Next level of coding

Don't know where to start? Start here! The Teacher Guide for Matatalab's Sensor 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 the next level of coding!

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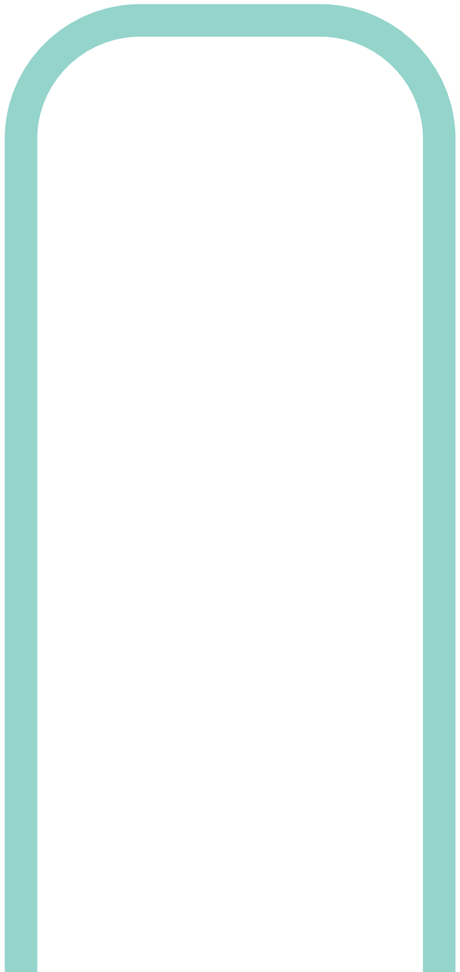
Sensor Add-on

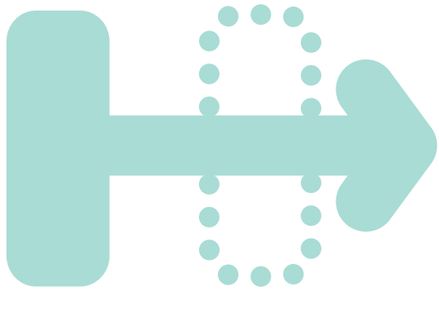
Teacher Guide



lessons

Sensor Add-on

Teacher Guide



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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.

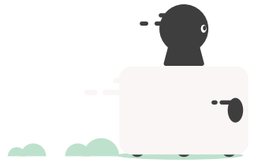
We iterate by making mistakes, evaluating them, revising our plans, and trying again. We continue to do that until we get it right. The value of this process cannot be understated. Iteration is not just how we learn to code, but how we learn. This constant state of failure and improvement though does 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!

Lets Go!

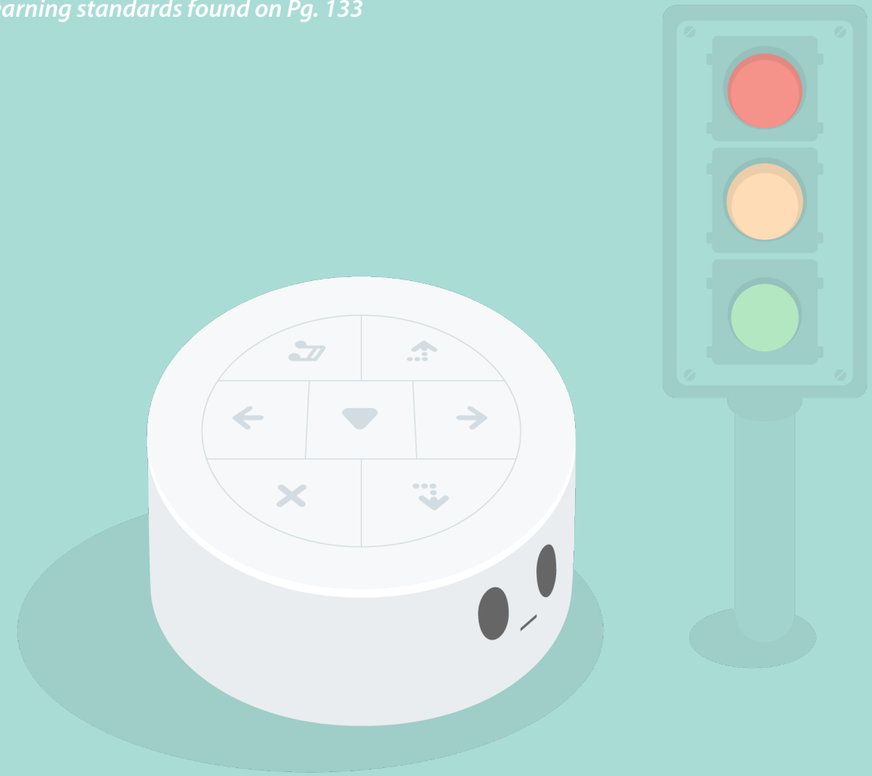
Lesson 01

Ready, Set, Go!

Grades K - 3 *60 mins*

MatataBot is great at waiting for directions! Using the tiles that detect colours of red, green or yellow objects, create a code using the **Wait Until** block that allows MatataBot to wait for a traffic light signal colour. If it detects green, it should move forward a long distance, alternately, MatataBot should move forward a shorter distance when it detects yellow. Finally, if MatataBot detects a red object, it should stop and not move at all! Help MatataBot wait and follow the directions accurately!

Learning standards found on Pg. 133



Ready, Set, Go!

Lesson 01

Grades K - 3

60 mins

In Ready, Set, Go!, students will be able to allow the MatataBot to wait until certain colours are detected before moving using the sensor controller attached to the top of MatataBot. By "sensing" a particular colour, MatataBot will be able to successfully navigate through the Nature Map set up to their liking using colour cards and/or obstacles.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor by waiting to sense certain colours in front of MatataBot. You will also understand how MatataBot will move in certain ways due to the certain colours sensed and learn how MatataBot will find its way around a map.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a colour sensor allowing MatataBot to wait as it senses colours in front of it. In addition, you will have a lasting impression of how well you have coded MatataBot to find its way around the Nature Map through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into a colour sensor using the **Green**, **Yellow** or **Red** coding blocks placed under it.

2) Use their own creativity to set up the Nature Map using colour cards from the Pro Set that MatataBot could sense and navigate around, moving in different ways when sensing different colours.

3) Use critical thinking and coding skills to determine the most strategic way to navigate MatataBot around the Nature Map.

What you'll do

Using the **Green**, **Yellow** and **Red** coding tiles and colour cards, set up the Nature Map for MatataBot to navigate through. Add a start and end flag to your path and use **Wait Until** block as well as the sensor controller to help MatataBot navigate through the map successfully by waiting until it detects certain colours in front of it.

What you'll need

- Class set of Matatalab Pro Set
- Class set of Sensor add-on set
- Projector/Display Screen
- Nature Map
- Coloured cards or objects (specifically green, yellow and green)
- Animation Add-on set (optional for extension activities)

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software
- Download example programs and prepare to show to class

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What are the 3 colours of a traffic light?" "What do the 3 colours of the traffic light mean for drivers?" Say, "MatataBot loves driving around the city! Today, you will code your MatataBot to navigate around the Nature Map and use its colour sensors to find its way around. Have fun!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "sense" various colours in front of it by having the sensor controller placed on top of the MatataBot.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Command Tower the same way by turning it on using the power button, attaching it to the Control Board, then pressing the power button 3 times to connect Both MatataBot and Controller to the Command Tower.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with a **Green**, **Yellow** or **Red** coding block placed under it. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks in order to determine the number of times MatataBot will move.

5) Once students have a rough idea of where MatataBot is moving on the Nature Map, ask them to place green, yellow or red objects (or colour cards if accessible) around the Map. They should then test out their code to see if their MatataBot is sensing colours and moving around accurately.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sensor controller placed on top of MatataBot to sense coloured objects placed on the Nature Map. Encourage the use of various movement blocks before and after the **Green**, **Yellow** and **Red** coding blocks are placed to allow MatataBot to move around the map, detecting different coloured objects or cards.

2) Ask students to place 2 flags on the Nature Map. One flag somewhere at the beginning of the map and another flag somewhere near the end.

3) Then, together with you, ask students to creatively design a path on the Nature Map where they will place their coloured cards or objects for MatataBot to sense and navigate around. Discuss what makes a good path (e.g. has a beginning and an end).

Independent practice

45 mins

1) Before students can start coding, encourage them to come up with a rough sketch of how their path will look on a blank sheet of paper or chart paper.

2) Once the rough sketch has been created, students can start placing their coloured objects on the Nature Map and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing and maneuvering along their path.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the sensor controller into a robot that senses colours?

d) "How did you code for it on the Control Board and use the Command Tower?"

e) "How did you move MatataBot around the map?"

f) "Was your group able to get to the end of the path successfully?"

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language) 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

As students are challenged to code for the sensing of coloured cards or objects in a path, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time drawing their concept for their path, in 1-2 classes prior to this lesson, come up with this rough sketch in advance on chart paper.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may choose to change Both eyes on the MatataBot to match the colour of the object sensed (use Animation Add-on).
- Additionally, students may choose to create a celebration dance or play music through MatataBot when it reaches the end of the path.

Supporting files & links

An example sketch of a path showing the use of coloured cards/objects on the Nature Map with a flag at the beginning and end of the path.

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students, in their groups, were able to successfully come up with a rough sketch for their path using various coloured cards/objects in their sketch.
- Students have correctly transformed the controller into an obstacle sensor using the **Wait Until** button as well as the **Green**, **Yellow** and **Red** blocks placed under it.
- Students were able to successfully code and exit their created path on the Nature Map by navigating their MatataBot through it.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

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 02

Colour & Sound Show

Grades 1 - 3 *60 mins*

MatataBot loves a good light and sound show! Using the tiles that detect various colours, create a code using the **Wait Until** block that allows MatataBot to wait for the detection of different colours. If it detects a certain colour, MatataBot would play a sound. Set up objects in a specific order and play different sounds while detecting the colours of each object. Help MatataBot compose a song and have a class concert!

Learning standards found on Pg. 135

Colour & Sound Show

Lesson 02

Grades 1 - 3

60 mins

In Colour and Sound show, students will be able to create their own songs by using the sensor controller connected to MatataBot. By "sensing" various coloured objects, MatataBot will be able to successfully play different musical notes and compose a song altogether. Students may also use colour cards instead of coloured objects to allow MatataBot another way to "sense colours" and play different notes or music.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense coloured objects in front of it. You will also understand how MatataBot will play a sound/musical note when a certain colour is sensed and learn how MatataBot will play a song from the coloured objects that are in place.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a colour sensor while MatataBot plays various musical notes and songs. In addition, you will have a lasting impression of how well you have coded MatataBot to play different sets of songs through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into a colour sensor and music player using the **Green**, **Yellow** or **Red** coding blocks placed under it.

2) Use their own creativity to play a song using the coloured objects set up in order.

3) Use critical thinking and coding skills to determine the most strategic way to play songs or sets of music through MatataBot.

What you'll do

Use the music button on the Controller to play different sounds when the sensor is placed in front of different coloured objects. Students will be challenged to set up objects to play an ascending/descending musical scale (from lowest to highest sound and vice versa) using the **Wait Until** blocks and **Green**, **Yellow** and **Red** blocks. Students will compose their own songs using different coloured objects.

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Coloured objects (Green, Yellow, Red)
- Music warm-up cards

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "How is traditional music made?" Give examples such as a piano, guitar, drums, etc. Ask, "How else would we be able to play music using Matatalab?" Discuss the traditional ways we can play music using Matatalab (e.g. music tiles, music button on sensor). Say, "MatataBot loves to play music in different ways! Today, you will code your MatataBot to play musical notes using the sensor controller by sensing different coloured objects. Be creative and have fun!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "sense" various objects in front of it by using the sensor controller to sense the coloured objects by holding the controller and waving it in front of the coloured objects.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place the **Wait Until** coding block on the Control Board with **Green**, **Yellow** and/or **Red** colour coding blocks placed under it. Students should then test out their code to see if their MatataBot is sensing coloured objects and playing a musical note based on the colour sensed using the **Alto Clef Music**, **Treble Clef Music**, and **Melody** blocks. Place the appropriate music blocks after the **Wait Until** block in order for MatataBot to play different musical notes.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sensor controller to play music when a particular coloured object is sensed.

2) Ask students to place the coloured objects in front of them strategically enough so that when the sensor controller is waved in front of the object, MatataBot plays the musical notes in an organized manner.

3) With the help of the Music warm-up cards, allow students to use the cards to assist them in playing different types of music (e.g. Twinkle, Twinkle).

Independent practice

45 mins

1) Before students can start coding, encourage them to come up with a rough idea of where their objects are placed. They are then able to place the **Wait Until** block followed by the colour and music coding blocks.

2) Students are encouraged to use their own creativity to create their own types of music and play them through MatataBot. They are also encouraged to use the **Preset Dancing** blocks at the beginning or end of their code to make a dance to go along with their coded music.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the sensor controller into a robot to play music? How did you code for it on the Control Board and use the Command Tower? What blocks did you use?"

d) "Was your group able to work with another group and present a song together?"

Interdisciplinary & 21st century connections

This lesson can be used in Art/Music to help teach topics such as creating compositions with purpose and demonstrating understanding that sounds can be represented by symbols. 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

As students are challenged to code for the sensing of coloured objects in order to play music based on the colour sensed, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code. In addition, instead of coming up with their own music, students may use the Music warm-up cards throughout the class time to help them ease through the coding process

Accommodations

- If students have a difficult time sensing coloured objects to play music, they can instead focus on using the Music warm-up cards to create music on the Control Board without the use of the sensor controller.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may choose to compose a song together with another group and hold presentations for each group(s) to showcase their colour and sound show.
- Additionally, students may choose to create a celebration dance through MatataBot at the beginning or end of their composition.
- Finally, students may also try and display the same coloured lights through their MatataBot's eyes that match the coloured object sensed when a musical note is played.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
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Youtube- http://bit.ly/connect-sensor-2

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

Assessment

Student work will be assessed in the following manner:

- Students, in their groups, were able to successfully come up with a rough sketch for where their objects will be placed in order to make an organized piece of music.
- Students have correctly transformed the controller into a colour sensor using the **Wait Until** button as well as the **Green**, **Yellow** and **Red** blocks placed under it along with **Alto Clef Music**, **Treble Clef Music**, and **Melody** blocks.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

Category/Level Criteria	*Level 1 Poor performance*	*Level 2 Needs improvement*	*Level 3 Adequate*	*Level 4 Excellent*
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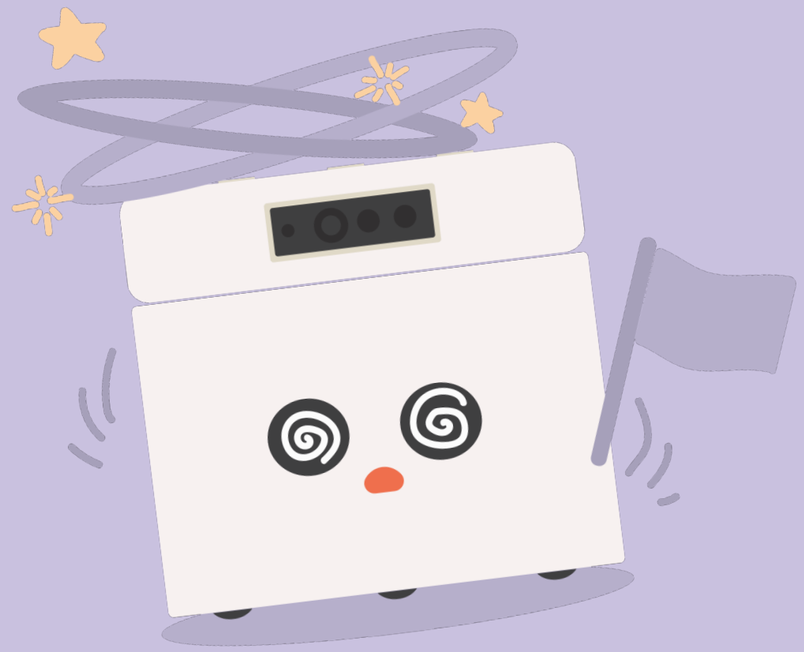
Lesson 03

Gyro Match Up

Grades K - 1 *60 mins*

MatataBot loves to play matching games! After being assigned a specific colour, each group will drive their MatataBot from the center towards a matching MatataBot that has the same colour. Using the **Wait Until** coding block and the **Shake** block, shake the controller as fast as you can to get to the matching MatataBot first!

