 3
Interconnections of cultural and technological innovations of global and local indigenous peoples Relationships between humans and their environment

ALBERTA
GRADE 2 SOCIAL STUDIES
Canada's Dynamic Communities
2.1.1 Appreciate the physical and human geography of the communities studied:
Appreciate how a community's physical geography shapes identity (I, LPP)
Appreciate the diversity and vastness of Canada's land and peoples (CC, LPP)
Value oral history and stories as ways to learn about the land (LPP, TCC)
Acknowledge, explore and respect historic sites and monuments (CC, LPP, TCC)
Aemonstrate care and concern for the environment (C, ER, LPP)
SKILLS AND PROCESSES FOR GRADE 2
2.S.3 Develop skills of geographic thinking:
Use a simple map to locate communities studied in Canada
Determine distance on a map, using relative terms such as near/far, here/there
Apply the concept of relative location to determine locations of people and places

Use cardinal directions to locate communities studied in relation to one's own community
2.S.4 Demonstrate skills of decision making and problem solving:
Apply ideas and strategies to decision making and problem solving
Propose new ideas and strategies to contribute to decision making and problem solving
GRADE 3 SOCIAL STUDIES
Communities in the World
3.1.3 examine the geographic characteristics that shape communities in other parts of the world by exploring and reflecting upon the following questions for inquiry:
Where, on a globe and/or map, are the communities in relation to Canada? (LPP)
In what ways do the people in the communities depend on, adapt to and change the environment in which they live and work? (ER, LPP)
In what ways do the communities show concern for their natural environment? (GC, LPP)
How does the physical geography influence the human activities in the communities (e.g., availability of water, climate)? (CC, LPP)
GRADE 3 SKILLS AND PROCESSES
3.S.3 Develop skills of geographic thinking:
Create and use a simple map to locate communities studied in the world
Use cardinal and intermediate directions to locate places on maps and globes
Apply the concept of relative location to determine locations of people and places
Apply the terms hemisphere, poles, equator
3.S.4 Demonstrate skills of decision making and problem solving:
Apply new ideas and strategies to contribute to decision making and problem solving
Support proposed ideas, strategies and options with facts and reasons
Collaborate with others to devise strategies for dealing with problems and issues
Use technology to organize and display data in a problem-solving context

SASKATCHEWAN
GRADE 2 SOCIAL STUDIES
IN2.1 Determine characteristics of a community.
DR2.2 Analyze the influence of the natural environment on the local community.
DR2.3 Identify physical representations as constructed models of real things.
RW2.1 Describe ways in which the local community meets the needs and wants of its members.
GRADE 3 SOCIAL STUDIES
IN3.1 Analyze daily life in a diversity of communities.
DR3.2 Assess the degree to which the geography and related environmental and climatic factors influence ways of living on and with the land.
RW3.1 Appraise the ways communities meet their members' needs and wants.

MANITOBA
GRADE 2 SOCIAL STUDIES
2-KI-004 Identify the defining characteristics of communities.
2-KI-005 Describe characteristics of their local communities.
2-KCC-012 Identify common features of Canadian communities.
2-KL-016 Name natural resources in their local community.
2-KL-017 Give examples of ways in which the natural environment influences their communities.
2-KL-021 Give examples of ways in which the natural environment shapes daily life in communities studied.
2-KH-026 Identify ways in which life in Canadian communities has changed over time.
2-KE-036 Give examples of goods produced in Canadian communities.
2-KE-037 Describe different types of work in Canadian communities studied.
2-KE-038 Give examples of needs common to all Canadians.
GRADE 3 SOCIAL STUDIES
3-KG-029 Identify ways in which community services can help people acquire their basic human rights.
3-KL-017 Describe the influence of natural phenomena on ways of life in communities studied.
3-KE-036 Give examples of how the natural environment influences work, goods, technologies, and trade in communities studied.

ONTARIO
GRADE 2 SOCIAL STUDIES
B2.1 Formulate questions to guide investigations into some aspects of the interrelationship between the natural environment of selected communities and the ways in which people live
B2.3 Analyse and construct simple maps to determine and illustrate patterns in the interrelationship between the location of some communities and human activities in those communities
B3.6 Identify basic human needs and describe some ways in which people in communities around the world meet those needs
GRADE 3 SOCIAL STUDIES
B1.1 Describe some major connections between features of the natural environment of a region and the type of land use and/or the type of community that is established in that region.

B2.3 Analyse and construct print and digital maps, including thematic maps, as part of their investigations into the environmental impact of land and/or resource use in different municipal regions
B3.5 Describe major types of land use and how they address human needs and wants

QUEBEC
<u>GEOGRAPHY, HISTORY, CITIZENSHIP EDUCATION</u>
KNOWLEDGE RELATED TO THE ORGANIZATION OF A SOCIETY IN ITS TERRITORY
GRADE 1 TO 2 A.TODAY
1. Location in Space and Time
Orients himself/herself in space, a simple drawing, an illustration or a scale model
2. Human Elements:
b. Names needs satisfied by economic activities (e.g. food, entertainment)
c. Names means of transportation and transportation routes (e.g. car, train, airplane; highway, road, railway)
3. Natural elements
a. Names types of relief (e.g. plain, valley, plateau, hill, mountain chain)
b. Names elements of climate (e.g. precipitation, temperature)
c. Names bodies of water (e.g. river, lake)
d. Names natural resources (e.g. forest, water, fertile soil, minerals)
Knowledge Related to Change in a Society and its Territory
GRADE 1 TO 2 PAST AND PRESENT
c.Names changes in means of transportation and transportation routes
GRADE 3 SCIENCE AND TECHNOLOGY
Material World, System and Interaction
6. Transportation technology (e.g. car, airplane, boat) Recognizes the influence and impact of transportation technology on people's way of life and surroundings

NEW BRUNSUICK
KINDERGARTEN TO GRADE 2 SOCIAL STUDIES
Unit 1 Students as Individuals
K 1.3 identify needs and wants that are common to all children;
K 1.5 recognize that families (local, national, and global) have varied traditions, rituals and celebrations;
K 1.6 identify and describe groups to which they belong
Unit 4 Place and Community
K 4.1 describe and locate some of the natural and constructed features of their community;
Grade 3 Social Studies
3.1.2 Describe the major physical features, climates, and vegetation of their province and the Atlantic region
3.1.3 examine where people live and how people make a living in their province

NOVA SCOTIA
GRADE 2 SOCIAL STUDIES
Learners will investigate change in the community.
Learners will investigate how individuals and diverse cultural groups, including Acadians, African Nova Scotians, Gaels, and Mi'kmaq, have contributed to change.
Learners will investigate how decisions are made as consumers.
Learners will analyse ways for supporting sustainable development in local communities.
Grade 3 Social Studies
Learners will investigate the location of Nova Scotia in Atlantic Canada.

PRINCE EDWARD ISLAND
GRADE 2 SOCIAL STUDIES
2.4.1 explain how and why physical environments change over time
2.4.2 describe how people's interactions with their environment have changed over time
2.4.3 demonstrate an understanding of sustainable development and its importance to our future
GRADE 3 SOCIAL STUDIES
3.1.2 describe the major physical features, climates, and vegetation of their province and the Atlantic region

3.1.3 examine where people live and how people make a living in their province

NORTHWEST TERRITORIES
GRADE 2 SOCIAL STUDIES
KCC-004 Identify the defining characteristics of communities.
KCC-005 Describe characteristics of their local communities.
KCC-012 Identify common features of Canadian communities.
KL-016 Name natural resources in their local community.
KL-017 Give examples of ways in which the natural environment influences their communities.
KL-021 Give examples of ways in which the natural environment shapes daily life in communities studied.
KL-022 Explain the importance of conserving or restoring natural resources.
2-KH-026 Identify ways in which life in Canadian communities has changed over time.
2-KE-036 Give examples of goods produced in Canadian communities.
2-KE-037 Describe different types of work in Canadian communities studied.
2-KE-038 Give examples of needs common to all Canadians.
Grade 3 Social Studies
KCC-010 Describe characteristics of daily life in communities studied.

KL-017 Describe the influence of natural phenomena on ways of life in communities studied.
KL-018 Give examples of the use of natural resources in communities studied.
KL-019 Recognize that people have diverse ways of living on or with the land.
KG-029 Identify ways in which community services can help people acquire their basic human rights.
KE-035 Give examples of work, goods, and technologies in communities studied.
KE-036 Give examples of how the natural environment influences work, goods, technologies, and trade in communities studied.

NUNAVUT
SOCIAL STUDIES GRADES 1 TO GRADE 6
Please refer to the Northwest Terretories curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

04.Expressive Stories

COMMON CORE

ENGLISH LANGUAGE ARTS STANDARDS
WRITING
KINDERGARTEN
CCSS.ELA-LITERACY.W.K.3
Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.
GRADE 1
CCSS.ELA-LITERACY.W.1.3
Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.
Speaking & Listening
KINDERGARTEN
CCSS.ELA-LITERACY.SL.K.5
Add drawings or other visual displays to descriptions as desired to provide additional detail.
CCSS.ELA-LITERACY.SL.K.6
Speak audibly and express thoughts, feelings, and ideas clearly.
GRADE 1
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.SL.1.5
Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
CCSS.ELA-LITERACY.SL.1.6
Produce complete sentences when appropriate to task and situation.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
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GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
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K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
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1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
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K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

NCSS

4. Individual Development and Identity

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
ENGLISH LANGUAGE ARTS
KINDERGARTEN AND GRADE 1
Structure of story
Oral language strategies
Writing processes

ALBERTA
GRADE 1 ENGLISH LANGUAGE ARTS
General Outcome 2
2.3 Understand techniques and elements
Know that stories have beginnings, middles and endings
Tell what characters do or what happens to them in a variety of oral, print and other media texts
2.4 Generate ideas
Generate and contribute ideas for individual or group oral, Print and other media texts
General Outcome 4
4.3 Enhance presentation
Add such details as labels, captions and pictures to oral, Print and other media texts
Use effective oral and visual communication
Speak in a clear voice, with appropriate volume, to an audience
Demonstrate attentive listening and viewing
Ask questions to clarify information
Be attentive and show interest during listening or viewing activities
General Outcome 5
5.1 Respect Others and Strengthen Community
5.2 Work within a Group

SASKATCHEWAN
KINDERGARTEN ENGLISH LANGUAGE ARTS
Compose and Create
CCK.1 Compose and create various visual, multimedia, oral, and written texts that explore and present thoughts, ideas, and experiences.
CCK.2 Use and construct symbols, pictures, and dramatizations to communicate feelings and ideas in a variety of ways.
GRADE 1 ENGLISH LANGUAGE ARTS
Compose and Create
CC1.1 Compose and create a range of visual, multimedia, oral, and written texts that explore and present thoughts on identity (e.g., Feelings), community (e.g., Neighbourhood), social responsibility (e.g., Plants and Trees).
CC1.2 Represent key ideas and events, in a logical sequence and with detail, in different ways (including dramatization, pictures, sounds, physical movement, charts, models, and drawings).
CC1.3 Speak clearly and audibly about ideas, experiences, preferences, questions, and conclusions in a logical sequence, using expression and dramatization when appropriate.