Learning standards found on Pg. 138



Gyro Match Up

Lesson 03

Grades K - 1

60 mins

In Gyro Match Up, students will be able to match up their MatataBot with another MatataBot with the same colour by "shaking" the controller. By shaking the controller and using its gyro features, students will be able to race and move their Bot towards another matching colour MatataBot by shaking as fast as they can. Match up with another Bot first to win!

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a gyroscopic device by being able to shake it. You will also understand how MatataBot will move based on how fast you shake the controller and learn how MatataBot will match with another MatataBot that has the same assigned colour.

The ideas that will last with you beyond the classroom is how well you have transformed the controller into a gyroscopic device when the controller is shaken. In addition, you will have a lasting impression of how well you have coded MatataBot to match with another MatataBot with the same colour as quick as possible.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the controller into a gyroscopic device using the **Shake** coding block placed under it.

2) Use their own critical thinking skills to find a matching MatataBot with the same colour as fast as they can and drive towards it.

3) Use the necessary coding skills to determine the most strategic way to get their MatataBot to match with the same coloured MatataBot.

What you'll do

After being assigned a specific colour, each group will drive their MatataBot from the center towards a matching MatataBot that has the same colour. Using the **Wait Until** coding block and the **Shake** block placed under it, shake the controller as fast as you can to get to the matching MatataBot first!

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set.
- Projector/Display Screen.

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "How do you play matching games?" "What are some matching games you have played before?" Say, "MatataBot loves matching! Today, you will code your MatataBot to move and navigate to another groups' MatataBot that has the same colour as yours by shaking the controller as fast as you can. Have fun!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to move only when the controller is shaken.

   a) First, connect the Controller to MatataBot by switching to the "Control Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

   b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with a **Shake** coding block placed under it. Students may test out their code by pressing the 'X' (clear) button on the controller and hold down the button for 2 seconds to enter this shaking mode. By continuing to hold down the button, it will enhance the speed of the robot's movements - the faster you shake the controller, the faster MatataBot will move.

5) Alternatively, keeping in "Control Mode" will allow students to press and hold the 'Play' button on the controller to begin using the gyro function. Toggle your controller in different directions to move MatataBot in various ways (e.g. twisted left = turns left, twist right = turns right, twist towards you = moves backward, twist away from you = moves forward).

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the controller to move around only when the controller is shaken. Encourage the use of various movement blocks after the **Shake** coding block for MatataBot to move around and match with another MatataBot that has the same assigned colour.

2) Alternatively, press the 'Play' button to enter gyro mode and maneuver MatataBot by twisting your hand holding the controller in various ways.

3) Then, together with you, ask students to move to and match with the same coloured MatataBot by shaking the controller. The faster you shake, the faster MatataBot moves.

Independent practice

45 mins

1) Before students can start coding, encourage them to think about how they can use and place the movement blocks after the **Wait Until** and **Shake** coding blocks.

2) Once they have a rough idea of how their MatataBot will move while the controller is shaken, students can start coding and place their coding blocks on the Control Board. Encourage them to either use the 'X' or clear button on the controller for MatataBot to move or the gyro feature by holding the 'Play' button and twist the controller for MatataBot to move in various ways.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

12) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

13) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the controller to control MatataBots movements? Which button did you press on the controller in Control Mode? How did you code for it on the Control Board?"

d) "How did you move MatataBot to match with other MatataBot's who had the same colour as yours?"

e) "Did your groups' MatataBot successfully match with another group's MatataBot in the fastest time? If not, how will you change your code to do so if you had another chance?"

Interdisciplinary & 21st century connections

This lesson can be used in any subject area as a means to test student knowledge in the subject area. 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

If students have a difficult time coding using the **Wait Until** and **Shake** coding blocks on the Control Board, they may use the alternative way to move their groups' MatataBot using the "Play" button and twisting the controller in various ways. As students are challenged to code their controller, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time thinking about their code using the **Wait Until** and **Shake** coding blocks, in 1-2 classes prior to this lesson, come up with an example code and write it down in order to be used in the class you are running the lesson.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage social interactions.

Extension activities:

- Students may program a random colour of lights with the **Random** block, then drive MatataBot to find their colour match in this manner! Create a celebration dance or music when your group matches with another groups' MatataBot.
- Hint: use the **Music** button on the Controller to randomly play music on MatataBot. Students may also play for fun or keep score between groups the number of times their group finds a match first.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- http://bit.ly/connect-sensor-1

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- http://bit.ly/connect-sensor-2

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

Assessment

Student work will be assessed in the following manner:

- Students in their groups have come up with their code using the proper coding blocks before starting to code on the Control Board.
- Students correctly transformed the controller to move MatataBot as fast as possible to match with the same coloured MatataBot from another group with the colour being assigned previously by the teacher.
- Students have chosen at least one way to move their MatataBot and match with the same coloured MatataBot (hold and press the Play button, Clear button (shaking)).
- Students were able to match with another group's MatataBot successfully first.
- Students were able to complete any extension activities (time permitting).

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

Adventure Trivia Game

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

It's Trivia time! In this lesson, two groups will compete as they travel around one Nature Map. Each pair should develop a set of 10 trivia questions about various topics that will be asked to another pair. When a question is asked, the first one who "buzzes in" will take a shot at answering the question. The winning team is the one who will answer enough questions correctly and move their MatataBot one space at a time until they reach the finish line!

Learning standards found on Pg. 139

Adventure Trivia Game

Lesson 04

Grades 1 - 2

60 mins

This lesson is open to playing this adventure trivia game using various subjects or topics discussed in the classroom prior to the game. For example, trivia questions from units in Social Studies or Science can help the students remember and recall various facts and information. The Nature Map used is a means to travel around from start to finish or students can create their own map matching their subject area.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the sensor controller into a buzzer. You will also understand the various ways you could move MatataBot around the map and learn how you are able to reach the finish line on the map by answering some trivia questions.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a buzzer with lights and sounds coming from MatataBot to mimic buzzers used in a trivia game. In addition, you will have a lasting impression when answering trivia questions correctly in order to move MatataBot around the map through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use **Wait Until** coding block correctly to transform the sensor controller into a buzzer only when the Play button is pressed.

2) Use coding to recall and remember facts/information about a certain topic by answering trivia questions.

3) Use coding to determine the most strategic route to get to the finish line on the map.

What you'll do

Using the **Wait Until** block, transform the controller into a "buzzer". Press the Play button on the controller to turn on all the lights on the controller to one specific colour and make a sound on MatataBot. Have two groups competing as they travel around one Nature Map. Each pair should develop a set of 10 trivia questions about various topics that will be asked to another pair. Then, choose a start square and place a green flag at a start block and a red flag at the finish line. When a question is asked, the first one who "buzzes in" will take a shot at answering the question. The winning team is the one who will answer enough questions correctly and move their MatataBot one space at a time until they reach the finish line!

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Papers and pencils to write down trivia questions
- Nature Map

Prior to lesson

- Update Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Say, "MatataBot loves trivia games! Today, you will code your MatataBot to answer a set of trivia questions by transforming the sensor controller into a "buzzer" with lights and sounds. You will play a game with another group using the Nature Map to move across and reach the finish line as quick as possible. Good luck!"

3) Introduce how to use the **Wait Until** coding block in order for the students to transform the sensor controller into a "buzzer".

a) First, connect the Controller to MatataBot by switching to the "Control Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, allow students to use one of the various modes of movement using the controller in order to move their MatataBot towards the finish line each time they answer a question correctly: Arrow Buttons, Play Button (Gyro) or Clear Button. If students choose to use the Arrow Buttons, they do not need to use the **Wait Until** coding block on the Control Board. However, if students choose to use the Play Button or Gyro feature, they must use the **Press** coding block and place it under the **Wait Until** coding block on the Control Board. Alternatively, if students choose to use the Clear Button feature (for shaking the controller), they must use the **Shake** coding block and place it under the **Wait Until** coding block on the Control Board. For this control mode, press and hold down the clear button ('X') for 2 seconds and students will enter this mode. As students keep pressing down the button and shake the Controller, this will enhance the speed of the robot and the faster you shake, the faster the robot will move.

4) Once students have chosen the method of how they will be moving their MatataBot, they should test it out using the coding blocks on the Control Board (if necessary).

5) **Reminder:** reserve the **Play** button for students to create and use as the "buzzer" so students can use either the Arrow Buttons or Shaking options to move their MatataBot. However, students can still use the **Play** button in Gyro mode if it is held for 2 seconds to activate it.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and how this could be used with the controller and the MatataBot's movement on the Nature Map. Based on their choice, students can use the **Press** and **Shake** coding blocks to be placed under the **Wait Until** block as they begin to code.

2) Ask students to place 2 flags on the Nature Map. One flag somewhere at the beginning of the map and another flag somewhere near the end indicating the "finish line".

3) Then, together with you, ask students to come up with a couple of trivia questions to ask other groups on a particular topic/subject area. For example, in the "Understanding Earth and Space Systems" unit for Grade 1 Science and Technology, a trivia question could be, "What are the 4 seasons?"

4) As a class, come up with 2-3 questions together that students could potentially use in their trivia game with other groups.

Independent practice

45 mins

1) Before students can start coding, encourage them to come up with at least 10 trivia questions to ask another group on a particular subject area discussed in class along with the number of steps, written in brackets, MatataBot would take to move if this question is answered correctly. For example, "What are the 4 seasons?" (2 steps).

2) Have students write down these questions and their allotted steps in brackets on a sheet of paper. See the "Modifications and Accommodations" section of this lesson for more ideas on modifying or accommodating students' learning abilities.

3) Once the 10 questions have been developed, students can start coding to use their controller and play a trivia game with another group, taking turns asking questions and using the controller to move MatataBot with their partners.

4) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the sensor controller into a buzzer? Which button did you press on the controller? How did you code for it on the Control Board and Tower?"

d) "How did you move MatataBot around the map? Which movement option did your group use?"

e) "Did your groups' MatataBot reach the finish line on the map? If not, explain how you would be able to cross the finish line if you had another chance to play the trivia adventure again."

Interdisciplinary & 21st century connections

This lesson can be used in any subject area as a means to test student knowledge in the subject area using trivia questions. 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

If students have a difficult time coding for a buzzer on the Control Board, they may use any items around the classroom (bell, buzzer from a game set, etc) to use in their game. Instead of the controller, students may use the traditional **Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°** coding blocks to move their MatataBot throughout the Nature Map. As students are challenged to code for the buzzer, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time writing questions down, in 1-2 classes prior to this lesson, come up with these 10 questions and write them down in advance on chart paper.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage social interactions.

Extension activities:

- Students may play the trivia adventure game with 2-3 other groups (something like Jeopardy, each set of 2-3 student contestants have chosen a specific coloured light on the controller). The first one who "buzzes in" will take a shot at answering the question.

- Create a celebration dance or music when a question is answered correctly or when a team crosses the finish line.
- Hint: use the Music button on the Controller to randomly play music on MatataBot. Play for fun or keep score between groups.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students in their groups have come up with 10 or more trivia questions to be used in the adventure game.
- Students correctly transformed the controller into a buzzer using the Play button, while turning on lights and sounds that represent their group.
- Students have chosen at least one way to move their MatataBot across the Nature Map (hold and press the Play button, Clear button (shaking), Arrows on Controller or traditional coding on Control Board with coding blocks).
- Students were able to reach the finish line on the Nature Map by correctly answering the trivia questions asked by another group.
- Students were able to complete any extension activities (time permitting).

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 05

Moving Day

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

MatataBot is moving! Help him move on this moving day by creating and using the Lego arms that fit over it in order to move forward and detect objects to MatataBot to move. Using the **Wait Until**, **Obstacle** and **Colour** blocks as well as the **Function** blocks to transform the sensor controller and help MatataBot navigate around, detect your moving items and move as many different coloured blocks as you can!

Learning standards found on Pg. 144

Moving Day

Lesson 05

Grades 2 - 3

60 mins

In Moving Day, students will be able to create Lego "arms" as well as sense and move different coloured objects around by using the sensor controller attached to the top of MatataBot. By "sensing" whether there are obstacles in front or not as well as various coloured objects, MatataBot will be able to successfully move its items from one place to another. Students may also use Functions to successfully move in the same manner and pick up its items and move them around.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense objects in front of it as well as different coloured objects. You will also understand how MatataBot will pick up and move objects from one place to another and learn how MatataBot will use its newly created Lego arms to move the items around.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into obstacle and colour sensor when MatataBot senses objects and colours in front of it. In addition, you will have a lasting impression of how well you have coded MatataBot to move its items on moving day through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into an obstacle sensor using the **Obstacle** or **No Obstacle** coding blocks placed under it as well as **Colour** coding block.

2) Use their own creativity to create using Lego the arms that will allow MatataBot to move items around.

3) Use critical thinking and coding skills and Functions to determine the most strategic way to get MatataBot to successfully move its items from one place to another.

What you'll do

Create arms by using Lego pieces that fit over MatataBot in order to move forward and detect objects for it to move. Using the **Wait Until**, **Obstacle** and **Colour** blocks as well as the **Function** blocks to transform the sensor controller and help MatataBot navigate around, detect its moving items and move as many different coloured blocks as it can!

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set.
- Projector/Display Screen.
- Lego pieces enough to build one set of arms per group.
- Green, Red and Yellow coloured objects for moving.
- 2 flags indicating where the objects are and where they will be moved to.

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.
- Build an example of Lego arms that would be attached to MatataBot (time permitting).