MANITOBA
KINDERGARTEN SOCIAL STUDIES
0-KI-010 Identify different ways people communicate. Examples: art, dance, song, facial expression, body language, sign language
KINDERGARTEN TO GRADE 2
English Language Arts
Language as Exploration and Design
Language as Sense Making

ONTARIO
KINDERGARTEN EXPECTATIONS
1.3 use and interpret gestures, tone of voice, and other non-verbal means to communicate and respond (e.g., respond to non-verbal cues from the educator; vary tone of voice when dramatizing; name feelings and recognize how someone else might be feeling)
6.5 discuss and demonstrate in play what makes them happy and unhappy, and why
GRADE 1 LANGUAGE ORAL COMMUNICATION
2.3 communicate ideas and information orally in a clear, coherent manner
2.7 use one or more appropriate visual aids
GRADE 1 LANGUAGE WRITING
1.2 generate ideas about a potential topic, using a variety of strategies and resources
1.4 sort ideas and information for their writing in a variety of ways, with support and direction
1.5 identify and order main ideas and supporting details, initially with support and direction, using simple graphic organizers and simple organizational patterns

QUEBEC
ENGLISH LANGUAGE ARTS
Language learning process
B.Writing process
GRADE 1 TO 2
1. Prewriting: Understands the purpose for the writing
Writing Process
2.Drafting
c. Uses a structure that fits the type of writing (e.g. letter format, narrative)
3.Revision
b. Adds descriptive words and sufficient details
c. Sequences information, events

NEW BRUNSUICK
ENGLISH LANGUAGE ARTS KINDERGARTEN TO GR 3
2. Students will be able to communicate information and ideas effectively and clearly, and to respond personally and critically.
9. Students will be expected to create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes
10. Students will be expected to use a range of strategies to develop effective writing and media products to enhance their clarity, precision, and effectiveness.

NOVA SCOTIA
ENGLISH LANGUAGE ARTS PRIMARY
Learners will convey meaning by creating print and digital texts collaboratively and independently using imagination, personal experiences, and feelings.
Learners will use a range of strategies to develop effective writing and media products to enhance their clarity, precision and effectiveness.
ENGLISH LANGUAGE ARTS GRADE 1
Learners will interact using effective oral language skills considering audience, purpose, and situation.
Learners will convey meaning by creating print and digital texts collaboratively and independently using imagination, personal experiences, and feelings.
Learners will use writing and other forms of representation including, digital texts, to explore, clarify and reflect on their thoughts, feelings and experiences and learnings.

PRINCE EDWARD ISLAND
KINDERGARTEN
Early Literacy - Writing and Representing
4.2 begin to demonstrate an awareness of audience and purpose
LANGUAGE ARTS GRADE 1 TO GRADE 3
Students will speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences.
Students will be expected to use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations
Students will be expected to create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes.

NORTHWEST TERRITORIES
ENGLISH LANGUAGE ARTS PRIMARY TO GRADE 3
1.2.1 Combine ideas and develop understanding
4.1.1 Generate and focus ideas
4.1.2. Prepare to create texts: forms, genres, audience, purpose
4.1.3 Create original texts
4.4.1 Effective presentations
5.1.1 Work in groups

NUNAVUT
LANGUAGE ARTS KINDERGARTEN TO GRADE 6
Please refer to the NORTHWEST TERRITORIES curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the BRITISH COLOMBIA Curriculum

05.Metamorphasis

COMMON CORE
GRADE 2 MATHEMATICS GEOMETRY
CCSS.MATH.CONTENT.2.G.A.1
Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

ISTE
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INNOVATIVE DESIGNER
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4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA
1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS
BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 3
https://curriculum.gov.bc.ca/curriculum/adst/3
MATHEMATICS Gr 2
Direct Linear Measurement
2D Shapes and 3D objects
https://curriculum.gov.bc.ca/curriculum/mathematics/2
SCIENCE Gr 2
Metamorphic and non-metamorphic life cycles of different organisms
Similarities and differences between offspring and parent

ALBERTA
GRADE 2 MATHEMATICS SHAPES AND SPACE
Specific Outcome 8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.
GRADE 2 SCIENCE
Topic E- Small Crawling and Flying Animals
2–10 Describe the general structure and life habits of small crawling and flying animals; e.g., insects, spiders, worms, slugs; and apply this knowledge to interpret local species that have been observed.

SASKATCHEWAN
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS2.4 Describe, compare, and construct 2-D shapes, including: triangles, squares, rectangles, circles.
GRADE 2 SCIENCE
Life Science: Animal Growth and Changes
AN2.1 Analyze the growth and development of familiar animals, including birds, fish, insects, reptiles, amphibians, and mammals, during their life cycles.

MANITOBA
GRADE 2 MATHEMATICS SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes, including, triangles, squares, rectangles, circles
GRADE 2 SCIENCE
CLUSTER 1: GROWTH AND CHANGES IN ANIMALS
2-1-01 Use appropriate vocabulary related to their investigations of growth and changes in animals.
2-1-14 Describe changes in the appearance and activity of various animals as they go through a complete life cycle

ONTARIO
GRADE 2 MATHEMATICS GEOMETRY AND SPATIAL SENSE
-compose and describe pictures, designs, and patterns by combining two -dimensional shapes

GRADE 2 SCIENCE AND TECHNOLOGY GROWTH AND CHANGES IN ANIMALS
2.3 Investigate the lifecycle of a variety of animals, using a variety of methods and resources
2.4 Observe and compare changes in the appearance and activity of animals as they go through a complete life cycle
2.7 Use appropriate science and technology vocabulary, including life cycle, migration, adaptation, body coverings, and classify, in oral and written communication
2.8 Use a variety of forms to communicate with different audiences and for a variety of purposes

3.1 Identify and describe the major physical characteristics of different types of animals

QUEBEC
GRADE 2 MATHEMATICS
Geometry
C. Plane Figures
GRADE 1-2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
3. Describes plane figures (square, rectangle, triangle and rhombus)

NEW BRUNSUICK
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare, and construct 2-D shapes, including, triangles, squares, rectangles, circles

NOVA SCOTIA
GRADE 2 MATHEMATICS GEOMETRY
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles.
SCIENCE GRADE 2
Learners will analyse the relationship between animal growth and the environment.

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare, and construct 2-D shapes, including, triangles, squares, rectangles, circles
GRADE 2 SCIENCE ANIMAL GROWTH AND CHANGE
Investigating the Needs and Life Cycles of an Organism

NORTHWEST TERRITORIES
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum
SCIENCE GRADE 2
Identify and describe the major physical characteristics of different types of animals
Describe changes in the appearance and activity of an animal as it goes through a complete life cycle
Identify constant and changing traits in the same species of animals as they grow and mature
Use appropriate vocabulary in describing their investigations, explorations, and observations
Communicate the procedures and results of investigations for specific purposes using drawings, demonstrations, and oral or written descriptions

NUNAVUT
MATHEMATICS KINDERGARTEN THROUGH GRADE 3
Please refer to the Alberta Curriculum
SCIENCE KINDERGARTEN THROUGH GRADE 3
Please refer to the NORTHWEST TERRITORIES Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the BRITISH COLOMBIA Curriculum

06.Memory Matching Game

COMMON CORE

KINDERGARTEN
CCSS.MATH.CONTENT.K.G.A.2
Correctly name shapes regardless of their orientations or overall size.
CCSS.MATH.CONTENT.K.G.A.3
Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
CCSS.MATH.CONTENT.K.G.B.5
Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
CCSS.MATH.CONTENT.K.MD.B.3
Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
GRADE 1 MATHEMATICS GEOMETRY
CCSS.MATH.CONTENT.1.G.A.1
Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
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K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS KINDERGARTEN
Single Attributes of 2D shapes and 3D objects
Repeating Patterns with 2 or 3 elements
https://curriculum.gov.bc.ca/curriculum/mathematics/k
MATHEMATICS GRADE 1
Repeating patterns with multiple elements and attributes: Identifying sorting rules
https://curriculum.gov.bc.ca/curriculum/mathematics/1

ALBERTA
KINDERGARTEN MATHEMATICS PATTERNS AND RELATIONS
Specific Outcome 2
Sort a set of objects based on a single attribute, and explain the sorting rule.
GRADE 1 MATHEMATICS PATTERNS AND RELATIONS
Specific Outcome 3
Sort objects, using one attribute, and explain the sorting rule.

MANITOBA
GRADE 1 MATHEMATICS SHAPE AND SPACE
1.SS.2. Sort 3-D objects and 2-D shapes using one attribute, and explain the sorting rule.

ONTARIO
KINDERGARTEN EXPECTATIONS
17.2 communicate an understanding of basic spatial relationships (e/g/, use terms such as "above/below", "in/out", "forward/backward"- use visualization, perspective, and movements [flips/reflections, slides/translations, and turns/rotations]) in their conversations and play, in their predictions and visualizations, and during transitions and routines
20.5 investigate and describe how objects can be collected, grouped, and organized according to similarities and differences (e.g., attributes like size, colour)
GRADE 1 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Identify and describe common 2-D shapes.
GRADE 1 DATA MANAGEMENT AND PROBABILITY
Demonstrate an ability to organize objects into categories by sorting and classifying objects using one attribute and by describing informal sorting experiences

QUEBEC
MATHEMATICS
C. Plane Figures
GRADE 1-2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
3. Describes plane figures (square, rectangle, triangle and rhombus)

NEW BRUNSUICK
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.

PRINCE EDWARD ISLAND
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.

NORTHWEST TERRITORIES
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
MATHEMATICS KINDERGARTEN THROUGH GRADE 3
Please refer to the Alberta Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

07.Olympic Rings

COMMON CORE

GRADE 1 GEOMETRY
CCSS.MATH.CONTENT.1.G.A.2
Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
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CSTA

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1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

NCSS

9. Global Connections

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS GRADE 1
Comparison of 2D shapes and 3D objects
MATHEMATICS GRADE 2
Multiple attributes of 2D shapes and 3D objects

ALBERTA
GRADE 1 MATHEMATICS SHAPES AND SPACE
Specific Outcome 3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPES AND SPACE
Specific Outcome 8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.
GRADE 1 ENGLISH LANGUAGE ARTS
General Outcome 2 2.3 Understand forms and genres
Distinguish differences in the ways various oral, print and other media texts are organized
Identify various forms of media texts
GRADE 2 ENGLISH LANGUAGE ARTS
General Outcome 2 2.3Understand forms and genres
Recognize that ideas and information can be expressed in a variety of oral, print and other media texts
Identify and explain the use of various communication technologies

SASKATCHEWAN
GRADE 1 MATHEMATICS SHAPE AND SPACE
1.SS.3. Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes, including triangles squares rectangles circles
GRADE 2 ENGLISH LANGUAGE ARTS
CR2.2 View and explain (with support from the text) the key literal and inferential ideas (messages), important details, and how elements (such as colour, layout, medium, and special fonts) enhance meaning in grade-appropriate visual and multimedia texts.