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good moving company?" "How would that moving company move items from one house to another?" Explain the actions step by step. Say, "MatataBot loves moving! Today, you will code your MatataBot to help him on moving day by sensing and picking up coloured objects from one place and moving to another place. Have fun!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "sense" various objects in front of it by having the sensor controller placed on top of the MatataBot.

a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with an **Obstacle** coding block placed under it. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks in order to move a certain number of centimeters. For example, each movement forward is about 10cm, therefore adding the number **2** under a **Move Forward** block, will allow MatataBot to move 20cm.

5) Finally, have students add another **Wait Until** coding block and a **Colour** block placed under it so that MatataBot also senses a specific coloured object to move.

6) Once students have a rough idea of where MatataBot is moving to pick up different coloured objects, ask them to place various objects around the floor, especially green, yellow and red coloured objects. They should then test out their code to see if their MatataBot is sensing the appropriate coloured objects accurately.

7) While one student in the group is testing out the code, ask the other student in the group to start creating and building MatataBot's arms out of Lego. Advise students not to cover MatataBot's controller sensor with the Lego as it might affect it sensing ability to pick up objects.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and the **Obstacle** and **Colour** blocks. Discuss how this could be used with the sensor controller placed on top of MatataBot to sense various coloured objects placed on the floor for MatataBot to move on moving day. Encourage the use of various movement blocks before and after the **Obstacle** coding block for MatataBot to move around and pick up the objects by using its Lego arms created by the students.

2) Ask students to place a flag on one end of the floor where the objects for moving are and another flag where the blocks will be moved to.

3) Then ask students to creatively design Lego arms where they will place on MatataBot to help it move objects from one place to another. Discuss what makes good Lego arms. Make sure to discuss the importance of not covering the controller sensor with the arms.

Independent practice

45 mins

1) Before students can start coding, encourage them to come up with a rough idea of how their Lego arms will look like as well as where the different coloured objects will be placed along with 2 flags indicating where the objects are and where they are going to.

2) Once students have a rough idea of their Lego arm design, they can start placing their objects on the floor and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing various coloured objects to move.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the sensor controller into a robot that senses different coloured objects? How did you code for Both these features on the Control Board?"

d) "How did your MatataBot move around the floor during moving day?"

e) "Was your group able to successfully move the objects from one area to another? If not, explain how you would be able to move objects if you had another opportunity."

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language). 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

As students are challenged to code for the sensing of objects and colours, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time designing and creating their Lego arm, in 1-3 classes prior to this lesson, come up with this rough sketch in advance on chart paper.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may use the Matatalab Lego set to push items for moving day by attaching the lego block on wheels at the end of MatataBot.
- Additionally, students may use other coloured objects as obstacles from the Pro set along with the sensor control to sense obstacles on the road and avoid them using the **No Obstacle** coding block.

- Students may also want to use **Loop** blocks to accomplish their task of constantly moving to the same spot to pick up their next object.
- Finally, have a race as a class where the first group to move all their items to the other side wins!

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students, in their groups, were able to successfully come up with a rough sketch for Lego arm to be placed on MatataBot.
- Students have correctly transformed the controller into an object and colour sensor using the **Wait Until** button as well as the **Obstacle** and **Colour** blocks placed under it.
- Students were able to successfully code for and move their objects from one place to another.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

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 06

Light at the End of the Tunnel

Grades 1 - 3 *60 mins*

MatataBot needs to find the light at the end of the tunnel! Using the **Bright** and **Dark** coding blocks, have MatataBot sense when it gets dark as he enters into a tunnel and tries to navigate its way out of it. Use the tunnel blocks to create a dark environment for MatataBot to sense when it goes through it and with the help of the sensor controller, wait and sense when the brightness changes in the room or when coming out of the tunnel in order to navigate MatataBot successfully out of the dark tunnel.

Learning standards found on Pg. 147

Light at the End of the Tunnel

Grades 1 - 3

60 mins

In Light at the End of the Tunnel, students will be able to create their own tunnel for MatataBot to navigate through it by using the sensor controller attached to the top of MatataBot. By "sensing" when it is dark or bright, MatataBot will be able to successfully find its way out of the created tunnel.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense brightness and darkness surrounding the sensor controller. You will also understand how MatataBot will navigate through the tunnel you will create and learn how MatataBot will find its way out of this tunnel.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a light sensor when MatataBot senses brightness or darkness surrounding it. In addition, you will have a lasting impression of how well you have coded MatataBot to find its way out of the tunnel through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into a light sensor using the **Bright** or **Dark** coding blocks placed under it.

2) Use their own creativity to set up a tunnel that MatataBot could navigate through.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot out of the tunnel.

What you'll do

Using the **Bright** and **Dark** coding blocks, have MatataBot sense when it gets dark as he enters into a tunnel and try to navigate its way out of it. Use the tunnel blocks to create a dark environment for MatataBot to sense when it goes through it and with the help of the sensor controller, wait and sense when the brightness changes in the room or when coming out of the tunnel in order to navigate MatataBot successfully out of the dark tunnel.

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Nature Map
- Magnetic Matata Map OR materials for tunnel creation (card stock, scissors, tape)
- Animation Add-on Set (optional - for extension activities)

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good light sensor?" "How would you sense things around you if you were navigating through a dark tunnel?" Say, "MatataBot is not afraid of the dark. Today, you will code your MatataBot to navigate through a tunnel you will create and use its light sensors to find its way out of it. Good luck!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "sense" light surrounding it by having the sensor controller placed on top of the MatataBot.

    a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with a **Bright** and **Dark** coding blocks placed under it. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks in order to move longer distances.

5) Once students have a rough idea of where MatataBot is moving on the Nature Map, ask them to place a tunnel in a specific route on the Nature Map. They should then test out their code to see if their MatataBot is sensing light and navigating through the tunnel accurately.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sensor controller placed on top of MatataBot to sense brightness and darkness when placed on the Nature Map with a tunnel created on top of it. Encourage the use of various movement blocks before and after the **Bright** and **Dark** coding blocks for MatataBot to move through the tunnel.

2) Then, together with you, ask students to creatively design a tunnel where they will place on top of the Nature Map. Discuss what makes a good tunnel and path.

Independent practice

45 mins

1) Before students can start coding, encourage them to come up with a rough sketch of how their tunnel path will look on a blank sheet of paper. They could use the tunnel pieces or create their own using card stock, scissors and tape.

2) Once the rough sketch has been created, students can start placing their tunnel on the Nature Map and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing brightness and darkness and navigate its way through the tunnel and back out.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

   a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   c) "How did you transform the sensor controller into a robot that senses differences in light? How did you code for it on the Control Board?"

   d) "How did you move MatataBot through the tunnel?"

   e) "Was your group able to exit the tunnel successfully? If not, explain how you could exit the tunnel accurately if you had another opportunity to do so."

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language) as well as Science and Technology especially the units "Energy in Our Lives" and "Light and Sound". 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

As students are challenged to code for the sensing of difference in light when entering and trying to exit a tunnel, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time drawing their concept for tunnel and path to take, in 1-2 classes prior to this lesson, come up with this rough sketch in advance on chart paper.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may create a block of code that allows MatataBot to react in various ways if it spends a certain amount of time in the dark (e.g. randomly move, turn eyes red colour).
- Add a celebration dance when MatataBot exits the tunnel successfully including various lights and/or sounds.
- Additionally, students can code for MatataBot to turn on different coloured lights on the controller as it enters the tunnel (detecting darkness) and make sounds as you enter the tunnel.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students, in their groups, were able to successfully come up with a rough sketch for their tunnel and path.
- Students have correctly transformed the controller into a light sensor using the **Wait Until** button as well as the **Bright** and **Dark** blocks placed under it.
- Students were able to successfully code and exit their created tunnel on the Nature Map by navigating their MatataBot through it.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

Example nature 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.

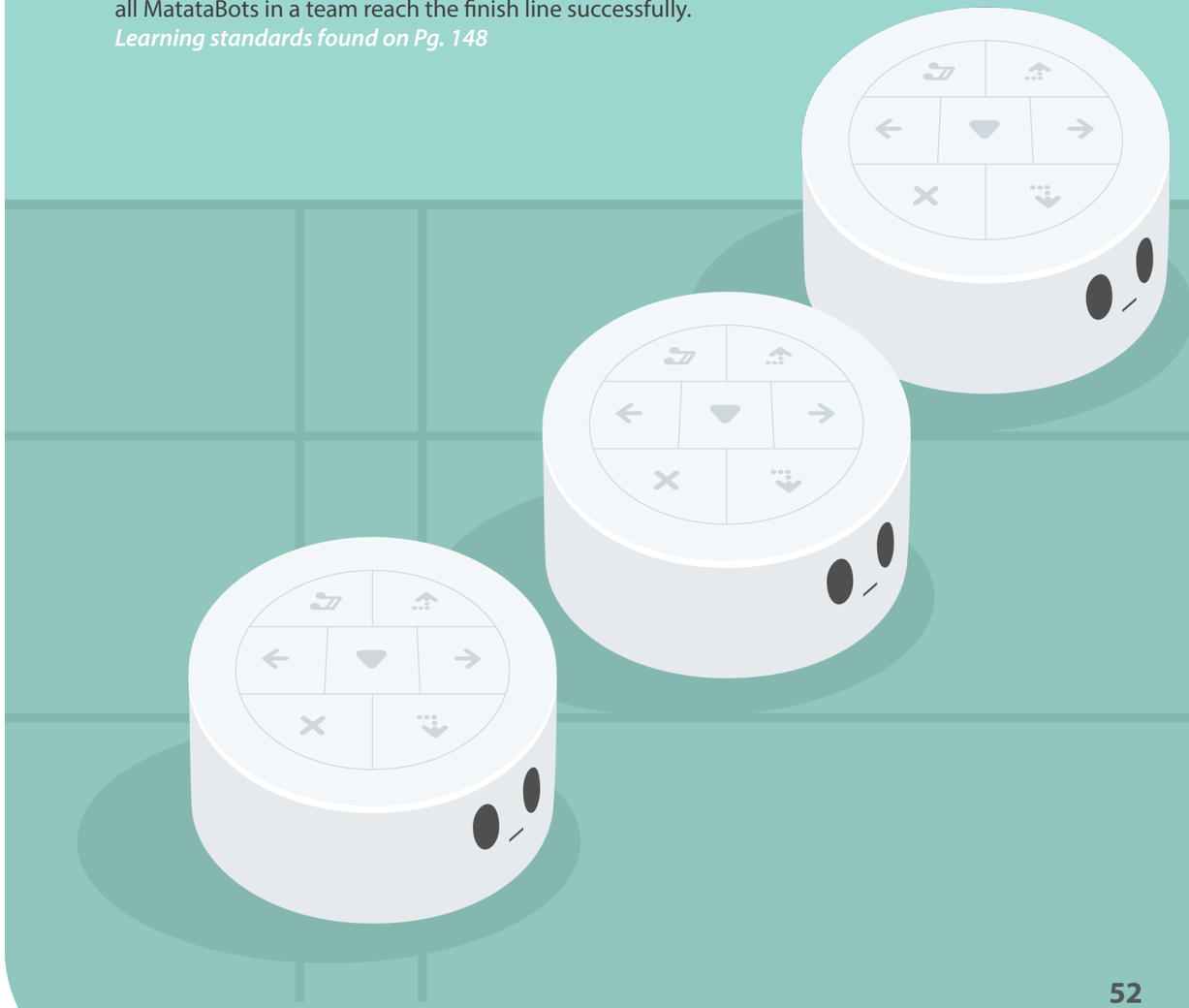
Lesson 07

Relay Race

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

MatataBot loves to work in a team! Using the Sensor Mode, MatataBot will send a message to another team's MatataBot to play a relay race game. The goal of the game is to relay a "forward" motion to the other MatataBot as quickly as possible, then have that MatataBot move ahead, send the same signal to another MatataBot down the line until all MatataBots in a team reach the finish line successfully.

Learning standards found on Pg. 148



Relay Race

Lesson 07

Grades 1 - 3

60 mins

In Relay Race, students will be able to send a "message" to other MatataBots, one at a time, in order to navigate towards a finish line by using the sensor controller attached to the top of MatataBot. By "sending" the message to another MatataBot in front of it, MatataBot will be able to successfully complete a relay race and have all MatataBots send and receive the same message in order to reach the finish line.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to send and receive messages or signals to other MatataBots in front of it. You will also understand how MatataBot will move based on the signals sent and learn how MatataBot will reach the finish line in this relay race in teams.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a signal sender and receiver when MatataBot sends a message or signal to other MatataBots in their team. In addition, you will have a lasting impression of how well you have coded MatataBot to reach the finish line through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Send a Signal** and **Receive a Signal** coding blocks correctly to transform the sensor controller into a message sender and receiver using various movement and turn coding blocks.

2) Use their own creativity to set up a path using other MatataBots in their team in order to get to the finish line first.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot in a team of Bots past the finish line first.

What you'll do

Using the Sensor Mode, MatataBot will send a message to another team's MatataBot to play a relay race game. The goal of the game is to relay a "forward" motion to the other MatataBot as quickly as possible, then have that MatataBot move ahead, send the same signal to another MatataBot down the line until all MatataBots in a team reach the finish line successfully.

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Nature Map
- Animation Add-on (optional for extension activities)

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "Does anyone know how to play broken telephone?" Discuss as a class how the game works by sending the same message around until the last person receives it.

3) Then ask, "What is a relay race? What makes a good race as a team?" "How would you play a relay race with a baton, for example?" Discuss how a baton is being passed down from one athlete to another. Say, "MatataBot loves to send and receive messages! Today, you will code your MatataBot to send a message to other MatataBots in a team using its controller sensors in order to get the team to the finish line. Good luck!"

4) Introduce how to use the **Send a Signal** and **Receive a Signal** coding blocks in order for MatataBot to "send" a particular message in front of it by having the sensor controller placed on top of the MatataBot.

a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

5) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Send a Signal** and **Receive a Signal** coding blocks on the Control Board. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks. **Note:** one student in a particular team will have the **Send a Signal** block while the remaining group members will start their code using a **Receive a Signal** block, followed by movement blocks and finally another **Send a Signal** block to pass on the signal on to the next MatataBot.

6) Once students have a rough idea of where MatataBot is moving on the Nature Map, ask each player in a team to place their MatataBot strategically on the map in order to get to the finish line successfully. Allow them to use green flags to indicate a start line and a red flag indicating the finish line. They should then test out their code to see if their MatataBot is sending and receiving signals accurately.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Send a Signal** and **Receive a Signal** coding blocks and discuss how this could be used with the sensor controller placed on top of MatataBot to send and receive signals to other MatataBots on a team. Encourage the use of various movement blocks before and after the **Send a Signal** and **Receive a Signal** coding blocks for MatataBot to move around the Nature Map.

2) Ask students to place 2 flags on the Nature Map. One flag somewhere at the beginning of the map and another flag somewhere near the end indicating the "finish line".

3) Then, together with you, ask students to creatively design a path where they will place their MatataBots on the Nature Map. Discuss what makes a good path to reach the finish line.

Independent practice

45 mins

1) Before students can start coding, encourage them to come up with a rough sketch of how their path will look on a blank sheet of paper.

2) Once the rough sketch has been created, students can start placing their MatataBots on the Nature Map and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing and sending signals to other MatataBots in their team.