MANITOBA
GRADE K - 2
ENGLISH LANGUAGE ARTS
Language as Power and Agency
GRADE 1 MATHEMATICS SHAPE AND SPACE
1.SS.3. Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes, including triangles squares rectangles circles

ONTARIO
GRADE 1 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Identify and describe common two-dimensional shapes and sort and classify them by their attributes using concrete materials and pictorial representations.
Compose patterns, pictures, and designs using common two-dimensional shapes
GRADE 2 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Compose and describe pictures, designs and patterns by combining two-dimensional shapes

GRADE 1 LANGUAGE MEDIA
1.6 Identify with support and direction, who makes some of the simple media texts with which they are familiar and why those texts are produced
2.1 Identify some of the elements and characteristics of a few simple media forms
GRADE 2 LANGUAGE MEDIA
1.6 Identify, initially with support and direction, who makes some of the simple media texts with which they are familiar and why those texts are produced
2.1 Identify some of the elements and characteristics of selected media forms

QUEBEC
MATHEMATICS
C. Plane Figures
GRADE 1-2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
3. Describes plane figures (square, rectangle, triangle and rhombus)
ENGLISH LANGUAGE ARTS
Conventions of Written and Media Language
B. Producing and Interpreting Media Texts
The student interprets and uses some common conventions of media language to connote meaning(s)/message(s) in a ***specific*** context/situation:
1. Images (in photographs, drawings and illustrations):
Uses and interprets the visual element of color (e.g. dark reds and blacks in a picture
book to show anger or fear)
A. Uses and interprets the visual element of color

NEW BRUNSUICK
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare, and construct 2-D shapes, including triangles squares rectangles circles
ENGLISH LANGUAGE ARTS KINDERGARTEN TO GR 3
7. Students will be expected to respond critically to a range of texts, applying their knowledge of language, form, and genre.

NOVA SCOTIA
ENGLISH LANGUAGE ARTS GR 1 TO GR 2
Learners will respond personally and critically to a range of culturally diverse texts.
GRADE 2 MATHEMATICS GEOMETRY
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles.

PRINCE EDWARD ISLAND
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare, and construct 2-D shapes, including triangles squares rectangles circles

ENGLISH LANGUAGE ARTS ENTRY TO GRADE 3
Students will be expected to respond critically to a range of texts, applying their knowledge of language, form, and genre.

NORTHWEST TERRITORIES
SOCIAL STUDIES
GRADE 1
KE-028 Give examples of how media may influence their needs, wants, and choices. Include: advertising and television programming.
GRADE 2
KE-039 Give examples of media influences on their choices and decisions.
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
MATHEMATICS KINDERGARTEN THROUGH GRADE 3
Please refer to the Alberta Curriculum
LANGUAGE ARTS KINDERGARTEN THROUGH GRADE 3
Please refer to the NORTHWEST TERRITORIES Curriculum
SOCIAL STUDIES GRADE 1 THROUGH GRADE 3
Please refer to the NORTHWEST TERRITORIES Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the BRITISH COLOMBIA Curriculum

08.Concentric Shapes

COMMON CORE

GRADE 2 MATHEMATICS GEOMETRY
CCSS.MATH.CONTENT.2.G.A.1
Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
GRADE 3 MATHEMATICS GEOMETRY
CCSS.MATH.CONTENT.3.G.A.1
Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

ISTE

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1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
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4c Students develop, test and refine prototypes as part of a cyclical design process.
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K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS

BRITISH COLOMBIA
ARTS EDUCATION 2
https://curriculum.gov.bc.ca/curriculum/arts-education/2
ARTS EDUCATION 3
https://curriculum.gov.bc.ca/curriculum/arts-education/3
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS Grade 2
Multiple attributes of 2D shapes and 3D objects

ALBERTA
GRADE 2 ARTS EDUCATION
Component 3 [APPRECIATION] Students will interpret artworks literally.
Component 4 [MAIN FORMS AND PROPORTION] Students will learn the shapes of things as well as develop decorative styles.
Component 8 [UNITY] Students will create unity through density and rhythm.
Component 10 (i) [PURPOSE 3] Students will decorate items personally created.
GRADE 3 ARTS EDUCATION
Component 3 [APPRECIATION] Students will interpret artworks by examining their context and less visible characteristics.
Component 4 [MAIN FORMS AND PROPORTION] Students will perfect forms and develop more realistic treatments.
Component 8 [UNITY] Students will create unity by interrelating the parts of a composition.
GRADE 2 MATHEMATICS
Shape and Space
Specific Outcome 8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.

SASKATCHEWAN
MATHEMATICS 2 SHAPE AND SPACE OUTCOMES
SS2.4 Describe, compare, and construct 2-D shapes, including: triangles, squares, rectangles, and circles.
[C, CN, R, V]
MATHEMATICS 3 SHAPE AND SPACE OUTCOMES
SS3.5 Demonstrate understanding of 2-D shapes (regular and irregular) including triangles, quadrilaterals, pentagons, hexagons, and octagons including: describing, comparing, and sorting
ARTS EDUCATION GRADE 2
Creative/Productive Visual Arts
CP2.8 Create art works using a variety of visual art concepts (e.g., secondary colours), forms (e.g., collage, drawing, painting, sculpture, mobile, traditional art), and media (e.g., paper, found objects, paint, crayons).
ARTS EDUCATION GRADE 3
Creative/Productive Visual Arts
CP3.8 Create art works using a variety of visual art concepts (e.g., contour lines), forms (e.g., drawing, sculpture), and media (e.g., pencils, pastels, found objects).
CRITICAL/RESPONSIVE
CR3.1 Describe ideas and problem-solving processes used in own arts expressions

MANITOBA
MATHEMATICS GR 2 SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles
[C, CN, R, V]
KINDERGARTEN TO GR 8 VISUAL ARTS
Art Language and Tools (A—L1) Students demonstrate understanding of the elements and principles of artistic design in a variety of contexts.
Valuing Artistic Experience (A—V1) Students demonstrate interest, curiosity, and engagement while experiencing art in a variety of contexts

ONTARIO
MATHEMATICS GR 2 GEOMETRY AND SPATIAL SENSE
-Identify and describe various polygons and sort and classify them by their geometric properties using concrete materials and pictorial representations.
-compose and describe pictures, designs, and patterns by combining two -dimensional shapes
MATHEMATICS GR 3 GEOMETRY AND SPATIAL SENSE
-Identify and compare various polygons and sort them by their geometric properties.
-Compare various angles using concrete materials and pictorial representations and describe angles as bigger than smaller than or about the same as other angles.
GRADE 2 AND GRADE 3 ARTS - VISUAL ARTS
D1.2 Demonstrate an understanding of composition, using principles of design to create narrative art works or art works on a theme or topic
D1.4 use a variety of materials, tools, and techniques to respond to design challenges

QUEBEC
MATHEMATICS
MEASUREMENT GR 2
1. Compares lengths
GEOMETRY C. PLANE FIGURES GRADE 1 TO 2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
3. Describes plane figures (square, rectangle, triangle and rhombus)
GEOMETRY C. PLANE FIGURES GRADE 3
5. Identifies and constructs parallel lines and perpendicular lines
6. Describes quadrilaterals (e.g. parallel segments, per-

pendicular segments, right angles, acute angles, obtuse angles)
VISUAL ARTS
KNOWLEDGE
B. LANGUAGE OF VISUAL ARTS
1. SHAPE
Grade 2 a. Names rounded or angular shapes
Grade 3 b. Identifies rounded or angular shapes
2. LINE
Grade 3 b. Identifies lines, including horizontal, vertical, short and long lines
6. PATTERN
Grade 2 a. Names some patterns
Grade 3 b. Identifies some patterns
8. SPATIAL ORGANIZATION
Grade 2 a.Names ways of organizing elements in space: enumeration, juxtaposition, repetition and alternance
Grade 3 b. Identifies ways of organizing elements in space, including superimposition, symmetry and asymmetry
APPLICATIONS OF KNOWLEDGE
A. To use personal ideas inspired by the stimulus for creation
Grade 2 a. Looks for an idea related to the stimulus for creation while consulting sources of information
Grade 3 b. Looks for a few ideas related to the stimulus for creation while consulting sources of information
B. To use transforming gestures and elements of visual arts language
2. LANGUAGE OF VISUAL ARTS
Grade 2 Experiments with elements of visual arts language: shape, line, colour, value, texture, pattern, volume
Grade 3 b. Uses elements of visual arts language
c. Uses a variety of elements of visual arts language

NEW BRUNSUICK
MATHEMATICS GR 2 SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles [C, CN, R, V]
VISUAL ARTS
K-2.1.1 create art for a variety of reasons and recognize that there are many kinds of visual arts
K-2.2.1 explore the elements (colour, shape, line, value, space, form, and texture) and the principles of design with emphasis on pattern and repetition in the visual environment (Refer to "Elements of Art & Design: Mapped", page 29)
K-2.2.2 explore basic art skills, techniques, and vocabulary through a wide range of materials and available technologies
3.1.1 explore line, shape and form, space, colour, value and texture and the principles of pattern and repetition in the visual environment
3.1.5 explore a range of materials, tools, equipment, and processes

NOVA SCOTIA
VISUAL ARTS
GRADE 2 AND GRADE 3
Outcome 1: Students will explore and manipulate a range of materials, technologies, and processes to create a variety of artworks that express feelings, ideas, and understandings.
Outcome 3: Students will demonstrate an awareness of, reflect upon, and develop respect for art and art making.
MATHEMATICS GEOMETRY 2-D SHAPES
GRADE 2
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles. [C, CN, R, V]
GRADE 3
Outcome G02: Students will be expected to name, describe, compare, create, and sort regular and irregular polygons, including triangles, quadrilaterals, pentagons, hexagons, and octagons according to the number of sides. [C, CN, R, V]

PRINCE EDWARD ISLAND
MATHEMATICS SHAPES AND SPACE GRADE 2
SS8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles [C, CN, R, V]
SS9 Identify 2-D shapes as parts of 3-D objects in the environment
VISUAL ARTS
GRADE 2
Strand 1 develop and demonstrate an understanding of the elements and principles of art and design in creating and viewing artwork (FC2.1)
Strand 2 use a variety of materials, tools, and techniques to respond to design challenges (CP2.4)
GRADE 3
Strand 1 develop and demonstrate an understanding of the elements and principles of art and design in creating and viewing artwork (FC3.1)
Strand 2 use a variety of materials, tools, and techniques to respond to design challenges (CP3.4)

NORTHWEST TERRITORIES
VISUAL ARTS GRADE 2 AND GRADE 3
Please refer to the Saskatchewan Curriculum
MATHEMATICS GRADE 2 AND GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
MATHEMATICS GRADE 2 AND GRADE 3
Please refer to the Alberta Curriculum
VISUAL ARTS GRADE 2 AND GRADE 3
Please refer to the Saskatchewan Curriculum
YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the BRITISH COLOMBIA Curriculum

09.Caterpillar

COMMON CORE

GRADE 1 MATHEMATICS GEOMETRY
CCSS.MATH.CONTENT.1.G.A.1
Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
CCSS.MATH.CONTENT.1.G.A.2
Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.
Grade 1 Geometry
Grade 2 Mathematics Geometry
CCSS.MATH.CONTENT.2.G.A.1

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

NGSS

GRADE 1
1-LS1-2 Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS 2
Multiple attributes of 2D Shapes and 3D objects
https://curriculum.gov.bc.ca/curriculum/mathematics/2
SCIENCE
GRADE 1
Names of local plants and animals
Structural features of living things in the local environment
GRADE 2
Metamorphic and non-metamorphic life cycles of

different organisms
Similarities and differences between offspring and parent

ALBERTA
GRADE 1 MATHEMATICS SHAPES AND SPACE
Specific Outcome 3
Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPES AND SPACE
Specific Outcome 8
Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.
GRADE 1 SCIENCE
Topic E: Small Crawling and Flying Animals
1-11 Describe some common living things, and identify needs of those living things.
GRADE 2 SCIENCE
Topic E: Small Crawling and Flying Animals
2–10 Describe the general structure and life habits of small crawling and flying animals; e.g., insects, spiders, worms, slugs; and apply this knowledge to interpret local species that have been observed.

SASKATCHEWAN
MATHEMATICS GRADE 1 SHAPE AND SPACE
SS1.3
Replicate composite 2-D shapes and 3-D objects.
MATHEMATICS GRADE 2 SHAPE AND SPACE
SS2.4
Describe, compare, and construct 2-D shapes, including: triangles, squares, rectangles, circles.
GRADE 2 SCIENCE
Life Science: Animal Growth and Changes
AN2.1
Analyze the growth and development of familiar animals, including birds, fish, insects, reptiles, amphibians, and mammals, during their life cycles.
Physical Science: Motion and Relative Position
MP2.1
Analyze methods of determining the position of objects relative to other objects.

MANITOBA
GRADE 1 MATHEMATICS SHAPE AND SPACE
1.SS.3. Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes, including triangles, squares, rectangles,circles
GRADE 1 SCIENCE
Differentiate between living things according to observable characteristics, including appearance and behavior.
GRADE 2 SCIENCE
Cluster 1: Growth and Changes in Animals
2-1-01 Use appropriate vocabulary related to their investigations of growth and changes in animals.
2-1-14 Describe changes in the appearance and activity of various animals as they go through a complete life cycle
Cluster 3: Position and Motion
2-3-01 Use appropriate vocabulary related to their investigations of position and motion.
2-3-03 Explore and describe changes in the position of an object in relation to its original position, themselves, or another object.

ONTARIO
GRADE 1 MATHEMATICS
GEOMETRY AND SPATIAL SENSE
Identify and describe common two-dimensional shapes and sort and classify them by their attributes using concrete materials and pictorial representations.
Compose patterns, pictures, and designs using common two-dimensional shapes
GRADE 1 SCIENCE AND TECHNOLOGY
UNDERSTANDING LIFE SYSTEMS
3.2 Identify the physical characteristics of a variety of plants and animals
GRADE 2 MATHEMATICS
GEOMETRY AND SPATIAL SENSE
Compose and describe pictures, designs and patterns by combining two-dimensional shapes
GRADE 2 SCIENCE AND TECHNOLOGY
GROWTH AND CHANGES IN ANIMALS
2.3 Investigate the life cycle of a variety of animals using a variety of methods and resources
2.4 observe and compare changes in the appearance and activity of animals as they go through a complete life cycle
2.7 Use appropriate science and technology vocabulary
2.8 Use a variety of forms to communicate with different audiences and for a variety of purposes
Movement
2.2 Investigate and describe different kinds of movement
2.6 Use a variety of forms to communicate with different audiences and for a variety of purposes
3.1 describe different ways in which objects move

QUEBEC
GEOMETRY C. PLANE FIGURES GRADE 1 TO 2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
10. Describes circles

NEW BRUNSWICK
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.

NOVA SCOTIA
GRADE 2 MATHEMATICS GEOMETRY
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles.
GRADE 2 SCIENCE
Learners will analyze the relationship between animal growth and the
Environment.
Learners will test motion of objects.

PRINCE EDWARD ISLAND
SCIENCE
GRADE 1
LS – 2 Classify the characteristics and needs of living things
GRADE 2
Animal Growth and Change
Assist in setting up and maintain a life-supporting environment for an organism such as a mealworm or caterpillar
Physical Science
Describe the position of an object relative to other objects, using language such as "to the left of", "on top", "beside" or "two giant steps behind", or to an identified space, and place an object in an identified position
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.

NORTHWEST TERRITORIES
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum
SCIENCE GRADE 2
Identify and describe the major physical characteristics of different types of animals
Describe changes in the appearance and activity of an animal as it goes through a complete life cycle
Identify constant and changing traits in the same species of animals as they grow and mature
Use appropriate vocabulary in describing their investigations, explorations, and observations
Communicate the procedures and results of investigations for specific purposes using drawings, demonstrations, and oral or written descriptions

NUNAVUT
MATHEMATICS KINDERGARTEN THROUGH GRADE 3
Please refer to the Alberta Curriculum

SCIENCE KINDERGARTEN THROUGH GRADE 3
Please refer to the Northwest Territories Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the BRITISH COLOMBIA Curriculum

10.All About Me

COMMON CORE

GRADE 1 GEOMETRY
CCSS.MATH.CONTENT.1.G.A.2
Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.
GRADE 2 GEOMETRY
CCSS.MATH.CONTENT.2.G.A.1
Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

NCSS

4. Individual Development and Identity

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS 2
Multiple attributes of 2D Shapes ***and*** 3D objects
https://curriculum.gov.bc.ca/curriculum/mathematics/2

ALBERTA
GRADE 1 MATHEMATICS SHAPES AND SPACE
Specific Outcome 3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPES AND SPACE
Specific Outcome 8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.

SASKATCHEWAN
MATHEMATICS GRADE 1 SHAPE AND SPACE
SS1.3 Replicate composite 2-D shapes and 3-D objects.
MATHEMATICS GRADE 2 SHAPE AND SPACE
SS2.4 Describe, compare, and construct 2-D shapes, including: triangles, squares, rectangles, circles.
GRADE 2 SCIENCE
Physical Science: Motion and Relative Position
MP2.1 Analyze methods of determining the position of objects relative to other objects.

MANITOBA
GRADE 2 MATHEMATICS SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes, including triangles, squares, rectangles,circles
GRADE 1 MATHEMATICS SHAPE AND SPACE
1.SS.3. Replicate composite 2-D shapes and 3-D objects.
GRADE 2 SCIENCE
Cluster 3: Position and Motion
2-3-01 Use appropriate vocabulary related to their investigations of position and motion.
2-3-03 Explore and describe changes in the position of an object in relation to its original position, themselves, or another object.

ONTARIO
GRADE 1 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Identify and describe common two-dimensional shapes and sort and classify them by their attributes using concrete materials and pictorial representations.
Compose patterns, pictures, and designs using common two-dimensional shapes
GRADE 2 MATHEMATICS GEOMETRY AND SPATIAL SENSE
Identify and describe various polygons and sort and classify them by their geometric properties
Compose and describe pictures, designs and patterns by combining two-dimensional shapes
GRADE 2 SCIENCE AND TECHNOLOGY MOVEMENT
2.2 Investigate and describe different kinds of movement
3.1 Describe different ways in which objects move

QUEBEC
GEOMETRY C. PLANE FIGURES GRADE 1 TO 2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
3. Describes plane figures (square, rectangle, triangle and rhombus)

NEW BRUNSUICK
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare, and construct 2-D shapes, including triangles, squares, rectangles,circles.

NOVA SCOTIA
GRADE 2 MATHEMATICS GEOMETRY
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles.
GRADE 2 SCIENCE
Learners will test motion of objects.

PRINCE EDWARD ISLAND
SCIENCE
GRADE 2
Physical Science
describe the position of an object relative to other objects, using language such as "to the left of", "on top", "beside" or "two giant steps behind", or to an identified space, and place an object in an identified position
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS3 Replicate composite 2-D shapes and 3-D objects.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare, and construct 2-D shapes, including triangles, squares, rectangles,circles.

NORTHWEST TERRITORIES
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

11.Home Sweet Home

COMMON CORE

GRADE 2 GEOMETRY
CCSS.MATH.CONTENT.2.G.A.1
Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
GRADE 3 GEOMETRY
CCSS.MATH.CONTENT.3.G.A.1
Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.

1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS Grade 2
Multiple attributes of 2D shapes and 3D objects
ARTS EDUCATION 2
https://curriculum.gov.bc.ca/curriculum/arts-education/2
ARTS EDUCATION 3
https://curriculum.gov.bc.ca/curriculum/arts-education/3

ALBERTA
GRADE 2 MATHEMATICS SHAPES AND SPACE
Specific Outcome 8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.
GRADE 2 ARTS EDUCATION
Component 3 [APPRECIATION] Students will interpret artworks literally.
Component 4 [MAIN FORMS AND PROPORTION] Students will learn the shapes of things as well as develop decorative styles.
Component 8 [UNITY] Students will create unity through density and rhythm.
Component 10 (i) [PURPOSE 3] Students will decorate items personally created.
Grade 3 ARTS EDUCATION
Component 3 [APPRECIATION] Students will interpret artworks by examining their context and less visible characteristics.
Component 4 [MAIN FORMS AND PROPORTION] Students will perfect forms and develop more realistic treatments.
Component 8 [UNITY] Students will create unity by interrelating the parts of a composition.