3) Once complete, students may choose to complete some extension activities from the Extensions section

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the sensor controller into a signal sender and receiver? How did you code for it on the Control Board?"

d) "How did you move MatataBot around the Nature map?"

e) "Was your team able to reach the finish line successfully? If not, explain how you could reach the finish line if you had another opportunity to do so."

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language). 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

As students are challenged to code for sending and receiving messages to other MatataBots in their team, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time drawing their concept for their path of MatataBots, in 1-2 classes prior to this lesson, come up with this rough sketch in advance on chart paper.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may create a celebration dance or song when your team wins using any format (e.g. play button press). Include lights on the controller or LED lights on MatataBot (Animation add-on).
- Students may also choose to move in various shapes (e.g. Square, Triangle, Rectangle, Star, etc) by sending and receiving signals to MatataBots in their team to form and complete the specific chosen shape.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Using the Sensor to Send and Receive Signals:
Youtube- *http://bit.ly/send-receive-signals*

Assessment

Student work will be assessed in the following manner:

- Students, in their groups, were able to successfully come up with a rough sketch for their path.
- Students have correctly transformed the controller into a message sender and receiver using the **Send a Signal** and **Receive a Signal** coding blocks.
- Students were able to successfully code and reach the finish line on the Nature Map by navigating their MatataBot through it and sending and receiving appropriate messages, utilizing all MatataBots in their team.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

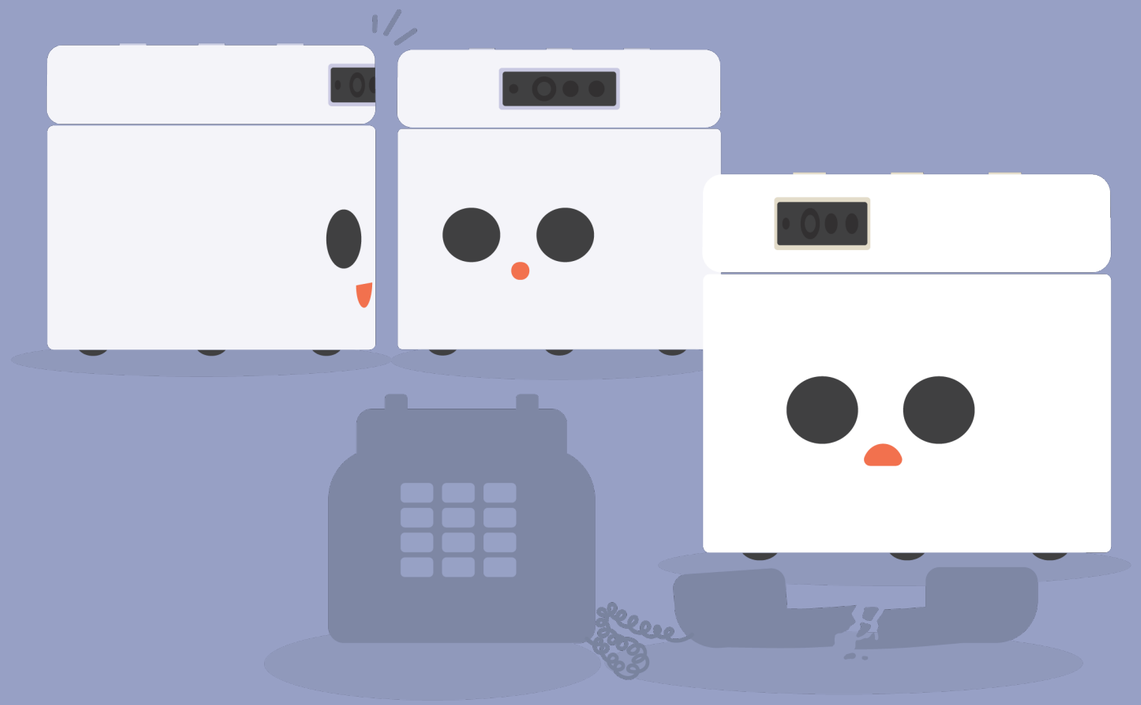
Relay race graphic

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.

Broken Telephone Signal

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

MatataBot doesn't like it when a signal is broken! In a group of 3 or 4 Matatalab sets, using the **Send a Signal** and **Receive a Signal** blocks, choose one group to send an initial signal using a set of blocks describing their message (movements, sounds, lights, etc). Then, allow MatataBot to move around the classroom and keep sending the signal to the next group until it reaches the last Bot. All groups should code for a celebration dance/music once the message has been sent around successfully!
Learning standards found on Pg. 150



Broken Telephone Signal

Lesson 08

Grades 1 - 3
60 mins

In Broken Telephone Signal, students will be able to send a "message" to other MatataBots, one at a time, in order to navigate around the classroom sending the same message by using the sensor controller attached to the top of MatataBot. By "sending" the message to another MatataBot in front of it, MatataBot will be able to successfully send the same message from the initial MatataBot and have all MatataBots send and receive the same message in order to final MatataBot in the group.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to send and receive messages or signals to other MatataBots in front of it. You will also understand how MatataBot will move based on the signals sent and learn how the first MatataBot's message will reach the last MatataBot in the team.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a signal sender and receiver when MatataBot sends a message or signal to other MatataBots in their team. In addition, you will have a lasting impression of how well you have coded the first MatataBot, along with other MatataBots in the team, for the message to reach the last MatataBot through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Send a Signal** and **Receive a Signal** coding blocks correctly to transform the sensor controller into a message sender and receiver using various movement, turn and sound (music) coding blocks.

2) Use their own creativity to set up a path using other MatataBots in their team in order to get the initial message to the last and final MatataBot successfully.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot in a team of Bots to finally receive the initial message that was sent by the first MatataBot in the team.

What you'll do

In a group of 3 or 4 Matatalab sets, using the **Send a Signal** and **Receive a Signal** blocks, choose one group to send an initial signal using a set of blocks describing their message (movements, sounds, lights, etc). Then, allow MatataBot to move around the classroom and keep sending the signal to the next group until it reaches the last Bot. All groups should code for a celebration dance/music once the message has been sent around successfully!

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "Does anyone know how to play broken telephone?" Discuss as a class how the game works with sending the same message around until the last person receives it. Say, "MatataBot loves to send and receive messages! Today, you will code your MatataBot to send a message to other MatataBots in a team using its controller sensors in order to get the message sent by the first MatataBot in a team to the last MatataBot. Have fun and good luck!"

3) Introduce how to use the **Send a Signal** and **Receive a Signal** coding blocks in order for MatataBot to "send" a particular message in front of it by having the sensor controller placed on top of the MatataBot.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

   b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) as well as sound/music blocks followed by the **Send a Signal** and **Receive a Signal** coding blocks on the Control Board. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks. **Note:** one student in a particular team will have the **Send a Signal** block while the remaining group members will start their code using a **Receive a Signal block**, followed by another **Send a Signal** block to pass on the same signal onto the next MatataBot.

5) Once students have a rough idea of the message being sent and received, ask each player in a team to place their MatataBot's strategically on the classroom floor in order to send and receive the same message from the first MatataBot successfully. They should then test out their code to see if their teams' MatataBot's are sending and receiving the same signal/message accurately.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Send a Signal** and **Receive a Signal** coding blocks and discuss how this could be used with the sensor controller placed on top of MatataBot to send and receive signals to other MatataBots on a team. Encourage the use of various movement and sound/music blocks before and after the **Send a Signal** coding block (for the first MatataBot only) in order for the other MatataBot's to receive that signal and resend the same message to the next MatataBot in the team.

2) Then, together with you, ask students to creatively design a path where they will place their MatataBots on the classroom floor. Discuss what makes a good path to send the initial message to the final MatataBot on a team.

Independent practice

45 mins

1) In groups of 3 or 4 MatataBots (with about 6 - 8 students) students can start placing their MatataBots on the classroom floor and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing and sending signals to other MatataBots in their team.

2) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

   a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   c) "How did you transform the sensor controller into a signal sender and receiver? How did you code for it on the Control Board?"

   d) "How did you move MatataBot around the classroom floor?"

   e) "Was your team able to send the initial message around to other MatataBots in their team successfully? If not, what happened and how would you update your code for MatataBot to send a message accurately if you had another opportunity to do so."

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language). 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

As students are challenged to code for sending and receiving messages to other MatataBots in their team, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may choose more messages to send around as a whole class.
- Add different events to initiate the first signal sent such as Shaking, Hearing Sound, Play Button pressed or certain Colour/Light detected.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Using the Sensor to Send and Receive Signals:
Youtube- *http://bit.ly/send-receive-signals*

Assessment

Student work will be assessed in the following manner:

> Students have correctly transformed the controller into a message sender and receiver using the **Send a Signal** and **Receive a Signal** coding blocks.

> Students were able to successfully code an initial message to be sent around to other MatataBots in a team by navigating their MatataBot through to others and sending and receiving the same message, utilizing all MatataBots in their team while reaching the last MatataBot in the team with the initial message successfully.

> Students were able to complete any extension activities (time permitting).

> Students were able to successfully work in pairs or teams throughout the lesson.

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.

Matata
Light Twister

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

MatataBot loves to play the game of Twister. Using the **Clockwise** or **Counter Clockwise** light colour blocks that show up on the controller, code to randomly choose one of the 12 colours to light up. Then, create a mini twister game board with the 12 colours that correspond to the displayed lights. Code for MatataBot to move to the corresponding displayed coloured on the board using the Gyro or button press functions on the controller.
Learning standards found on Pg. 151

Matata
Light Twister

Lesson 09

Grades 2 - 3
60 mins

In Matata Light Twister, students will be able to create their own twister game board to navigate by using the sensor controller. The controller will also be used to display a random colour that MatataBot will drive towards in the least amount of time. By using the Gyro or Button Press features on the controller, MatataBot will be able to successfully navigate its way around the game board.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into one that randomly displays a certain colour. You will also understand how MatataBot will be used as a controller to move MatataBot around the Twister game board you will create and learn how MatataBot will find its way around the board.

The ideas that will last with you beyond the classroom is how well you have transformed the controller to display randomly selected colours. In addition, you will have a lasting impression of how well you have coded MatataBot to find its way around the Twister game board you will create through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Clockwise** or **Counter Clockwise** light colour coding blocks correctly to transform the sensor controller to display randomly selected colours using the **Random** coding block placed under it.

2) Use their own creativity to set up a Twister game board that MatataBot would move around on using the Gryo or Button Press features on the controller.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot around all colours on the game board.

What you'll do

Using the **Clockwise** or **Counter Clockwise** light colour blocks that show up on the controller, code to randomly choose one of the 12 colours to light up. Then, create a mini twister game board with the 12 colours that correspond to the displayed lights. Code for MatataBot to move to the corresponding displayed coloured on the board using the Gyro or button press functions on the controller.

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Large chart paper for Twister game board
- Pencils and markers to colour Twister game board
- Artist Add-on (optional - for extension activities)

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.
- Artist Add-on Set (optional - for extension activities).

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "Does anyone know how to play the game of Twister?" Explain how to play the game. Then ask, "How would MatataBot potentially move on a Twister game board?" Say, "MatataBot loves Twister! Today, you will code your MatataBot to navigate around a game board you will create and find your way around it. Have fun and good luck!"

3) Introduce how to use the **Clockwise** or **Counterclockwise** light colour coding blocks and **Random** blocks in order for MatataBot to randomly display a colour that MatataBot will move to on the created game board.

   a) First, connect the Controller to MatataBot by switching to the "Control Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

   b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place a **Random** coding block under the **Clockwise** or **Counter Clockwise** blocks in order to randomly choose a colour in a clockwise or counterclockwise fashion. Then, use the **Wait Until** block with a **Press** or **Shake** coding blocks placed under it in order to activate this random choice of colour. Hint to students that this code needs to be put first on their Control Board.

5) Once students have a rough idea of how colours will be chosen, ask them to test out their code to see if their MatataBot is displaying a colour only when activated in the way they wanted to.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the controller to display a randomly chosen coloured light on the controller using the **Random** coding block placed under it.

2) Ask students to choose the way they would like to move MatataBot on the game board: either Gyro or Button Press. Allow students some time to code for this.

3) Then, together with you, ask students to creatively design the Twister game board on chart paper using pencils and markers. Explain it should be 4 x 3 which would have 12 colours on it. Students may choose to use the Artist Add-on set to make circles in order for students to colour in (optional).

Independent practice

45 mins

1) Before students can start coding on their own, encourage one member of the group to come up with a rough sketch of how their game board will look on a blank sheet of paper.

2) Once the rough sketch has been created, students can start creating the final copy of their game board. One member of the group can take care of that task while the other member will code for choosing a random colour and the movements of MatataBot.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

   a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   c) "How did you transform the controller into a random colour generator to display? How did you code for it on the Control Board?"

   d) "How did you move MatataBot around your Twister game board?"

   e) "Was your group able to navigate around the game board and go through all 12 colours? If not, what would you do next time to reach your goal?"

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language) as well as Art. 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

As students are challenged to code for the controller to display a randomly selected colour light, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time drawing their concept for their game board, in 1-2 classes prior to this lesson, come up with this rough sketch in advance on chart paper.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may use the markers to have MatataBot draw its movements as it moves from one randomly coloured square to another.
- Students may also choose to keep score if they went to the right colour in a set amount of time (e.g. 10 seconds or less).
- Play with another team on the same game board.

Supporting files & links

Image of Twister game board:
Image- *http://bit.ly/twister-board*

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students, in their groups, were able to successfully come up with a rough sketch for their own Twister game board.
- Students have correctly transformed the controller into a random colour light selector and display it on the controller using the **Clockwise** or **Counterclockwise** coding blocks with a **Random** block placed under it.
- Students have correctly transformed the controller to initiate this random colour choice using the **Wait Until** button as well as the **Press** or **Shake** blocks placed under it.
- Students were able to successfully code their MatataBot's movement using the Gyro or Button Press features on the controller and move around their created game board.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

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.

Natural Disaster Rescue

Lesson 10

Grades 2 - 3 ***Part 1- 60 mins, Part 2- 60 mins***

MatataBot comes to the rescue! MatataBot's fellow Bot is trapped due to a natural disaster and needs to be rescued. Using the sensors to detect a trap or obstacle, another MatataBot stops and sends out an SOS signal to get help using the **Send a Signal** and **Receive a Signal** blocks as well as the sensor controller to help MatataBot navigate through the traps successfully and save the trapped MatataBot.
Learning standards found on Pg. 153

Natural Disaster Rescue

Grades 2 - 3
Part 1- 60 mins, Part 2- 60 mins

In Natural Disaster Rescue, students will be able to code their MatataBots to help rescue another trapped MatataBot with the help of another Bot using the sensor controller attached to the top of MatataBot. By "sensing" whether there are obstacles in front or not, MatataBot will be able to successfully find its way around the disaster and send signals to get help from another Bot. Students may also use colour cards instead of obstacles to allow MatataBot another way to "sense colours" and navigate its way through the various traps and obstacles.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense objects in front of it. You will also understand how MatataBot will avoid obstacles set up around a disaster trap you will create. You will finally learn how MatataBot will find its way to rescue another trapped MatataBot while sending signals for help from one Bot to another.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into obstacle sensor and avoider when MatataBot senses objects or colours in front of it. In addition, you will have a lasting impression of how well you have coded MatataBot to find the trapped MatataBot and send a signal to get some help from the natural disaster through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into an obstacle sensor using the **Obstacle** or **No Obstacle** coding blocks placed under it.