SASKATCHEWAN
MATHEMATICS GRADE 2 SHAPE AND SPACE
SS2.4 Describe, compare, and construct 2-D shapes, including: triangles, squares, rectangles, circles.
MATHEMATICS 3 SHAPE AND SPACE OUTCOMES
SS3.5 Demonstrate understanding of 2-D shapes (regular and irregular) including triangles, quadrilaterals, pentagons, hexagons, and octagons including: • describing • comparing • sorting

ARTS EDUCATION GRADE 2
Creative/Productive Visual Arts
CP2.8 Create art works using a variety of visual art concepts (e.g., secondary colours), forms (e.g., collage, drawing, painting, sculpture, mobile, traditional art), and media (e.g., paper, found objects, paint, crayons).
ARTS EDUCATION GRADE 3
Creative/Productive Visual Arts
CP3.8 Create art works using a variety of visual art concepts (e.g., contour lines), forms (e.g., drawing, sculpture), and media (e.g., pencils, pastels, found objects).
Critical/Responsive
CR3.1 Describe ideas and problem-solving processes used in own arts expressions

MANITOBA
MATHEMATICS GR 2 SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles
[C, CN, R, V]
KINDERGARTEN TO GR 8 VISUAL ARTS
Art Language and Tools (A—L1) Students demonstrate understanding of the elements and principles of artistic design in a variety of contexts.
Valuing Artistic Experience (A—V1) Students demonstrate interest, curiosity, and engagement while experiencing art in a variety of contexts

ONTARIO
MATHEMATICS GR 2 GEOMETRY AND SPATIAL SENSE
-Identify and describe various polygons and sort and classify them by their geometric properties using concrete materials and pictorial representations.
-compose and describe pictures, designs and patterns by combining two-dimensional shapes
Mathematics Gr 3 Geometry and Spatial Sense
-Identify and compare various polygons and sort them by their geometric properties.
-Compare various angles using concrete materials and pictorial representations and describe angles as bigger than smaller than or about the same as other angles.
Grade 2 and Grade 3 Arts - Visual Arts
D1.2 Demonstrate an understanding of composition, using principles of design to create narrative art works or art works on a theme or topic
D1.4 use a variety of materials, tools, and techniques to respond to design challenges

QUEBEC
MATHEMATICS
GEOMETRY C. PLANE FIGURES GRADE 1 TO 2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)

3. Describes plane figures (square, rectangle, triangle and rhombus)
GEOMETRY C. PLANE FIGURES GRADE 3
5. Identifies and constructs parallel lines and perpendicular lines
6. Describes quadrilaterals (e.g. parallel segments, perpendicular segments, right angles, acute angles, obtuse angles)
VISUAL ARTS
Knowledge
B. LANGUAGE OF VISUAL ARTS
1. SHAPE
Grade 2 a. Names rounded or angular shapes
Grade 3 b. Identifies rounded or angular shapes
2. LINE
Grade 3 b. Identifies lines, including horizontal, vertical, short and long lines
8. SPATIAL ORGANIZATION
Grade 2 a.Names ways of organizing elements in space: enumeration, juxtaposition, repetition and alternance
Grade 3 b. Identifies ways of organizing elements in space, including superimposition, symmetry and asymmetry
APPLICATIONS OF KNOWLEDGE
A. To use personal ideas inspired by the stimulus for creation
Grade 2 a. Looks for an idea related to the stimulus for creation while consulting sources of information
Grade 3 b. Looks for a few ideas related to the stimulus for creation while consulting sources of information
B. TO USE TRANSFORMING GESTURES AND ELEMENTS OF VISUAL ARTS LANGUAGE
2. LANGUAGE OF VISUAL ARTS
Grade 2 Experiments with elements of visual arts language: shape, line, colour, value, texture, pattern, volume
Grade 3 b. Uses elements of visual arts language
c. Uses a variety of elements of visual arts language

NEW BRUNSUICK
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS8 Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles.
GRADE 3 MATHEMATICS SHAPE AND SPACE
SS7 Sort regular and irregular polygons, including triangles, quadrilaterals, pentagons, hexagons,and octagons according to the number of sides.

VISUAL ARTS
K-2.1.1 create art for a variety of reasons and recognize that there are many kinds of visual arts
K-2.2.1 explore the elements (colour, shape, line, value, space, form, and texture) and the principles of design with emphasis on pattern and repetition in the visual environment (Refer to "Elements of Art & Design: Mapped", page 29)
K-2.2.2 explore basic art skills, techniques, and vocabulary through a wide range of materials and available technologies
3.1.1 explore line, shape and form, space, colour, value and texture and the principles of pattern and repetition in the visual environment
3.1.5 explore a range of materials, tools, equipment, and processes

NOVA SCOTIA
MATHEMATICS
GR 2 GEOMETRY
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles.
GR 3 GEOMETRY
Outcome G02: Students will be expected to name, describe, compare, create, and sort regular and irregular polygons, including triangles, quadrilaterals, pentagons, hexagons, and octagons according to the number of sides.
VISUAL ARTS
GRADE 2
Outcome 1: Students will explore and manipulate a range of materials, technologies, and processes to create a variety of artworks that express feelings, ideas, and understandings.
Outcome 2: Students will examine a range of artworks from diverse cultures and communities, including Acadians, African Nova Scotians, Gaels, and Mi'kmaq, with respect and sensitivity.
Outcome 3: Students will demonstrate an awareness of, reflect upon, and develop respect for art and art making.
GRADE 3
Outcome 1: Students will explore and manipulate a range of materials, technologies, and processes to create a variety of artworks that express feelings, ideas, and understandings.
Outcome 3: Students will demonstrate an awareness of, reflect upon, and develop respect for art and art making.
PRINCE EDWARD ISLAND
VISUAL ARTS
GRADE 2 AND GRADE 3
Strand 1 develop and demonstrate an understanding of the elements and principles of art and design in creating and viewing artwork (FC2.1)
Strand 2 use a variety of materials, tools, and techniques to respond to design challenges (CP2.4)
GRADE 2 MATHEMATICS SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles
[C, CN, R, V]
GRADE 3 MATHEMATICS SHAPE AND SPACE
SS7 Sort regular and irregular polygons, including triangles, quadrilaterals, pentagons, hexagons,and octagons according to the number of sides.

NORTHWEST TERRITORIES
VISUAL ARTS
GRADE 2 AND GRADE 3
Please refer to the Saskatchewan Curriculum
MATHEMATICS
GRADE 2 AND GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
VISUAL ARTS
GRADE 2 AND GRADE 3
Please refer to the Saskatchewan Curriculum
MATHEMATICS
GRADE 2 AND GRADE 3
Please refer to the Alberta Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

12.Length of Time

COMMON CORE

GRADE 2 MEASUREMENT AND DATA
CCSS.MATH.CONTENT.2.MD.A.3
Estimate lengths using units of inches, feet, centimeters, and meters.
CCSS.MATH.CONTENT.2.MD.A.4
Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS K
Direct Comparative Measurement
https://curriculum.gov.bc.ca/curriculum/mathematics/k
MATHEMATICS 1
Direct Measurement
https://curriculum.gov.bc.ca/curriculum/mathematics/1
MATHEMATICS 2
Direct Measurement
https://curriculum.gov.bc.ca/curriculum/mathematics/2
MATHEMATICS 3
Standard Units
https://curriculum.gov.bc.ca/curriculum/mathematics/3

ALBERTA
KINDERGARTEN MATHEMATICS SHAPES AND SPACE
Specific Outcome 1
Use direct comparison to compare two objects based on a single attribute, such as length (height), mass (weight) and volume (capacity).
GRADE 1 MATHEMATICS SHAPES AND SPACE
Specific Outcome 1
Demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared, ordering objects, making statements of comparison, filling, covering or matching.
GRADE 2 MATHEMATICS SHAPES AND SPACE
Specific Outcome 2
Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).
Specific Outcome 3
Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.
Specific Outcome 4
Measure length to the nearest nonstandard unit by: using multiple copies of a unit, using a single copy of a unit (iteration process).
GRADE 3 MATHEMATICS SHAPES AND SPACE
Specific Outcome 3
Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents for the units cm and m, modelling and describing the relationship between the units cm and m, estimating length, using referents, and measuring and recording length, width and height.

SASKATCHEWAN
MATHEMATICS GRADE 1 SHAPE AND SPACE
SS1.1 Demonstrate an understanding of measurement as a process of comparing by:identifying attributes that can be compared, ordering objects, making statements of comparison, filling, covering, or matching.
MATHEMATICS GRADE 2 SHAPE AND SPACE
SS2.1 Demonstrate understanding of nonstandard units for linear measurement by describing the choice and appropriate use of nonstandard units, estimating, measuring, and comparing and analyzing measurements.
[C, CN, ME, R, V]
MATHEMATICS GRADE 3 SHAPE AND SPACE
SS3.3d Pose and solve situational questions that involve the estimating or measuring of length (including perimeter) using cm or m.

MANITOBA
MATHEMATICS GRADE 1 SHAPE AND SPACE
1.SS.1. Demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared [C, CN, PS, R, V]
MATHEMATICS GRADE 2 SHAPE AND SPACE
2.SS.2. Relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight). [C, CN, ME, R, V]
2.SS.3. Compare and order objects by length, height, distance around, and mass (weight) using non-standard units, and make statements of comparison.
2.SS.4. Measure length to the nearest nonstandard unit by n using multiple copies of a unit n using a single copy of a unit (iteration process) [C, ME, R, V]
MATHEMATICS GRADE 3 SHAPE AND SPACE
3.SS.3. Demonstrate an understanding of measuring length (cm, m)

ONTARIO
KINDERGARTEN
16.2 investigate strategies and materials used when measuring with non-standard units of measure.
17.2 communicate an understanding of basic spatial relationships (e/g/, use terms such as "above/below", "in/out", "forward/backward"- use visualization, perspective, and movements [flips/reflections, slides/translations, and turns/rotations]) in their conversations and play, in their predictions and visualizations, and during transitions and routines
GRADE 1 MATHEMATICS MEASUREMENT
Demonstrate an understanding of the use of non-standard units of the same size
Estimate, measure and record lengths heights, and distances
Describe through investigation using concrete materials, the relationship between the size of a unit and the number of units needed to measure length.
GRADE 2 MATHEMATICS MEASUREMENT
Select and justify the choice of a standard unit or a non-standard unit to measure length
Estimate and measure length, height, and distance, using standard units and non-standard units
GRADE 3 MATHEMATICS MEASUREMENT
Estimate, measure, and record length, height, and distance, using standard units

QUEBEC
MATHEMATICS MEASUREMENT A.LENGTHS
GRADE 1-2
1. Compares lengths
2. Constructs rulers
3. Estimates and measures the dimensions of an object using unconventional units

GRADE 3
4. Estimates and measures the dimensions of an object using conventional units
b. metre, decimetre, centimetre and millimetre
5. Establishes relationships between units of measure for length a. metre, decimetre, centimetre and millimetre

NEW BRUNSUICK
MATHEMATICS KINDERGARTEN SHAPE & SPACE
SS1 Use direct comparison to compare two objects based on a single attribute, such as length
(height), mass (weight) and volume (capacity).
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS1 Demonstrate an understanding of measurement as a process of comparing by: • identifying attributes that can be compared • ordering objects • making statements of comparison • filling, covering or matching.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units)
used to measure length and mass (weight).
SS3 Compare and order objects by length, height, distance around and mass (weight) using
nonstandard units, and make statements of comparison.
SS4 Measure length to the nearest non-standard unit by using multiple copies of a unit, or using a single copy of a unit (iteration process).
GRADE 3 MATHEMATICS SHAPE AND SPACE
SS3 Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents for the units cm and m; modeling and describing the relationship between the units cm and m; estimating length using referents; measuring and recording length, width and height.

NOVA SCOTIA
MATHEMATICS MEASUREMENT
KINDERGARTEN
Outcome M01: Students will be expected to use direct comparison to compare two objects based on a single attribute, such as length, mass, volume, and capacity.
GRADE 1
Outcome M01: Students will be expected to demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared ordering objects making statements of comparison filling, covering, or matching
GRADE 2
Outcome M02: Students will be expected to relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass
Outcome M04: Students will be expected to measure length to the nearest non-standard unit by using multiple copies of a unit and using a single copy of a unit (iteration process).

GRADE 3
Outcome M03: Students will be expected to demonstrate an understanding of measuring length (cm, m) by selecting and justifying referents for the units centimetre or metre (cm, m) modelling and describing the relationship between the units centimetre or metre (cm, m) estimating length using referents measuring and recording length, width, and height

PRINCE EDWARD ISLAND
MATHEMATICS KINDERGARTEN SHAPE & SPACE
3.1 compare two objects based on a single attribute, such as length (height), mass (weight), and volume (capacity)
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS1 Demonstrate an understanding of measurement as a process of comparing by: • identifying attributes that can be compared • ordering objects • making statements of comparison • filling, covering or matching.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units)
used to measure length and mass (weight).
SS3 Compare and order objects by length, height, distance around and mass (weight) using
nonstandard units, and make statements of comparison.
SS4 Measure length to the nearest non-standard unit by: • using multiple copies of a unit • using a single copy of a unit (iteration process).
GRADE 3 MATHEMATICS SHAPE AND SPACE
SS3 Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents for the units cm and m; modeling and describing the relationship between the units cm and m; estimating length using referents; measuring and recording length, width and height.

NORTHWEST TERRITORIES
MATHEMATICS
KINDERGARTEN
11.9 Use direct or indirect measurement to solve problems. (Math GLO3a)
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
MATHEMATICS KINDERGARTEN THROUGH GRADE 3
Please refer to the Alberta Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

13.What Time is it, MatatBot?

COMMON CORE

GRADE 2 MEASUREMENT & DATA
CCSS.MATH.CONTENT.2.MD.C.7
Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
Grade 3 Measurement & Data
CCSS.MATH.CONTENT.3.MD.A.1
Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS GRADE 2
Multiple attributes of 2D shapes and 3D objects
MATHEMATICS GRADE 3
Time concepts
https://curriculum.gov.bc.ca/curriculum/mathematics/3

ALBERTA
GRADE 2 MATHEMATICS SHAPE AND SPACE
Specific Outcome 8 Describe, compare and construct 2-D shapes, including: triangles, squares, rectangles, and circles.
GR 3 MATHEMATICS-MATH-SHAPE AND SPACE-MEASUREMENT
Specific Outcome 2 Relate the number of seconds to a minute, the number of minutes to an hour and the number of days to a month in a problem-solving context.

SASKATCHEWAN
MATHEMATICS 2 SHAPE AND SPACE SS2.4 Describe, compare, and construct 2-D shapes, including: • triangles • squares • rectangles • circles.
[C, CN, R, V]
MATHEMATICS GR 3 SHAPE AND SPACE SS3.1 Demonstrate understanding of the passage of time including relating common activities to standard and nonstandard units,

describing relationships between units and solving situational questions. [C, CN, PS, R]
SCIENCE GRADE 2
MP2.1 Analyze methods of determining the position of objects relative to other objects.

MANITOBA
MATHEMATICS GR 2 SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles [C, CN, R, V]
MATHEMATICS GR 3 SHAPE AND SPACE
3.SS.1. Relate the passage of time to common activities using non-standard and standard units (minutes, hours, days, weeks, months, years). [CN, ME, R]
3.SS.2. Relate the number of seconds to a minute, the number of minutes to an hour, and the number of days to a month in a problem solving context. [C, CN, PS, R, V]
SCIENCE GRADE 2
Cluster 3: Position and Motion
2-3-01 Use appropriate vocabulary related to their investigations of position and motion.
2-3-03 Explore and describe changes in the position of an object in relation to its original position, themselves, or another object.

ONTARIO
MATHEMATICS GR 2 MEASUREMENT
-Tell and write the time to the quarter-hour, using demonstration digital and analogue clocks
MATHEMATICS GR 3 MEASUREMENT
-READ TIME USING ANALOGUE CLOCKS, TO THE NEAREST 5 MINutes and using digital clocks and represent time in 12-hour notation
-Solve problems involving the relationships between minutes and hours, hours and days, days and weeks, weeks and years, using a variety of tools
SCIENCE AND TECHNOLOGY GRADE 2
Movement
2.2 Investigate and describe different kinds of movement
2.6 Use a variety of forms to communicate with different audiences and for a variety of purposes
3.1 describe different ways in which objects move

QUEBEC
MATHEMATICS
GEOMETRY C. PLANE FIGURES GRADE 2
1. Compares and constructs figures made with closed curved lines or closed straight lines
2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
10. Describes circles

MEASUREMENT G. GRADE 2 AND 3
1. Estimates and measures time using conventional units
2. Establishes relationships between units of measure

NEW BRUNSUICK
MATHEMATICS SHAPE AND SPACE GRADE 2
SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles [C, CN, R, V]
MATHEMATICS SHAPE AND SPACE GRADE 3
SS1 Relate the passage of time to common activities using nonstandard and standard units (minutes, hours, days, weeks, months, years).
SS2 Relate the number of seconds to a minute, the number of minutes to an hour and the number of days to a month

NOVA SCOTIA
MATHEMATICS GEOMETRY 2-D SHAPES GRADE 2
Outcome G03: Students will be expected to recognize, name, describe, compare and build 2-D shapes, including triangles, squares, rectangles, and circles. [C, CN, R, V]
MATHEMATICS MEASUREMENT - TIME GRADE 3
Outcome M01: Students will be expected to relate the passage of time to common activities using non-standard and standard units (minutes, hours, days, weeks, months, years). [CN, ME, R]
Outcome M02: Students will be expected to relate the number of seconds to a minute, the numbers of minutes to an hour, the numbers of hours to a day, and the number of days to a month in a problem-solving context. [C, CN, PS, R, V]
GRADE 2 SCIENCE
Learners will test motion of objects.

PRINCE EDWARD ISLAND
MATHEMATICS GRADE 2 SHAPE AND SPACE
2.SS.8. Describe, compare, and construct 2-D shapes including triangles, squares, rectangles, and circles [C, CN, R, V]
MATHEMATICS GRADE 3 SHAPE AND SPACE
SS1 Relate the passage of time to common activities using nonstandard and standard units (minutes, hours, days, weeks, months, years).
SS2 Relate the number of seconds to a minute, the number of minutes to an hour and the number of days to a month in a problem solving context.
PHYSICAL SCIENCE GRADE 2
Describe the position of an object relative to other objects, using language such as "to the left of", "on top", "beside" or "two giant steps behind", or to an identified space, and place an object in an identified position

NORTHWEST TERRITORIES
MATHEMATICS GRADE 2 AND GRADE 3
Please refer to the Alberta Curriculum

SCIENCE AND TECHNOLOGY GRADE 2
Movement
Identify changes in the position of an object in relation to other objects (e.g., movement upward, to the left, downward, sideways); and
Describe, using their observations, the pattern of movement of objects (e.g., turning, spinning, swinging, bouncing, vibrating).

NUNAVUT
MATHEMATICS GRADE 2 AND GRADE 3
Please refer to the Alberta Curriculum
SCIENCE KINDERGARTEN THROUGH GRADE 3
Please refer to the Northwest Territories Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

14.Synchronized Dancing

COMMON CORE

GRADE 2 MEASUREMENT AND DATA
CCSS.MATH.CONTENT.2.MD.A.3
Estimate lengths using units of inches, feet, centimeters, and meters.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

NCSS

1. Culture
2. Time, Continuity, Change
9. Global Connections

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS 1
Direct Measurement with nonstandard units
https://curriculum.gov.bc.ca/curriculum/mathematics/1
ARTS EDUCATION
Gr 1
Dance: dynamics, body, space, time, relationships, form
Traditional and contemporary Aborigianl arts and art-making processes

A variety of local works of art and artistic traditions from diverse cultures and communities
Personal and collective responsibility associated with creating, experiencing, or sharing in a safe learning environment
Gr 2
Elements in the arts including but not limited to: Dance: dynamics, body, space, time, relationships, form
Processes, materials, technology, tools, and techniques to support art activities
Traditional and contemporary Aborigianl arts and art-making processes
A variety of local works of art and artistic traditions from diverse cultures and communities, times and places
Personal and collective responsibility associated with creating, experiencing, or sharing in a safe learning environment
Gr 3
Elements in the arts including but not limited to: Dance: dynamics, body, space, time, relationships, form
Processes, materials, technology, tools, and techniques to support art activities
Choreographic devices
Traditional and contemporary Aborigianl arts and art-making processes
A variety of local works of art and artistic traditions from diverse cultures and communities, times and places
Personal and collective responsibility associated with creating, experiencing, or sharing in a safe learning environment

ALBERTA
GRADE 1 MATHEMATICS SHAPE AND SPACE
Specific Outcome 1
Demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared, ordering objects, making statements of comparison, filling, covering or matching.
GRADE 2 MATHEMATICS SHAPE AND SPACE
Specific Outcome 4
Measure length to the nearest nonstandard unit by: using multiple copies of a unit, using a single copy of a unit (iteration process).
GRADE 2 SOCIAL STUDIES
A Community in the Past
2.2.1 appreciate how stories of the past connect individuals and communities to the present.
GRADE 3 SOCIAL STUDIES
Communities in the World
3.1.2 examine the social, cultural and linguistic characteristics that affect quality of life in communities in other parts of the world by exploring and reflecting upon the following questions for inquiry:
What are the traditions, celebrations, stories and practices in the communities that connect the people to the past and to each other (e.g., language spoken, traditions, customs)? (CC, GC, TCC)
How is identity reflected in traditions, celebrations, stories and customs in the communities? (CC, I, TCC)
GRADE 3 ARTS EDUCATION
Learning skill
6. The student will be able to create movement to demonstrate form in music.

SASKATCHEWAN
MATHEMATICS GRADE 1 SHAPE AND SPACE
SS1.1 Demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared, ordering objects, making statements of comparison, filling, covering, or matching.
MATHEMATICS GRADE 2 SHAPE AND SPACE
SS2.1 Demonstrate understanding of nonstandard units for linear measurement by: • describing the choice and appropriate use of nonstandard units • estimating • measuring • comparing and analyzing measurements. [C, CN, ME, R, V]
ARTS GRADE 1
CH1.1 Describe the arts and cultural traditions found in own home and school community.
ARTS GRADE 2
CH2.1 Identify key features of arts and cultural traditions in own community.
ARTS GRADE 3
CH3.1 Compare how arts expressions from various groups and communities may be a reflection of their unique environment (e.g., North and South Saskatchewan, urban and rural).
SOCIAL STUDIES GRADE 1
IN1.1 Describe the diversity of traditions, celebrations, or stories of individuals in the classroom and school.
SOCIAL STUDIES GRADE 2
IN2.1 Determine characteristics of a community.
SOCIAL STUDIES GRADE 3
IN3.2 Analyze the cultures and traditions in communities studied.