2) Use the **Send a Signal** and **Receive a Signal** coding blocks correctly to send signals from one controller to another.

3) Use their own creativity to set up traps using obstacles from the Pro Set or colour cards that MatataBot could sense and navigate around.

4) Use critical thinking and coding skills to determine the most strategic way to save the trapped MatataBot from the traps of the natural disaster.

5) Use excellent presentation/video recording skills to present the rescue mission to the rest of the class.

What you'll do

MatataBot's fellow Bot is trapped due to a natural disaster and needs to be rescued. In Part 1, using the sensors to detect a trap or obstacle using the **Wait Until**, **Obstacle** and **No Obstacle** coding blocks, another MatataBot stops and sends out an SOS signal to get help using the **Send a Signal** and **Receive a Signal** blocks as well as the sensor controller to help MatataBot navigate through the traps successfully and save the trapped MatataBot. In Part 2, students will record and present their rescue mission to the rest of the class.

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Obstacles or colour cards to be used as traps
- iMove or video recording device/software (for Part 2)

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction Part 1

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good rescue mission?""How would you avoid traps in front of you if you were navigating through a natural disaster?" Say, "MatataBot is on a rescue mission! Today, you will code your MatataBot to navigate around a disaster with lots of traps that you will create and use its obstacle sensors to find the trapped MataBot. Then, by sending signals for help to another Bot, that MatataBot will go and rescue the trapped Bot from disaster. Good luck!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "sense" various obstacles in front of it by having the sensor controller placed on top of the MatataBot.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

   b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with an **Obstacle** coding block placed under it. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks.

5) Then, allow students to use the **Send a Signal** and **Receive a Signal** coding blocks (on the Bot being rescued) followed by movement blocks to help rescue the trapped Bot out of the disaster scene. Students will then test out their code to see if their MatataBot is sensing obstacles and avoiding them to rescue the trapped Bot successfully.

6) Finally, as the class comes to an end, allow students to take a picture of their code on the Control Board as well as how they had set up their trapped Bot that is going to be rescued. This code and trap will be used in Part 2 of this lesson.

Introduction Part 2

5 mins

7) In Part 2 of this lesson, allow students to continue building their code and trap from last time using the pictures taken in the last class.

8) Using iMove or another device/software, record and edit clips with narration of their rescue mission. Present and share each disaster rescue mission with the rest of the class.

Guided Practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sensor controller placed on top of MatataBot to avoid obstacles and traps. Encourage the use of various movement blocks before and after the **Obstacle** and **No Obstacle** coding blocks for MatataBot to move around the the disaster scene and rescue the trapped Bot.

2) In addition, create a sample program with the students using the **Send a Signal** and **Receive a Signal** coding blocks with movement blocks that follow to help rescue the trapped Bot and follow the rescue team out of the trap.

Independent practice

40 mins

1) Students can start placing their obstacles as traps and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing and avoiding obstacles around their disaster scene. Students may also try sending signals from one Bot to another in order to save the trapped Bot in the natural disaster.

2) Once complete, students may choose to complete some extension activities from the Extensions section.

Lesson 10

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

   a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   c) "How did you transform the sensor controller into a robot that avoids obstacles? Into one that sends an SOS signal? How did you code for these on the Control Board?"

   d) "How did you move MatataBot around the traps?"

   e) "Was your group able to rescue another trapped Bot successfully? If not, what would you do differently next time if you had the chance to?"

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language) as well as Science and Technology (Natural Disasters). 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

As students are challenged to code for the sensing of obstacles, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

> Pair students to optimize co-teaching of prior knowledge.

> Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

> Students may choose to add a celebration dance when the Bot is rescued.

> Students may also choose to play various sounds and/or lights when coming into contact with various traps along the way to rescue the trapped Bot.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

> Students have correctly transformed the controller into an obstacle sensor using the **Wait Until** button as well as the **Obstacle** and **No Obstacle** blocks placed under it.

> Students have correctly transformed the controller into a message sender and receiver using the **Send a Signal** and **Receive and Signal** coding blocks placed under it.

> Students were able to successfully code and rescue the trapped MatataBot from the natural disaster.

> Students were able to complete any extension activities (time permitting).

> Students were able to successfully work in pairs or teams throughout the lesson.

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

Treasure Hunt

Grades K - 2 ***60 mins***

MatataBot loves the thrill of finding secret treasures! Using the Nature Map, students will select an area where a treasure will be placed, such as a red, green or yellow object along with various obstacles around the map that MatataBot would have to avoid in order to get to the treasure. Have MatataBot do a dance or play music once it reaches and senses the coloured treasure!

Learning standards found on Pg. 156

Treasure Hunt

Lesson 11

Grades K - 2

60 mins

In Treasure Hunt, students will be able to create their own treasure map to navigate through by using the sensor controller attached to the top of MatataBot in order to find a hidden treasure. By "sensing" whether there are obstacles in front or not, MatataBot will be able to successfully find its way around the treasure map filled with obstacles. Students may use a specific colour card as the treasure and once found, MatataBot will celebrate the discovery.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense objects in front of it. You will also understand how MatataBot will avoid obstacles set up around the treasure map you will put together with traps and learn how MatataBot will find its way to the hidden treasure.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into obstacle avoider when MatataBot senses objects in front of it. In addition, you will have a lasting impression of how well you have coded MatataBot to find its way around the treasure map finally finding the hidden treasure through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into an obstacle sensor using the **Obstacle** or **No Obstacle** coding blocks placed under it.

2) Use another **Wait Until** coding block to transform the sensor controller into a colour sensor using the **Red**, **Green** or **Yellow** coding blocks placed under it to sense the hidden treasure.

3) Use their own creativity to set up a treasure map using obstacles from the Pro Set and colour cards for the treasure that MatataBot could sense and navigate towards.

4) Use critical thinking and coding skills to determine the most strategic way to get MatataBot around the treasure map to find the hidden treasure.

What you'll do

Using the Nature Map, students will select an area where a treasure will be placed, such as a red, green or yellow object along with various obstacles around the map that MatataBot would have to avoid in order to get to the treasure. Have MatataBot do a dance or play music once it reaches and senses the coloured treasure!

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Nature Map used as a treasure map
- Colour Cards (red, green or yellow) for treasure or object with those colours
- Objects to be placed around the treasure map

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good treasure map?" "How would you avoid obstacles in front of you if you were navigating through a map to find the hidden treasure?" "How would you detect a specific colour treasure?" Say, "MatataBot loves finding treasures! Today, you will code your MatataBot to navigate around a treasure map you will create with a hidden treasure and obstacles and use its obstacle sensors to find your towards the hidden treasure. Good luck!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "sense" various obstacles in front of it by having the sensor controller placed on top of the MatataBot.

b) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

c) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with an **Obstacle** coding block placed under it. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks.

5) Once students have a rough idea of where MatataBot is moving on the Nature Map, ask them to place a red, green or yellow coloured treasure for MatataBot to find. In addition, add some obstacles around the map for MatataBot to avoid before finding the treasure. They should then test out their code to see if their MatataBot is sensing obstacles and avoiding them accurately as well as the coloured treasure.

6) Students may then use the other **Wait Until** coding block along with the **Red**, **Green**, or **Yellow** colour block placed under it to match the colour of the treasure that was hidden that MatataBot is hunting for.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sensor controller placed on top of MatataBot to avoid obstacles placed on the Nature Map. Encourage the use of various movement blocks before and after the **Obstacle** and **No Obstacle** coding blocks for MatataBot to move around the treasure map. Use the other Wait Until coding block along with the **Red**, **Green**, or **Yellow** colour block placed under it to match the colour of the treasure that was hidden that MatataBot is hunting for.

2) Ask students to place some obstacles on the Nature Map for MatataBot to avoid as it tries to find the hidden treasure.

Independent practice

45 mins

1) Students can start placing their obstacles on the Nature Map and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing and avoiding obstacles around the treasure map along with the hidden coloured treasure.

2) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the sensor controller into a robot that avoids obstacles? How did you code for it on the Control Board?"

d) "How did you transform the sensor controller into a robot that senses colour? How did you code for it on the Control Board?"

e) "Was your group able to find the hidden treasure successfully? If not, how would you find the treasure if you had another opportunity?"

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language). This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

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

Modifications

As students are challenged to code for the sensing of obstacles and colour on the treasure map, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time placing obstacles on their treasure map, perhaps allow them to use less obstacles to avoid making it a bit easier to navigate around.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may try to find the treasure on another groups' Nature Map.
- Add a celebration dance once the treasure is found.
- For an easier mode for younger students, connect the controller to MatataBot and use the gyro or arrow button features to navigate through the map and hunt for the treasure.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students have correctly transformed the controller into an obstacle sensor using the **Wait Until** button as well as the **Obstacle** and **No Obstacle** blocks placed under it.
- Students have correctly transformed the controller into a colour sensor using the **Wait Until** button as well as the **Red**, **Green** or **Yellow** blocks placed under it.
- Students were able to successfully code for and navigate around obstacles on the Nature Map in order to find the hidden treasure.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

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.

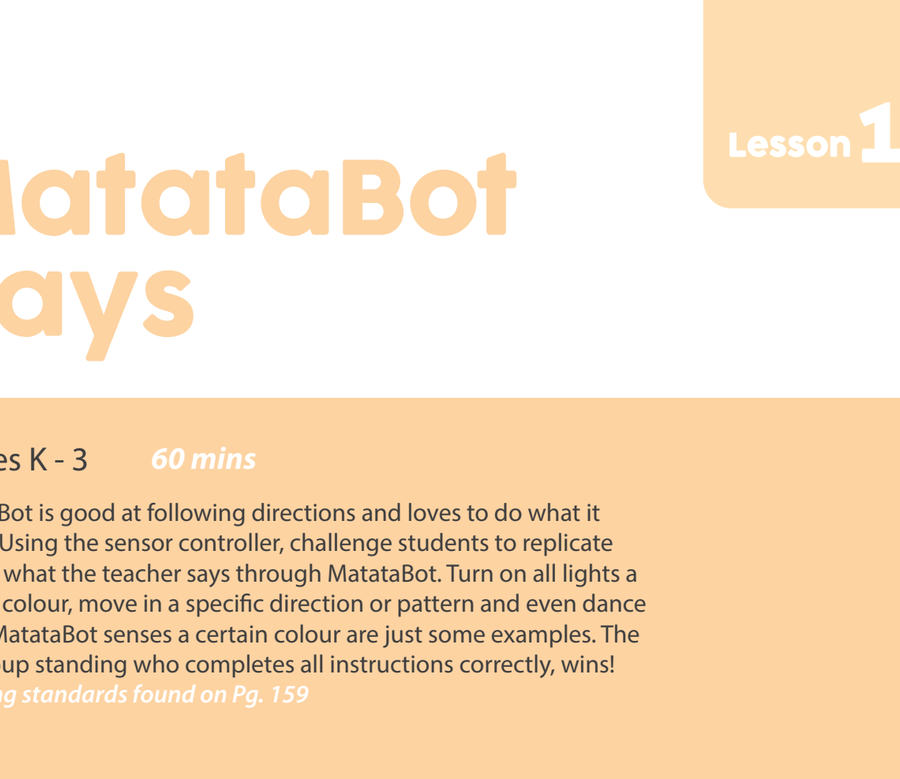
Lesson 12

MatataBot Says

Grades K - 3 *60 mins*

MatataBot is good at following directions and loves to do what it is told! Using the sensor controller, challenge students to replicate exactly what the teacher says through MatataBot. Turn on all lights a certain colour, move in a specific direction or pattern and even dance when MatataBot senses a certain colour are just some examples. The last group standing who completes all instructions correctly, wins!

Learning standards found on Pg. 159



MatataBot Says

Grades K - 3

60 mins

In MatataBot Says, students will be able to replicate exactly what the teacher says through the actions of MatataBot using the sensor controller. By placing the correct set of coding blocks on the Control Board, MatataBot will be able to successfully do what the teacher says.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense objects in front of it. You will also understand how MatataBot will do the specific actions the teacher mentions and learn how MatataBot will try and be the last one standing in a group of other MatataBots.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a controller of MatataBot in order to make the Bot do specific actions as described by the teacher. In addition, you will have a lasting impression of how well you have coded MatataBot to be the last group standing if you follow all directions correctly through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the various coding blocks correctly to transform the sensor controller into an obstacle sensor and move the MatataBot to match the actions that the teacher would mention.

2) Use their own creativity to figure out how to complete each task that the teacher would mention.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot to move and match what the teacher would mention.

What you'll do

MatataBot is good at following directions and loves to do what it is told! Using the sensor controller, challenge students to replicate exactly what the teacher says through MatataBot. Turn on all lights a certain colour, move in a specific direction or pattern and even dance when MatataBot senses a certain colour are just some examples. The last group standing who completes all instructions correctly, wins!

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Colour cards or coloured objects (green, yellow, red)

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good listener?" "How would you react when someone asks you to do something?" Explain that a good listener is someone who does the exact same actions someone such as an adult would ask them to do. Say, "MatataBot is an excellent listener and doer! Today, you will code your MatataBot to move in the manner that the teacher would mention as best as you can. Have fun!"

3) Introduce or review how to use the various coding blocks in order for MatataBot to move, display colours and "sense" various obstacles or colours in front of it by having using the sensor controller. These blocks include: **Wait Until**, **Send a Signal**, **Receive a Signal**, **All light colour**, **Clockwise light colour**, and **Counterclockwise light colour**.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to explore MatataBots movements using the various blocks in the Pro and Sensor add-on set. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks to make MatataBot move in different ways.

5) Once students have a rough idea of how MatataBot is moving, ask them to test out their code to see if their MatataBot is moving and sensing accurately.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the various different blocks including: **Wait Until**, **Send a Signal**, **Receive a Signal**, **All light colour**, **Clockwise light colour**, and **Counterclockwise light colour**. Try out the following actions for students to complete:

   a) Turn on all lights a certain colour (blue for example).

   b) Move in a specific direction or pattern (in a square, rectangle or triangle, for example).

   c) Get MatataBot to dance when it senses a certain colour in front of it (red obstacle for example).

Independent practice

45 mins

1) Before students can start coding, encourage them to explore the motions and actions of MatataBot before taking on the task of playing the "Simon Says" game as a class.

2) Once students have an idea using the coding blocks and activating the sensor controller, as a class, play several rounds of "Simon Says" and see which team is the last one standing. If a team does an action wrong other than what the teacher mentioned, they are out after 3 tries, for example.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

   a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   c) "How did you transform the sensor controller into a robot that moves and senses colours? How did you code for it on the Control Board?"

   d) "Was your group able to do exactly what the teacher had mentioned? If not, explain how you would be able to next time if you had another opportunity."