MANITOBA
MATHEMATICS GRADE 1 SHAPE AND SPACE
1.SS.1. Demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared [C, CN, PS, R, V]
MATHEMATICS GRADE 2 SHAPE AND SPACE
2.SS.2. Relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight). [C, CN, ME, R, V]
2.SS.4. Measure length to the nearest nonstandard unit by n using multiple copies of a unit n using a single copy of a unit (iteration process) [C, ME, R, V]

SOCIAL STUDIES GRADE 1
1-KI-009 Describe ways in which their family expresses its culture and identity.
KINDERGARTEN TO GRADE 2 DANCE
Understanding Dance in Context
DA-U1 Perform, observe, and demonstrate awareness of dance from various times, places, and peoples
Identify, share, and talk about examples of dance experienced at home, at school, and in the community
DA-UA-2
Demonstrate awareness that there are many different kinds of dance
Demonstrate understanding that dance works can be categorized according to common characteristics
Recognize that dance is an art form, along with drama, literary arts, music, and visual arts
DA-UA-3
Identify when and why people dance in daily life (e.g., for storytelling, celebrating, exercising, learning, communicating ideas, socializing)
K–2 da–U3.1 Demonstrate awareness of the intended meanings and/or purposes of dances encountered in own performance and viewing experiences (e.g., representations of nature in aboriginal hoop dancing, coal mining in the Japanese dance Tanko Bushi)
K–4 da–U3.3 Demonstrate appreciation of dance as a means of experiencing and exploring own and others' lives (e.g., feelings, values, stories, events, cultures)
K–4 da–U3.4 Demonstrate awareness that different groups of people may have their own characteristic dance (ideally, this awareness extends to the dance of own cultural or social groups)
GRADE 3 DANCE
Understanding Dance in Context
DA-U1 Perform, observe, describe, and compare dance from various times, places, social groups, and cultures
Identify, share, and talk about examples of dance experienced at home, at school, and in the community
DA-UA-2 Demonstrate awareness that there are many different kinds of dance
Demonstrate understanding that dance works can be categorized according to common characteristics
Recognize that dance is an art form, along with drama, literary arts, music, and visual arts
DA-UA-3 Explain a variety of purposes and roles for dance in own community and in other places and times
3–4 da–U3.1 Demonstrate awareness of the intended meanings and/or purposes of dances encountered in own performance and viewing experiences (e.g., representations of nature in aboriginal hoop dancing, coal mining in the Japanese dance Tanko Bushi)
K–4 da–U3.3 Demonstrate appreciation of dance as a means of experiencing and exploring own and others' lives (e.g., feelings, values, stories, events, cultures)
K–4 da–U3.4 Demonstrate awareness that different groups of people may have their own characteristic dance (ideally, this awareness extends to the dance of own cultural or social groups)

ONTARIO
Grade 1 and Grade 2 The Arts Dance
A3.1 Describe with teacher guidance, a variety of dances from different communities around the world that they have seen in the media, at live performances and social gatherings or in the classroom
A3.2 Identify and describe dance experiences in their own lives and communities
GRADE 3 THE ARTS DANCE
A3.1 Describe with teacher guidance, a variety of dances from communities in Canada and around the world that they have seen in the media, at live performances and social gatherings or in the classroom
A3.2 Identify and describe the role of dance in the community
GRADE 1 MATHEMATICS MEASUREMENT
Demonstrate an understanding of the use of non-standard units of the same size
Construct, using a variety of strategies, tools, for measuring lengths, heights, and distances in non-standard units.
Describe through investigation using concrete materials, the relationship between the size of a unit and the number of units needed to measure length.
Grade 2 Mathematics Measurement
Select and justify the choice of a standard unit or a non-standard unit to measure length
Estimate, measure and record the distance around objects, using non-standard units.

QUEBEC
MATHEMATICS
MEASUREMENT A.LENGTHS GRADE 1-2
1. Compares lengths
2. Constructs rulers
3. Estimates and measures the dimensions of an object using unconventional units
DANCE
LANGUAGE OF DANCE GRADE 1-3
5. Relation with partner
5.1. Position
5.2. Spatial actions
5.3. Coordination
5.4. Groups
Applications of knowledge
A. To use personal ideas inspired by the stimulus for creation
GRADE 1 TO 2
1. Stimulus for creation
a.Looks for ideas inspired by the stimulus for creation, using images and his/her emotions

GRADE 3
b.Looks for ideas inspired by the stimulus for creation, paying attention to his/her impressions, emotions and feelings
d. Looks for movements related to the stimulus for creation
C. To organize elements he/she has chosen
2. Structures
GRADE 1 TO 2
a.Experiments with elements of choreographic structure such as position, sequence and form
Grade 3
b. Uses some elements of choreographic structure
<u>SOCIAL SCIENCES</u>
Knowledge related to the organization of a society in its territory
Human Elements
2.2 Cultural Situation
c. Names artistic expressions (e.g. painting, sculpture)

NEW BRUNSUICK
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS1 Demonstrate an understanding of measurement as a process of comparing by: • identifying attributes that can be compared, ordering objects, making statements of comparison, filling, covering or matching.
GRADE 2
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).
SS4 Measure length to the nearest non-standard unit by: using multiple copies of a unit; using a single copy of a unit (iteration process).
ARTS KINDERGARTEN TO GRADE 3
Understanding and Connecting Contexts of Time, Place, and Community: Dance
3. Students will be expected to demonstrate critical awareness of and value for the role of the arts in creating and reflecting culture.
4. Students will be expected to respect the contributions to the arts of individuals and cultural groups in local and global contexts, and value the arts as a record of human experience and expression.
5. Students will be expected to examine the relationship among the arts, societies, and environments.

NOVA SCOTIA
SOCIAL STUDIES GRADE 3
Learners will investigate various groups including Acadians, African Nova Scotians, Gaels, and Mi'kmaq, through their expressions of culture.
<u>Mathematics Measurement</u>
GRADE 1
Outcome M01: Students will be expected to demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared ordering objects making statements of comparison filling, covering, or matching
GRADE 2
Outcome M02: Students will be expected to relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass
Outcome M04: Students will be expected to measure length to the nearest non-standard unit by using multiple copies of a unit and using a single copy of a unit (iteration process).
DANCE KINDERGARTEN TO GR 3
Cultural/Historical
7. Students will demonstrate an understanding of dance in cultural and historical contexts at personal, local and global levels.

PRINCE EDWARD ISLAND
GRADE 1 MATHEMATICS SHAPE AND SPACE
SS1 Demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared, ordering objects, making statements of comparison and filling, covering or matching.
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).
SS3 Compare and order objects by length, height, distance around and mass (weight) using nonstandard units, and make statements of comparison.
SS4 Measure length to the nearest non-standard unit by using multiple copies of a unit or by using a single copy of a unit (iteration process).
ARTS KINDERGARTEN TO GR 3
Understanding and Connecting Contexts of Time, Place, and Community: Dance
3. Students will be expected to demonstrate critical awareness of and value for the role of the arts in creating and reflecting culture.
4. Students will be expected to respect the contributions to the arts of individuals and cultural groups in local and global contexts, and value the arts as a record of human experience and expression.
5. Students will be expected to examine the relationship among the arts, societies, and environments.
<u>SOCIAL STUDIES</u>
KINDERGARTEN UNIT TWO FAMILIES
E.2.2 recognize that families have varied traditions, rituals, and Celebrations

NORTHWEST TERRITORIES
SOCIAL STUDIES GRADE 1
KCC-010 Give examples of diverse ways in which people live and express themselves. Examples: language, clothing, food, art, celebrations...

SOCIAL STUDIES GRADE 2
KCC-006 Identify cultural and language groups in their local communities.
SOCIAL STUDIES GRADE 3
KCC-009 Define the elements that constitute a culture. Include: ways of life, language, art, clothing, beliefs.
KCC-011 Give examples of cultural expression in communities studied. Examples: language and stories, art, music and dance, architecture, traditions, clothing...
KCC-012 Recognize the diversity of cultures and communities in the world.
ARTS EDUCATION GRADE 1 TO GRADE 3
Please refer to the Saskatchewan Curriculum
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
ARTS EDUCATION GRADE 1 TO GRADE 3
Please refer to the Saskatchewan Curriculum
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum
SOCIAL STUDIES GRADE 1 TO GRADE 3
Please refer to the Northwest Territories curriculum

YUKON TERRITORIES
YT Elementary School Curriculum
Please refer to the British Columbia Curriculum

15.Storytelling

COMMON CORE

English Language Arts
WRITING
<u>GRADE 2</u>
CCSS.ELA-LITERACY.W.2.3
Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.
<u>GRADE 3</u>
CCSS.ELA-LITERACY.W.3.3
Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
CCSS.ELA-LITERACY.W.3.3.A
Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally.
CCSS.ELA-LITERACY.W.3.3.B
Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations.
CCSS.ELA-LITERACY.W.3.3.C
Use temporal words and phrases to signal event order.
CCSS.ELA-LITERACY.W.3.3.D
Provide a sense of closure.

SPEAKING & LISTENING
<u>GADE 2</u>
CCSS.ELA-LITERACY.SL.2.4
Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.
CCSS.ELA-LITERACY.SL.2.6
Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
<u>GRADE 3</u>
CCSS.ELA-LITERACY.SL.3.4
Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
CCSS.ELA-LITERACY.SL.3.6
Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.
GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

CSTA

1A-CS-02
K - 2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware).
1A-CS-03
K - 2 Describe basic hardware and software problems using accurate terminology.
1A-AP-09
K - 2 Model the way programs store and manipulate data by using numbers or other symbols to represent information.
1A-AP-10
K - 2 Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11
K - 2 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-12
K - 2 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
1A-AP-14
K - 2 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
1A-AP-15
K - 2 Using correct terminology, describe steps taken and choices made during the iterative process of program development.