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language). 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

As students are challenged to code for various movements and actions on their MatataBot, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Teachers may add various levels of difficulty (e.g. Level 1: one set of instructions, Level 2: two-three sets of instructions, Level 3: four or more).
- Students may create a celebration dance or play music if their group wins.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students have correctly transformed the controller into an obstacle sensor as well as move correctly according to teacher instructions using various movement, light and sensor blocks.
- Students were able to successfully code and navigate their MatataBot as per the instructions of the teacher.
- Students in a team were able to win at least one round in MatataBot Says.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

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.

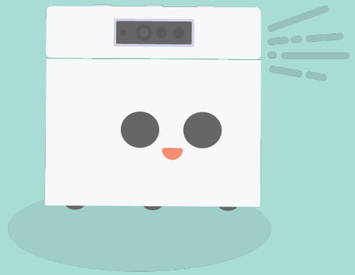
Lesson 13

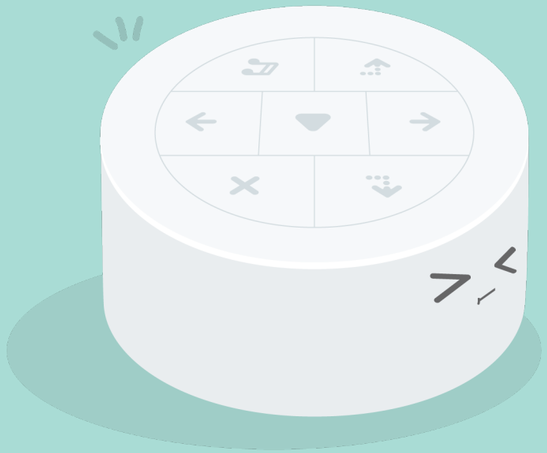
Marco Polo

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

MatataBot loves to listen and act to what people say! Using the microphone and sound sensor on the Controller, as well as the **Wait Until** and **Hear Sound** blocks, play a game of Marco Polo with MatataBot. Add a secondary way for your MatataBot to recognize only your specific sound, try combining it with colour cards or objects of your choice in your code. Have fun playing Marco Polo with MatataBot!

Learning standards found on Pg. 161





Marco Polo

Lesson 13

Grades 1 - 3

60 mins

In Marco Polo, students will be able to activate MatataBots' microphone and sound sensor to navigate their Bot to the sound heard by using the sensor controller attached to the top of MatataBot. By "hearing" where the sound is coming from MatataBot will be able to successfully find its way around and play a game of Marco Polo by responding to the sound and moving towards it.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sound sensor in order to hear sounds surrounding it. You will also understand how MatataBot will follow your voice and learn how MatataBot will respond to you using sound blocks.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into hearing sounds when MatataBot waits to hear a sound from its surrounding environment. In addition, you will have a lasting impression of how well you have coded MatataBot to follow your voice and respond through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into a sound sensor using the **Hear Sound** coding block placed under it.

2) Use their own creativity to have MatataBot follow you in different ways and respond to your sound.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot moving and responding to your voice.

What you'll do

Using the microphone and sound sensor on the Controller, as well as the **Wait Until** and **Hear Sound** blocks, play a game of Marco Polo with MatataBot. Add a secondary way for your MatataBot to recognize only your specific sound, try combining it with colour cards or objects of your choice in your code.

What you'll need

> Class set of Matatalab Pro Set and Sensor add-on set
> Projector/Display Screen

Prior to lesson

> Update Command Tower, MatataBot and Controller sets with latest software.
> Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good game of Marco Polo?" Briefly explain the game to students who may not know how the game is played. "How would you get the MatataBot to follow your voice?" Say, "MatataBot loves to play Marco Polo! Today, you will code your MatataBot to navigate around and follow your voice as well as respond back to you. Have fun and good luck!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "hear" sounds by having the sensor controller placed on top of the MatataBot.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

   b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with a **Hear Sound** coding block placed under it. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks.

5) Once students have a rough idea of how MatataBot will follow your voice, ask them to test out their code to see if their MatataBot can hear your voice and follow you around the classroom accurately.

6) To add a more unique way to hear your voice only, rather than other students' in the classroom, place a coloured card or object in front of MatataBot to sense and follow you only when it hears a sound and a colour is sensed in front of it.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sound sensor controller placed on top of MatataBot to hear your voice and follow you. Encourage the use of various movement blocks before and after the **Hear Sound** coding block for MatataBot to move around the classroom.

2) Then, together with you, ask students to test out their code to see if MatataBot is following your voice accurately.

Independent practice

45 mins

1) Students can start placing their movement blocks and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing sound and following your voice. Have MatataBot respond using various **Sound** blocks as it hears your voice.

2) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

   a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   c) "How did you transform the sensor controller into a robot that hears sound? How did you code for it on the Control Board?"

   d) "Was your group able to get their MatataBot to follow your voice successfully? If it didn't, what would you do differently with the code? How would you edit it?"

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language) 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

As students are challenged to code for the sensing sounds, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

> Pair students to optimize co-teaching of prior knowledge.

> Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

> Students may use the **Obstacle** block to help MatataBot avoid obstacles as it tries to navigate to your sound.

> Have a class race to see if you can get your MatataBot across the classroom first!

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

> Students have correctly transformed the controller into a sound sensor using the **Wait Until** block as well as the **Hear Sound** block placed under it.

> Students were able to successfully code and have their MatataBot navigate around the classroom towards their voice, avoiding obstacles when necessary.

> Students were able to complete any extension activities (time permitting).

> Students were able to successfully work in pairs or teams throughout the lesson.

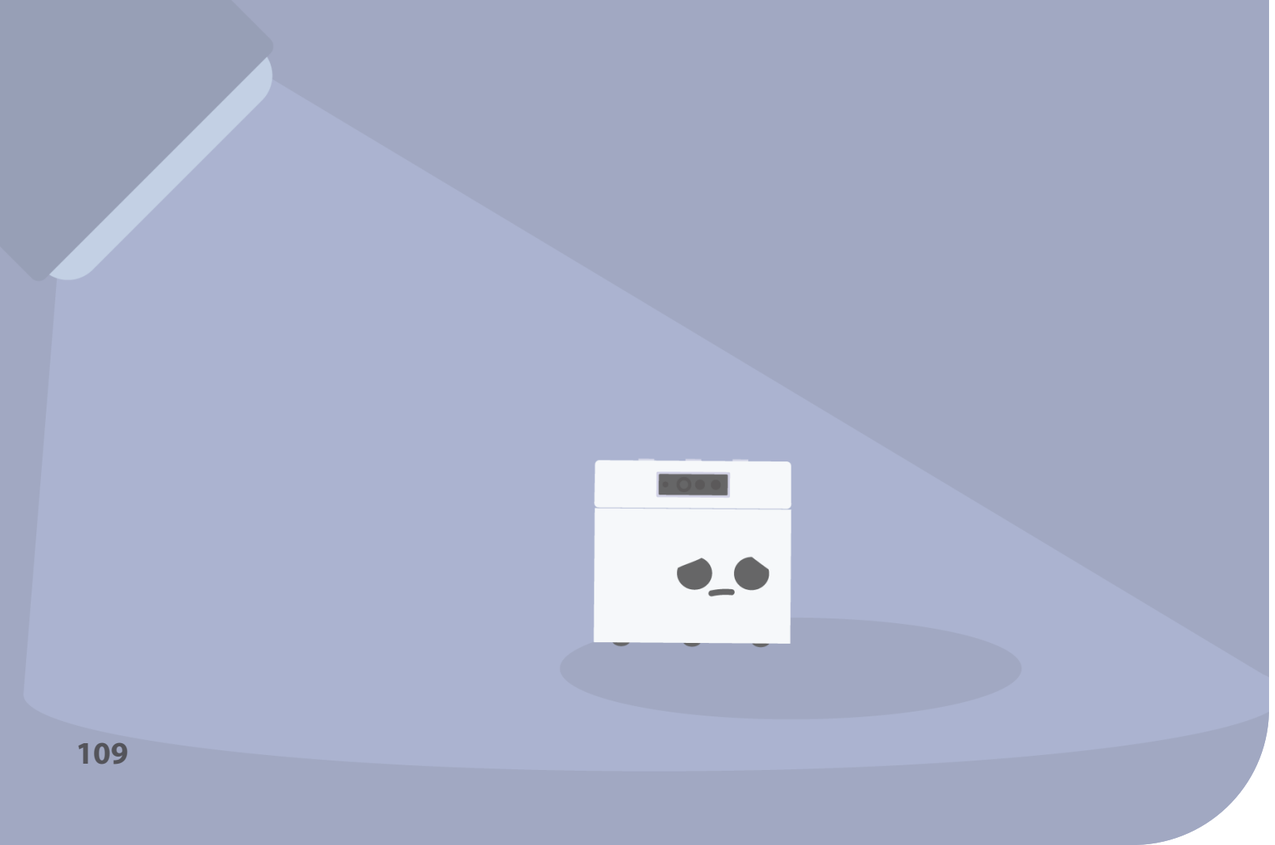
Category/Level Criteria	***Level 1 Poor performance***	***Level 2 Needs improvement***	***Level 3 Adequate***	***Level 4 Excellent***
Computational Thinking	Demonstrates limited ability to: • Break a complex problem down into smaller problems. (Decomposition) • Create a simple set of steps to solve the 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.

Not Afraid of the Dark

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

MatataBot is not afraid of the dark! Using the **Bright** and **Dark** coding blocks, have MatataBot sense when it gets dark as he enters into a dark area of the room and try to navigate its way to brighter places. Create a dark environment for MatataBot to sense when it goes through it and with the help of the sensor controller, wait and sense when the brightness changes in the room in order to navigate MatataBot successfully out of the dark areas.

Learning standards found on Pg. 162



Not Afraid of the Dark

Lesson 14

Grades 1 - 3

60 mins

In Not Afraid of the Dark, students will be able to create their own code for MatataBot to navigate through dark areas in the room by using the sensor controller attached to the top of MatataBot. By "sensing" when it is dark or bright, MatataBot will be able to successfully find its way out of dark places and find bright areas in the room.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense brightness and darkness surrounding the sensor controller. You will also understand how MatataBot will navigate through different light intensities in the room and learn how MatataBot will find its way out of dark areas.

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into a light sensor when MatataBot senses brightness or darkness surrounding it. In addition, you will have a lasting impression of how well you have coded MatataBot to find its way out of dark areas in the room through the opportunity of working in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding block correctly to transform the sensor controller into a light sensor using the **Bright** or **Dark** coding blocks placed under it.

2) Use their own creativity to set up a consistent motion for MatataBot to navigate and always avoid dark areas in the room.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot moving away from dark areas in the room.

What you'll do

Using the **Bright** and **Dark** coding blocks, have MatataBot sense when it gets dark as he enters through dark areas in the room and try to navigate its way towards brighter places. Turn off lights in the classroom to create a dark environment for MatataBot to sense when it navigates around the room and with the help of the sensor controller, wait and sense when the brightness changes in the room or in order to navigate MatataBot successfully out of the dark areas.

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Animation Add-on Set (optional - for extension activities)

Prior to lesson

- Update Command Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good light sensor?" "How would you sense things around you if you were navigating through dark areas of the room?" Say, "MatataBot is not afraid of the dark. Today, you will code your MatataBot to navigate through the dark areas of the room and use its light sensors to find its way out of it and find brighter areas. Good luck!"

3) Introduce how to use the **Wait Until** coding block in order for MatataBot to "sense" light surrounding it by having the sensor controller placed on top of the MatataBot.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

   b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with a **Bright** and **Dark** coding blocks placed under it. Students may also choose to use the smaller **Number** blocks to place under the movement coding blocks in order to move longer distances.

5) Once students have a rough idea of where MatataBot is moving on the classroom floor or carpet, they should test out their code to see if their MatataBot is sensing light and navigating through dark areas in the room accurately.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sensor controller placed on top of MatataBot to sense brightness and darkness when placed on the classroom floor/carpet. Encourage the use of various movement blocks before and after the **Bright** and **Dark** coding blocks for MatataBot to move around and sensing bright and dark areas of the room.

Independent practice

45 mins

1) Students can start placing their tunnel on the classroom floor/carpet and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing brightness and darkness and navigate its way through the room.

2) Once complete, students may choose to complete some extension activities from the Extensions section

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

   a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

   c) "How did you transform the sensor controller into a robot that senses differences in light? How did you code for it on the Control Board?"

   d) "How did you move MatataBot throughout the room?"

   e) "Was your group able to code for MatataBot to move away from dark areas in the room successfully? If not, explain how you would improve your code if you had the opportunity to do so again."

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language) as well as Science and Technology especially the units "Energy in Our Lives" and "Light and Sound". This lesson could also be co-taught with another content area teacher.

21st Century Skills include:

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

Modifications

As students are challenged to code for the sensing of difference in light around the room, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

Create a block of code that allows MatataBot to react in various ways if it spent a certain amount of time in the dark (e.g. randomly move, turn eyes red colour, etc.) using the Animation add-on for eye colour.

Supporting files & links

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students have correctly transformed the controller into a light sensor using the **Wait Until** block as well as the **Bright** and **Dark** blocks placed under it.
- Students were able to successfully code and navigate their MatataBot through various areas of the room that are bright and dark.
- Students were able to complete any extension activities (time permitting).
- Students were able to successfully work in pairs or teams throughout the lesson.

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 15

Maze Master

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

MatataBot needs to find a way out of the maze! Using the red obstacles, set up a maze for MatataBot to find its way through. Add a start and end flag to your path and use **Obstacle** and **No Obstacle** blocks as well as the sensor controller to help MatataBot navigate through the created maze successfully.

Learning standards found on Pg. 164

Maze Master

Lesson 15

Grades 1 - 3

60 mins

In Maze Master, students will be able to create their own maze to navigate through by using the sensor controller attached to the top of MatataBot. By "sensing" whether there are obstacles in front or not, MatataBot will be able to successfully find its way out of the created maze. Students may also use colour cards instead of obstacles to allow MatataBot another way to "sense colours" and navigate its way through the maze.

Big ideas & essential questions

The ideas that will last with you beyond the classroom is how well you have transformed the sensor controller into obstacle avoider when MatataBot senses objects or colours in front of it. In addition, you will have a lasting impression of how well you have coded MatataBot to find its way out of the maze through the opportunity of working in a team.

As a result of going through this lesson, you will understand how to transform the controller into a sensor in order to sense objects in front of it. You will also understand how MatataBot will avoid obstacles set up around the maze you will create and learn how MatataBot will find its way out of this maze.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the **Wait Until** coding tile blocks correctly to transform the sensor controller into an obstacle sensor using the **Obstacle** or **No Obstacle** coding tile blocks placed under it.

2) Use their own creativity to set up a maze using obstacles from the Pro Set or colour cards that MatataBot could sense and navigate around.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot out of the maze.

What you'll do

Using the red obstacles from the Pro Set, set up a maze for the MatataBot to find his way through. Add a start and end flag to your path and use **Obstacle** and **No Obstacle** blocks as well as the sensor controller to help MatataBot navigate through the created maze successfully.

What you'll need

- Class set of Matatalab Pro Set
- Class set of Sensor add-on set
- Projector/Display Screen
- Papers and pencils to draw a rough sketch of maze and where obstacles are placed
- Nature Map

Prior to lesson

- Update Tower, Bot and Controller sets with latest software
- Download example programs and prepare to show to class

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a good maze?" "How would you avoid obstacles in front of you if you were navigating through a maze?" Say, "MatataBot loves mazes! Today, you will code your Bot to navigate around a maze you will create and use its obstacle sensors to find your way out. Good luck!"

3) Introduce how to use the **Wait Until** coding tile in order for MatataBot to "sense" various obstacles in front of it by having the sensor controller placed on top of the Bot.

   a) First, connect the Controller to MatataBot by switching to the "Sensor Mode" on the Controller, turning on Both controller and Bot and wait to establish a connection (Both blue lights on controller and MatataBot stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Commander Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding tiles (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding tile on the Control Board with an **Obstacle** coding tile placed under it. Students may also choose to use the smaller **Number** tiled blocks to place under the movement coding tiles.

5) Once students have a rough idea of where MatataBot is moving on the Nature Map, ask them to place up to 8 red obstacles from their Pro Set. They should then test out their code to see if their MatataBot is sensing obstacles and avoiding them accurately.

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the sensor placed on top to avoid obstacles placed on the Nature Map. Encourage the use of various movement blocks before and after the **Obstacle** and **No Obstacle** coding blocks for MatataBot to move around the maze.

2) Ask students to place 2 flags on the Nature Map. One flag somewhere at the beginning of the map and another flag somewhere near the end indicating the "finish line".

3) Then, together with you, ask students to creatively design a maze where they will place their red obstacles on the Nature Map. Discuss what makes a good maze.

Independent practice

45 mins

1) Before students can start coding, encourage them to come up with a rough sketch of how their maze will look on a blank sheet of paper. They are able to use up to 8 red obstacles from the Pro Set to design their mazes.

2) Once the rough sketch has been created, students can start placing their red obstacles on the Nature Map and start coding to use their controller sensor (placed on top of MatataBot) as a means of sensing and avoiding obstacles around their mazes.

3) Once complete, students may choose to complete some extension activities from the Extensions section

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working on.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the sensor controller into a robot that avoids obstacles? How did you code for it on the Control Board and Tower?"

d) "How did you move MatataBot around the map?"

e) "Was your group able to exit the maze successfully?"

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language) 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

As students are challenged to code for the sensing of obstacles in a maze, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- If students have a difficult time drawing their concept for their maze, in 1-2 classes prior to this lesson, come up this rough sketch in advance on chart paper.
- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage social interactions.

Extension activities:

- Students may use the **Red**, **Green**, or **Yellow** sensor coding blocks as well as the colour cards to set up another path.
- Students may choose to create a celebration dance or play music through MatataBot when it reaches the end of the maze.
- Students are encouraged to test out other mazes that other groups have built by updating the code on their Control Board and try to exit their mazes.

Supporting files & links

Please refer to an example sketch of a maze showing the use of 8 obstacle pieces on the Nature Map.

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- If students in their groups have come up with a rough sketch for their mazing using up to 8 red obstacles pieces in their sketch.
- If students correctly transformed the controller into an obstacle sensor using the **Wait Until** block as well as the **Obstacle** and **No Obstacle** coding blocks placed under it.
- If students were able to exit their created maze on the Nature Map by navigating their MatataBot through it.
- If students were able to complete any extension activities (time permitting).

Maze nature 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 16

MatataBot Soccer

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

Using either the Gyro function or Arrow buttons on the controller move MatataBot and a game of play soccer as a class. Hold down the arrow buttons on the controller to maintain a specific state of motion. Add colours to your team by using the **All Light Colour** block in order to differentiate your MatataBot from another teams' MatataBot.

Learning standards found on Pg. 166

MatataBot Soccer

Lesson 16

Grades 1 - 3

60 mins

In MatataBot Soccer, students will be able to play a game of soccer with the rest of the class by using the sensor controller and the Gyro or Arrow features. By using these features MatataBot will be able to successfully move around the playing field either using the Gyro shaking feature (the more you shake the controller, the faster MatataBot moves) or its traditional arrows on the controller. The whole class will be able to play a game of soccer and students will try to score goals against each other.

Big ideas & essential questions

As a result of going through this lesson, you will understand how to transform the controller into a MatataBot controller in order to move MatataBot in various ways. You will also understand how MatataBot will move using the Gyro feature or the Arrows on the controller and learn how MatataBot will be able to score goals in a game of soccer.

The ideas that will last with you beyond the classroom is how well you have transformed the controller into a true motion controller when MatataBot moves the way you have coded it to move. In addition, you will have a lasting impression of how well you have coded MatataBot to move around in a playing field and score goals for your team through the opportunity of working together in a team.

Learning outcomes

TSWBAT : the students will be able to:

1) Use the Gyro shaking features using the 'X' or clear button correctly to transform the controller into a true game controller by holding the button down and shaking the controller at various speeds.

2) Use the Arrows on the controller by pressing the 'Play' button then the various Up, Down, Left and Right arrows to move MatataBot around the playing field.

3) Use critical thinking and coding skills to determine the most strategic way to get MatataBot moving around the playing field and score goals for the team.

What you'll do

Using either the Gyro function or Arrow buttons on the controller move MatataBot and a game of play soccer as a class. Hold down the arrow buttons on the controller to maintain a specific state of motion. Add colours to your team by using the **All Light Colour** block in order to differentiate your MatataBot from another teams' MatataBot.

What you'll need

- Class set of Matatalab Pro Set and Sensor add-on set
- Projector/Display Screen
- Mini soccer ball or alternative balls (Ping pong ball, foosball, etc.)
- 4 flags per group to be used as goal posts
- Animation Add-on Set (optional - for extension activities)

Prior to lesson

- Update Tower, MatataBot and Controller sets with latest software.
- Download example programs and prepare to show to class.
- Playing field on the floor using 4 flags as goal posts.

Introduction

5 mins

1) Welcome students to the course and introduce the rules of the class: Mutual Respect, Safety and Have Fun.

2) Ask, "What makes a great soccer player?" "How would you move on the soccer field in order to participate in the game?" Say, "MatataBot loves to play soccer! Today, you will code your MatataBot to be a soccer player and navigate around the playing field while using its gyro or arrow features. You will play in a team against another team to see who could score the most goals and win the game. Have fun!"

3) Introduce how to use the Gyro or Arrow features on the controller in order for MatataBot to move in various ways.

   a) First, connect the Controller to MatataBot by switching to the "Controller Mode" on the Controller, turning on Both controller and MatataBot and wait to establish a connection (Both blue lights on controller and MatataBot will flash, then stop flashing and remain on when connection is established). In order to establish this connection, press the power button 3 times on the controller, finally hearing a connection sound.

b) Next, connect the Command Tower the same way by turning it on using the power button, then pressing the power button 3 times to connect Both MatataBot and Controller to it.

4) Next, allow students to place some movement coding blocks (**Move Forward**, **Move Backward**, **Left Turn 90°**, **Right Turn 90°**) followed by the **Wait Until** coding block on the Control Board with a **Shake** coding block placed under it. Students may test out their code by pressing the 'X' (clear) button on the controller and hold down the button for 2 seconds to enter this shaking mode. By continuing to hold down the button, it will enhance the speed of the robot's movements - the faster you shake the controller, the faster MatataBot will move.

5) Alternatively, keeping in "Control Mode" students may press and hold the 'Play' button on the controller to begin using the gyro function. Toggle your controller in different directions to move MatataBot in various ways (e.g. twisted left = turns left, twist right = turns right, twist towards you = moves backward, twist away from you = moves forward).

Guided practice

5 mins

1) Together with you, create a sample program with the students using the **Wait Until** coding block and discuss how this could be used with the controller to move around only when the controller is shaken. Encourage the use of various movement blocks after the **Shake** coding block for MatataBot to move around the playing soccer field accurately.

2) Alternatively, press the 'Play' button to enter gyro mode and maneuver MatataBot by twisting your hand and holding the controller in various ways.

3) Then, together with you, ask students to move MatataBot around by shaking the controller. The faster you shake, the faster MatataBot moves.

Independent practice

45 mins

1) Before students can start coding, encourage them to think about how they can use and place the movement blocks after the **Wait Until** and **Shake** coding blocks.

2) Once they have a rough idea of how their MatataBot will move while the controller is shaken, students can start coding and place their coding blocks on the Control Board. Encourage them to either use the 'X' or clear button on the controller for MatataBot to move or the gyro feature by holding the 'Play' button and twist the controller for MatataBot to move in various ways.

3) Once complete, students may choose to complete some extension activities from the Extensions section.

Wrap up

5 mins

1) Have students pack up their Pro and Sensor add-on sets and clean up the area they were working in.

2) Ask the following questions:

a) "What was the most exciting part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

b) "What was the most challenging part of today's coding lesson?" (Field student responses and answer any questions about the controller or MatataBot's movements).

c) "How did you transform the controller to control MatataBots movements? Which button did you press on the controller in Control Mode? How did you code for it on the Control Board?"

d) "How did you move MatataBot around the field in order to score goals for your team?"

e) "Did your groups' MatataBot successfully win as a team? If not, how will you change your code to do so if you had another chance? What would you change to make MatataBot's movement better or react faster to your shaking movement?"

Interdisciplinary & 21st century connections

This lesson can be used in Mathematics to help teach topics within Geometry and Spatial sense (describing location using positional language). 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

As students are challenged to code for the movement of MatataBot using either the gyro or arrow features, consider stopping after 10 minutes and use a successful group's code to demonstrate/model the critical thinking involved in determining the code.

Accommodations

- Pair students to optimize co-teaching of prior knowledge.
- Pair students in groups of 3 to encourage positive social interactions.

Extension activities:

- Students may choose to randomly play music when a goal is scored using the Music button on the controller or use the Colour Cards to play different sounds as you celebrate a goal.
- Students may also designate a specific colour for their team using the **Look** blocks from the Animation add-on set in order to change one or Both of MatataBot's LED eye lights to match the colour on the same team.

Supporting files & links

Image of soccer field that could be used for class use:
Image- *http://bit.ly/soccer-field-1*

How to Connect Sensor Controller to MatataBot [0:00 - 3:34]:
Youtube- *http://bit.ly/connect-sensor-1*

How to Connect Sensor Controller to MatataBot and Tower (along with blocks descriptions):
Youtube- *http://bit.ly/connect-sensor-2*

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

Assessment

Student work will be assessed in the following manner:

- Students in their groups have come up with their code using the proper coding blocks before starting to code on the Control Board.
- Students correctly transformed the controller to move MatataBot as fast as possible to move around the soccer field and play a game in teams.
- Students have chosen at least one way to move their MatataBot (hold and press the Play button, Clear button (shaking)).
- Students were able to use MatataBot in a team to play a game of soccer successfully.
- Students were able to complete any extension activities (time permitting).

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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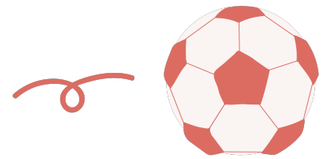

Appendix

01.Ready, Set, Go!

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
INNOVATIVE DESIGNER
4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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.
CREATIVE COMMUNICATOR
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
6b Students create original works or responsibly repurpose or remix digital resources into new creations.
6c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
6d Students publish or present content that customizes the message and medium for their intended audiences.
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

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
GRADE 1 SCIENCE
Content: properties of light and sound depend on their source and the objects with which they interact. *https://curriculum.gov.bc.ca/curriculum/science/1*
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADE 1 SCIENCE
1-5 Identify and evaluate methods for creating colour and for applying colours to different materials.
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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).

MANITOBA
KINDERGARTEN SCIENCE
K-0-4e. Participate in cooperative group learning experiences
GRADE 1 SCIENCE
1-0-4f. Work in cooperative partnerships and groups
GRADE 2 SCIENCE
2-0-4a. Follow simple directions, and describe the purpose of steps followed
2-0-4f. Work in a variety of cooperative partnerships and groups
GRADE 3 SCIENCE
3-0-4f. Assume roles and share responsibilities as group members
GRADE 1 MATHEMATICS
1.SS.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
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).
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).

ONTARIO
GRADE 1 MATHEMATICS
- Describe the relative locations of objects or people using positional language.
GRADE 2 MATHEMATICS
- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.

QUEBEC
GRADE 1 & 2 SCIENCE
A. Matter
1. Properties and characteristics of matter Classifies objects according to their properties (e.g. colour, shape, size, texture, smell)
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units

NEW BRUNSWICK
GRADE 1 MATHEMATICS
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
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.

NORTHWEST TERRITORIES
KINDERGARTEN SCIENCE
Matter and Materials - Outcome: List the primary colours; Collect and sort objects according to colours; and Describe the process for creating secondary colour from primary colours
GRADE 1 MATHEMATICS
Shape and Space - Outcome 1 - Demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.l
Shape and Space - 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).

NUNAVUT
CURRICULUM FOR KINDERGARTEN TO GRADES 1, 2 AND 3, please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

02.Colour & Sound Show

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
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K-2-ETS1-2 ENGINEERING DESIGN
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PROVINCIAL STANDARDS

BRITISH COLUMBIA
GRADES 1, 2 & 3 ARTS EDUCATION (MUSIC)
Content: elements in the arts, including but not limited to music: beat/pulse, rhythm, tempo, pitch, dynamics, form.
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADES 1, 2 & 3 ART (MUSIC)
Component 7 - EMPHASIS: Students will create emphasis based on personal choices.
Component 8 - UNITY: Students will create unity through density and rhythm.
Component 10 (i) - PURPOSE 5: Students will create an original composition, object or space based on supplied motivation.
A. Outside stimulation from sources such as music, literature, photographs, film, creative movement, drama, television and computers can be interpreted visually.
B. Details, patterns or textures can be added to the surface of three-dimensional works.

SASKATCHEWAN
GRADE 1 ART (MUSIC)
CP1.5 Create music expressions and contribute to decisions about ideas, sounds, instruments, and order (e.g., loud/soft, fast/slow, high/low).
CP1.6 Demonstrate understanding of patterns and the elements of music
GRADE 2 ART (MUSIC)
CP2.5 Create sound compositions using communities as inspiration.
CP2.6 Create and perform music that demonstrates understanding of: • form (repetition and contrast) • beat (strong and weak beats/accents) and meter (2/4 and 4/4) • rhythm (create ostinati) • tempo (fast/slow paces) • dynamics (loud/soft) • pitch (high/low sounds) and pitch direction (moving up/ down/staying the same) • texture (layers of sounds) • tone colour (variety).
GRADE 3 ART (MUSIC)
CP3.5 Demonstrate basic skills in use of voice and a variety of sound objects and instruments (traditional and/ or homemade) using the environment (e.g., natural, constructed, imagined) as inspiration.
CP3.6 Create and perform music (vocal and instrumental) that demonstrates knowledge of: • form (repeated or contrasting phrases: call/ response, question/answer, rounds) • rhythm (interplay of beat, tempo, and patterns of duration) • pitch (combining pitch and rhythm to form melody) • dynamics (levels of loud/ soft) • texture (combining and layering sounds) • tone colour (differentiate).