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
ENGLISH LANGUAGE ARTS
GRADE 2 AND GRADE 3
Structure of story
Oral language strategies
Writing processes

ALBERTA
GRADE 2 SOCIAL STUDIES CANADA'S
DYNAMIC COMMUNITIES
2.1.1 appreciate the physical and human geography of the communities studied:
Appreciate how a community's physical geography shapes identity (I, LPP)
Appreciate the diversity and vastness of Canada's land and peoples (CC, LPP)
Value oral history and stories as ways to learn about the land (LPP, TCC)
Acknowledge, explore and respect historic sites and monuments (CC, LPP, TCC)
Demonstrate care and concern for the environment (C, ER, LPP)

GRADE 2 ENGLISH LANGUAGE ARTS
General Outcome 2
2.3 Understand techniques and elements
identify main characters, places and events in a variety of oral, print and other media texts
identify how pictures, illustrations and special fonts relate to and enhance print and other media texts
2.4 Create Original Text
Structure texts
create narratives that have beginnings, middles and ends; settings; and main characters that perform actions
use traditional story beginnings, patterns and stock characters in own oral, print and other media texts
General Outcome 3
3.3 Organize, Record and Evaluate
Organize information
categorize related ideas and information, using a variety of strategies, such as finding significant details and sequencing events in logical order
produce oral, print and other media texts with introductions, middles and conclusions
General Outcome 4
4.3 Present and Share
Use effective oral and visual communication
Demonstrate effective listening and viewing
General Outcome 5
5.1 Respect Others and Strengthen Community
5.2 Work within a Group

SASKATCHEWAN
GRADE 2 ENGLISH LANGUAGE ARTS
CC2.2 Use a variety of ways to represent understanding and to communicate ideas, procedures, stories, and feelings in a clear manner with essential details.
CC2.3 Speak clearly and audibly in an appropriate sequence for a familiar audience and a specific purpose when recounting stories and experiences, giving directions, offering an opinion and providing reasons, and explaining information and directions.
CC2.4 Write stories, poems, friendly letters, reports, and observations using appropriate and relevant details in clear and complete sentences and paragraphs of at least six sentences.
Grade 3 English Language Arts
CC3.2 Communicate ideas and information pertaining to topics, problems, questions, or issues by creating easy-to-follow representations with a clear purpose.
CC3.3 Speak to present ideas and information appropriately in informal (e.g., interacting appropriately with others to share ideas and opinions, complete tasks, and discuss concerns or problems) and some formal situations (e.g., giving oral explanations, delivering short, simple reports, demonstrating and describing basic procedures) for different audiences and purposes.
CC3.4 Write to communicate ideas, information, and experiences pertaining to a topic by creating easy-to-follow writing (including a short report, a procedure, a letter, a story, a short script, and a poem) with a clear purpose, correct paragraph structure, and interesting detail.

MANITOBA
KINDERGARTEN TO GRADE 2
English Language Arts
Language as Exploration and Design
Language as Sense Making

ONTARIO
GRADE 2 LANGUAGE ORAL COMMUNICATION
2.3 Communicate ideas, opinions, and information orally in a clear, coherent manner using simple but appropriate organizational patterns
2.4 Choose a variety of appropriate words and phrases to communicate their meaning accurately and engage the interest of their audience
GRADE 2 LANGUAGE WRITING
1.2 Generate ideas about a potential topic, using a variety of strategies and resources
1.4 Sort ideas and information for their writing in a variety of ways with support and direction
1.5 Identify and order main ideas and supporting details, using graphic organizers and organizational patterns
GRADE 3 LANGUAGE ORAL COMMUNICATION
2.3 Communicate orally in a clear, coherent manner, presenting ideas, opinions, and information in a logical sequence
GRADE 3 LANGUAGE WRITING
1.2 Generate ideas about a potential topic, using a variety of strategies and resources
1.4 Sort ideas and information for their writing in a variety of ways
1.5 Identify and order main ideas and supporting details into units that could be used to develop a short, simple paragraph, using graphic organizers

QUEBEC
ENGLISH LANGUAGE ARTS
Language learning process
B.Writing process
GRADE 1 TO 2
1. Prewriting: a. Understands the purpose for the writing
GRADE 3
1. Prewriting: b. Selects topic and text type based on purpose and audience
2.Drafting
GRADES 1 TO 4
c. Uses a structure that fits the type of writing (e.g. letter format, narrative)
3.Revision

GRADES 2 TO 5
b. Adds descriptive words and sufficient details
c. Sequences information, events

NEW BRUNSUICK
ENGLISH LANGUAGE ARTS KINDERGARTEN TO GR 3
2. Students will be able to communicate information and ideas effectively and clearly, and to respond personally and critically.
9. Students will be expected to create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes
10. Students will be expected to use a range of strategies to develop effective writing and media products to enhance their clarity, precision, and effectiveness.

NOVA SCOTIA
ENGLISH LANGUAGE ARTS GRADE 2 AND GRADE 3
Learners will convey meaning by creating print and digital texts collaboratively and independently using imagination, personal experiences, and feelings.
Learners will create text including digital collaboratively and independently using a variety of forms for a range of audiences and purposes.
Learners will use a range of strategies to develop effective writing and media products to enhance their clarity, precision and effectiveness.

PRINCE EDWARD ISLAND
LANGUAGE ARTS GRADE 1 TO GRADE 3
Students will speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences.
Students will be expected to use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations
Students will be expected to create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes.

NORTHWEST TERRITORIES
ENGLISH LANGUAGE ARTS PRIMARY TO GRADE 3
1.1.1 Use conversation to explore understanding
1.2.1 Combine ideas and develop understanding
4.1.1 Generate and focus ideas
4.1.2. Prepare to create texts: forms, genres, audience, purpose
4.1.3 Create original texts
4.4.1 Effective presentations
5.1.1 Work in groups

NUNAVUT
Language Arts Kindergarten through Grade 3
Please refer to the Northwest Territories Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum

16.Tic-Tac-Go!

COMMON CORE

GRADE 2 MEASUREMENT AND DATA
CCSS.MATH.CONTENT.2.MD.A.3
Estimate lengths using units of inches, feet, centimeters, and meters.
CCSS.MATH.CONTENT.2.MD.A.4
Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

ISTE

EMPOWERED LEARNER
1d Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
INNOVATIVE DESIGNER
4b Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
4c Students develop, test and refine prototypes as part of a cyclical design process.
4d Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
COMPUTATIONAL THINKER
5a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
5c Students break problems into component parts, extract key information, and develop descriptive models and understand complex systems or facilitate problem-solving.
5d Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

GLOBAL COLLABORATOR
7c Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

NCSS

8. Science, Technology, and Society

PROVINCIAL STANDARDS

BRITISH COLOMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES K-3
https://curriculum.gov.bc.ca/curriculum/adst/k
MATHEMATICS 2
Direct Measurement
https://curriculum.gov.bc.ca/curriculum/mathematics/2
MATHEMATICS 3
Standard Units
https://curriculum.gov.bc.ca/curriculum/mathematics/3

ALBERTA
GRADE 2 MATHEMATICS SHAPE AND SPACE
Specific Outcome 2 Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).
Specific Outcome 4 Measure length to the nearest non-standard unit by: using multiple copies of a unit, using a single copy of a unit (iteration process).
GRADE 3 MATHEMATICS SHAPE AND SPACE
Specific Outcome 3 Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents for the units cm and m, modelling and describing the relationship between the units cm and m, estimating length, using referents, measuring and recording length, width and height.

SASKATCHEWAN
MATHEMATICS GRADE 2 SHAPE AND SPACE
SS2.1 Demonstrate understanding of nonstandard units for linear measurement by: • describing the choice and appropriate use of nonstandard units • estimating • measuring • comparing and analyzing measurements. [C, CN, ME, R, V]
MATHEMATICS GRADE 3 SHAPE AND SPACE
SS3.3d Pose and solve situational questions that involve the estimating or measuring of length (including perimeter) using cm or m.
GRADE 2 SCIENCE
Physical Science: Motion and Relative Position
MP2.1 Analyze methods of determining the position of objects relative to other objects.

MANITOBA
GRADE 2 SCIENCE
Cluster 3: Position and Motion
2-3-01 Use appropriate vocabulary related to their investigations of position and motion.
2-3-03 Explore and describe changes in the position of an object in relation to its original position, themselves, or another object.

MATHEMATICS GRADE 2 SHAPE AND SPACE
2.SS.2. Relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight). [C, CN, ME, R, V]
2.SS.3. Compare and order objects by length, height, distance around, and mass (weight) using non-standard units, and make statements of comparison.
2.SS.4. Measure length to the nearest nonstandard unit by n using multiple copies of a unit n using a single copy of a unit (iteration process) [C, ME, R, V]
MATHEMATICS GRADE 3 SHAPE AND SPACE
3.SS.3. Demonstrate an understanding of measuring length (cm, m)

ONTARIO
GRADE 2 MATHEMATICS MEASUREMENT
Select and justify the choice of a standard unit or a non-standard unit to measure length
Estimate and measure length, height, and distance, using standard units and non-standard units
GRADE 3 MATHEMATICS MEASUREMENT
Estimate, measure, and record length, height, and distance, using standard units
Compare and order objects on the basis of linear measurements in centimetres and/or metres in problem-solving contexts
GRADE 2 SCIENCE AND TECHNOLOGY MOVEMENT
2.2 Investigate and describe different kinds of movement
3.1 Describe different ways in which objects move

QUEBEC
MATHEMATICS
MEASUREMENT A.LENGTHS GRADE 1-2
1. Compares lengths
2. Constructs rulers
3. Estimates and measures the dimensions of an object using unconventional units
GEOMETRY C. PLANE FIGURES GRADE 2
1. Compares and constructs figures made with closed curved lines or closed straight lines 2. Identifies plane figures (square, rectangle, triangle, rhombus and circle)
10. Describes circles
MEASUREMENT A.LENGTHS GRADE 3
4. Estimates and measures the dimensions of an object using conventional units
b. metre, decimetre, centimetre and millimetre
5. Establishes relationships between units of measure for length a. metre, decimetre, centimetre and millimetre

NEW BRUNSUICK
GRADE 2
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units) used to measure length and mass (weight).
SS4 Measure length to the nearest non-standard unit by: using multiple copies of a unit; using a single copy of a unit (iteration process).
GRADE 3 MATHEMATICS SHAPE AND SPACE
SS3 Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents for the units cm and m; modeling and describing the relationship between the units cm and m; estimating length using referents; measuring and recording length, width and height.

NOVA SCOTIA
MATHEMATICS MEASUREMENT
GRADE 2
Outcome M02: Students will be expected to relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass
Outcome M04: Students will be expected to measure length to the nearest non-standard unit by using multiple copies of a unit and using a single copy of a unit (iteration process).
GRADE 3
Outcome M03: Students will be expected to demonstrate an understanding of measuring length (cm, m) by selecting and justifying referents for the units centimetre or metre (cm, m) modelling and describing the relationship between the units centimetre or metre (cm, m) estimating length using referents measuring and recording length, width, and height
SCIENCE GRADE 2
Learners will test motion of objects.

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS SHAPE AND SPACE
SS2 Relate the size of a unit of measure to the number of units (limited to nonstandard units)
used to measure length and mass (weight).
SS3 Compare and order objects by length, height, distance around and mass (weight) using
nonstandard units, and make statements of comparison.
SS4 Measure length to the nearest non-standard unit by: • using multiple copies of a unit • using a single copy of a unit (iteration process).
GRADE 3 MATHEMATICS SHAPE AND SPACE
SS3 Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents for the units cm and m; modeling and describing the relationship between the units cm and m; estimating length using referents; measuring and recording length, width and height.
SCIENCE GRADE 2 Physical Science
Describe the position of an object relative to other objects, using language such as "to the left of", "on top", "beside" or "two giant steps behind", or to an identified space, and place an object in an identified position

NORTHWEST TERRITORIES
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

NUNAVUT
MATHEMATICS GRADE 1 THROUGH GRADE 3
Please refer to the Alberta Curriculum

YUKON TERRITORIES
YT ELEMENTARY SCHOOL CURRICULUM
Please refer to the British Columbia Curriculum