MANITOBA
GRADE 1 & 2 ART (MUSIC)
K–2 M–c1.1 - Experiment constructively with grade-appropriate music elements, concepts, and techniques to create musical patterns, themes, and/or motifs.
GRADE 3 ART (MUSIC)
3–4 M–c1.1 - Search for and discover ideas, themes, and/or motifs for music making through experimentation, improvisation, and/or play with music elements, concepts, and techniques

ONTARIO
GRADE 1 & 2 ART (MUSIC)
C1.3 create compositions for a specific purpose and a familiar audience
C1.4 use the tools and techniques of musicianship in musical performances
C1.5 demonstrate understanding that sounds can be represented by symbols
GRADE 3 ART (MUSIC)
C1.3 create compositions for a specific purpose and a familiar audience
C1.4 use the tools and techniques of musicianship in musical performances
C1.5 demonstrate an understanding of standard and non-traditional musical notation

QUEBEC
GRADE 1 & 2 ART (MUSIC)
A. To use personal ideas inspired by the stimulus for creation - Looks for an idea inspired by the stimulus for creation, paying attention to his/her emotions and feelings
B. Language of music and graphic representation - Ex-

periments with some of the following elements: intensity and dynamics, duration, pitch, tone colour and quality of sound

GRADE 3 ART (MUSIC)

A. To use personal ideas inspired by the stimulus for creation. Looks for ideas inspired by the stimulus for creation

B. Uses different elements: intensity and dynamics, duration, pitch, tone colour and quality of sound

NEW BRUNSWICK

GRADE 1 ART (MUSIC)

1.1.1 demonstrate an awareness of rhythmic/melodic concepts, patterns in music, and timbre
1.1.2 explore and use rhythm, dynamics, and pitch to communicate thoughts, experiences, and feelings
1.1.3 explore a range of ways of expressing thoughts, experiences, and feelings through music, with emphasis on materials
1.1.4 contribute to activities that explore creative use of sound sources
1.1.5 record simple rhythmic and melodic patterns, using adapted notation
1.6.1 respond through movement to simple melodies, with emphasis on high/low, same/different beat/rhythm
1.6.2 describe same/different, long/short
1.6.3 explore possibilities and make choices during the music-making process

GRADE 2 ART (MUSIC)

2.1.1 demonstrate an awareness of rhythmic/melodic concepts, form, and texture in music
2.1.2 explore and use tone colour to express thoughts, experiences, and feelings
2.1.3 discover and experiment with a range of ways of expressing thoughts, experiences, and feelings through music, with emphasis on texts and tone colour
2.1.4 explore a variety of rhythmic/melodic concepts and forms to create, make, and present music
2.1.5 improvise simple melodic and rhythmic ostinato accompaniments
2.1.6 perform and record simple rhythmic and melodic patterns, using standard or adapted notation
2.8.1 share ideas and feelings about their music-making
2.8.2 talk about their reasons for making and creating music

GRADE 3 ART (MUSIC)

3.1.1 explore and use harmony and texture to communicate thoughts, experiences and feelings
3.1.2 explore a range of materials and techniques to create, make and present music
3.1.3 improvise simple melodic and rhythmic ostinato accompaniments
3.1.4 experiment with a range of ways of communicating thoughts, experiences and feelings through music, with an emphasis on notational styles
3.6.1 respond to music with emphasis on tone set, articulation, texture, timbre and in-tune part-singing
3.6.2 share ideas and feelings about each others' responses to music
3.6.3 describe their own and others' music-making with emphasis on tone set, articulation, texture and timbre
3.6.4 explore different solutions and make choices during the music-making process

NOVA SCOTIA

GRADE 1 ART (MUSIC)

1.1.1 demonstrate an awareness of rhythmic/melodic concepts, patterns in music, and timbre
1.2.1 explore and use rhythm, dynamics, and pitch to communicate thoughts, experiences, and feelings
1.2.2 explore a range of ways of expressing thoughts, experiences, and feelings through music, with emphasis on materials
1.2.3 contribute to activities that explore creative use of sound sources
1.3.1 record simple rhythmic and melodic patterns, using adapted notation
2.2.1 combine music and movement in their music making

GRADE 2 ART (MUSIC)

1.1.1 demonstrate an awareness of rhythmic/melodic concepts, form, and texture in music
1.2.1 explore and use tone colour to express thoughts, experiences, and feelings
1.2.2 discover and experiment with a range of ways of expressing thoughts, experiences, and feelings through music, with emphasis on texts and tone colour
1.2.3 explore a variety of rhythmic/ melodic concepts and forms to create, make, and present music
1.2.4 improvise simple melodic and rhythmic ostinato accompaniments
1.3.1 perform and record simple rhythmic and melodic patterns, using standard or adapted notation
2.2.1 use movement to enhance their music making

GRADE 3 ART (MUSIC)

1.1.1 explore and use harmony and texture to communicate thoughts, experiences, and feelings
1.2.1 explore a range of materials and techniques to create, make, and present music
1.3.1 experiment with a range of ways of communicating thoughts, experiences, and feelings through music, with an emphasis on notational styles
2.3.1 create and present songs with rhythmic accompaniment that express personal meaning

PRINCE EDWARD ISLAND

GRADE 1 ART (MUSIC)

- Students will be expected to identify basic musical elements and concepts and to respond personally and critically in a variety of ways to arrange musical text through identifying, experiencing, discovering, creating, and demonstrating.

GRADE 2 ART (MUSIC)

- Students will be expected to identify basic musical elements and concepts and to respond personally and critically in a variety of ways to arrange musical text through identifying, exploring, experiencing, discovering, creating, and demonstrating.

GRADE 3 ART (MUSIC)

- Students will be expected to identify basic musical elements and concepts and to respond personally and critically in a variety of ways to arrange musical text through distinguishing, experiencing, exploring, creating and demonstrating.

NORTHWEST TERRITORIES

PLEASE REFER TO SASKATCHEWAN CURRICULUM

NUNAVUT

Curriculum for Grades 1, 2 and 3,
please refer to the Alberta Curriculum

YUKON TERRITORIES

PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

03.Gyro Match Up

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR

3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.

3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.

INNOVATIVE DESIGNER

4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.

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.

CREATIVE COMMUNICATOR

6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

6b Students create original works or responsibly repurpose or remix digital resources into new creations.

6c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.

6d Students publish or present content that customizes the message and medium for their intended audiences.

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

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information

about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

MANITOBA
GRADE 1 MATHEMATICS
1.SS.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.

ONTARIO
GRADE 1 MATHEMATICS
- Describe the relative locations of objects or people using positional language.

QUEBEC
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units

NEW BRUNSWICK
GRADE 1 MATHEMATICS
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.

NORTHWEST TERRITORIES
KINDERGARTEN PROBLEM & SOLVING AND DECISION-MAKING
9.6 - Use direct or indirect measurement to solve problems. (Math GLO3a)
GRADE 1 MATHEMATICS
Shape and Space - Outcome 1: Demonstrate an understanding of measurement as a process of comparing by:
• identifying attributes that can be compared
• filling, covering or matching

NUNAVUT
CURRICULUM FOR KINDERGARTEN AND GRADE 1,
please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

04.Adventure Trivia Game

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
INNOVATIVE DESIGNER
4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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.
CREATIVE COMMUNICATOR
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
6b Students create original works or responsibly repurpose or remix digital resources into new creations.
6c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
6d Students publish or present content that customizes the message and medium for their intended audiences.
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

COULD BE ADAPTED TO ALL 10 STRANDS IN SOCIAL STUDIES AS TRIVIA QUESTIONS ARE DEVELOPED BY STUDENTS WITHIN VARIOUS SUBJECT AREAS DISCUSSED IN SPECIFIC CLASSROOMS:
CULTURE
TIME, CONTINUITY AND CHANGE
PEOPLE, PLACES AND ENVIRONMENT
INDIVIDUAL, DEVELOPMENT AND IDENTITY
INDIVIDUALS, GROUPS AND INSTITUTIONS
POWER, AUTHORITY AND GOVERNANCE
PRODUCTION, DISTRIBUTION AND CONSUMPTION
SCIENCE, TECHNOLOGY AND SOCIETY
GLOBAL CONNECTIONS
CIVIC IDEALS AND PRACTICES

NGSS

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2
SOCIAL SCIENCE 1
COULD BE ADAPTED TO ANY TOPICS WITHIN SOCIAL STUDIES AS TRIVIA QUESTIONS ARE DEVELOPED BY STUDENTS WITHIN VARIOUS SUBJECT AREAS DISCUSSED IN SPECIFIC CLASSROOMS.
https://curriculum.gov.bc.ca/curriculum/social-studies/1
SOCIAL SCIENCE 2
COULD BE ADAPTED TO ANY TOPICS WITHIN SOCIAL STUDIES AS TRIVIA QUESTIONS ARE DEVELOPED BY STUDENTS WITHIN VARIOUS SUBJECT AREAS DISCUSSED IN SPECIFIC CLASSROOMS.
https://curriculum.gov.bc.ca/curriculum/social-studies/2

ALBERTA
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).
GRADE 2 SOCIAL STUDIES
VALUES AND ATTITUDES
- 2.1.1 - appreciate the physical and human geography of the communities studied
- 2.1.2 - investigate the physical geography of an Inuit, an Acadian, and a prairie community in Canada by exploring and reflecting
- 2.1.3 - investigate the cultural and linguistic characteristics of an Inuit, an Acadian and a prairie community in Canada by exploring and reflecting
- 2.1.4 - investigate the economic characteristics of communities in Canada by exploring and reflecting
- 2.2.6 - analyze how the community being studied emerged, by exploring and reflecting

- 2.2.7 - examine how the community being studied has changed, by exploring and reflecting

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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 1 & 2 SOCIAL STUDIES
DR1.2 Describe kinship patterns of the past and present and describe according to traditional teachings
DR1.3 Demonstrate awareness of humans' reliance on the natural environment to meet needs, and how location affects families in meeting needs and wants.
DR1.4 Recognize globes and maps as representations of the surface of the Earth, and distinguish land and water masses on globes and maps.
RW1.1 Describe the influence of physical, spiritual, emotional, and intellectual needs and wants on personal well-being.

MANITOBA
GRADE 1 MATHEMATICS
1.SS.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
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).
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).
GRADE 1 & 2 SOCIAL STUDIES
COULD BE ADAPTED TO ANY TOPICS WITHIN SOCIAL STUDIES AS TRIVIA QUESTIONS ARE DEVELOPED BY STUDENTS WITHIN VARIOUS SUBJECT AREAS DISCUSSED IN SPECIFIC CLASSROOMS.

ONTARIO
GRADE 1 MATHEMATICS
- Describe the relative locations of objects or people using positional language.
GRADE 2 MATHEMATICS
- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.
GRADE 1 SOCIAL STUDIES
A2.1 formulate questions to guide investigations into some aspects of the interrelationship between events, people, and/or places in their lives and their own roles, relationships, responsibilities, and identity/sense of self
A2.2 gather and organize information on significant events, people, and/or places in their lives that contribute or have contributed to the development of their roles, relationships, responsibilities, and identity/sense of self
A2.6 communicate the results of their inquiries, using appropriate vocabulary
B1.1 describe some of the ways in which people make use of natural and built features of, and human services in, the local community to meet their needs, and what might happen if these features/services did not exist
B2.1 formulate questions to guide investigations into some aspects of the interrelationship between people and the natural and built features of their community, with a focus on some of the short- and long-term effects of this interrelationship
B2.2 gather and organize information on the interrelationship between people and the natural and built features of their community, and on the effects of this interrelationship, using sources that they have located themselves or that have been provided to them
B2.6 communicate the results of their inquiries using appropriate vocabulary
B3.4 demonstrate an understanding of the basic elements of a map
B3.7 identify some of the services in the community for which the government is responsible
GRADE 2 SOCIAL STUDIES
A2.1 formulate questions to guide investigations into some of the past and present traditions and celebrations in their own family and the communities to which they belong
A2.6 communicate the results of their inquiries, using appropriate vocabulary
A3.1 identify and describe different types of families
A3.2 identify some different groups in their community and describe some of the ways in which they contribute to diversity in Canada
A3.4 describe some significant traditions and celebrations of their families, their peers, and their own communities, as well as of some other communities in Canada
A3.6 identify some ways in which heritage is passed on through various community celebrations and events
A3.7 identify some ways in which heritage is passed on through various family celebrations and practices
B1.1 compare selected communities from around the world, including their own community, in terms of the lifestyles of people in those communities and some ways in which the people meet their needs
B1.2 describe some of the ways in which two or more distinct communities have adapted to their location, climate, and physical features
B1.3 demonstrate an understanding of the importance of sustainability in people's interrelationship with their natural environment and of some of the consequences of sustainable and/or non-sustainable actions
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 B2.2 gather and organize information and data about some communities' locations, climate, andphysical features, and the ways of life of people in these communities

QUEBEC
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units
GRADE 1 & 2 SOCIAL SCIENCES
COULD BE ADAPTED TO ANY TOPICS WITHIN SOCIAL STUDIES AS TRIVIA QUESTIONS ARE DEVELOPED BY STUDENTS WITHIN VARIOUS SUBJECT AREAS DISCUSSED IN SPECIFIC CLASSROOMS.

NEW BRUNSWICK
GRADE 1 MATHEMATICS
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
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.
GRADE 1 SOCIAL STUDIES
1.1.1 demonstrate an understanding of the importance of interactions between people; 1.1.2 demonstrate an understanding of the similarity and diversity of social and cultural groups;
1.1.3 demonstrate an understanding that people within groups have rights and responsibilities.
1.2.1 describe how plants and animals meet their needs in a given environment;
1.2.5 describe how people depend upon and interact with different natural environments;
1.3.2 explain how good eating habits contribute to health and well-being;
1.3.3 identify habits and products that are harmful to our health;
1.3.4 understand and practise safety skills
1.4.1 demonstrate an understanding that the way people live in their community evolves over time;
1.4.2 demonstrate an understanding that signs, symbols, direction and scale are used to represent landmarks and locations;
1.4.3 recognize that Aboriginal peoples' relationship with place has changed over time; 1.4.4 explain how interactions between communities (local, national, and global) have changed over time;
1.4.5 demonstrate an understanding of the factors that influence how needs and wants are met;
1.4.6 demonstrate an understanding of how communities depend on each other for the exchange of goods and services.
GRADE 2 SOCIAL STUDIES
2.1.1 describe growth and development of familiar animals during their life cycle;
2.1.2 identify a variety of sources and ideas to investigate and illustrate key concepts in animal development;
2.1.3 describe changes in humans as they grow, and contrast human growth with that of other organisms.
2.2.1 describe how people contribute to making change in communities;
2.2.2 demonstrate an understanding that technology has changed over time to meet their needs, wants, and interests;
2.5.1 describe how air and water interact in the environment and how these elements impact people and places;
2.5.2 compare properties of familiar liquids and solids and investigate how they interact; 2.5.3 describe how people's interactions with the environment have changed over time;
2.5.4 demonstrate an understanding of sustainable development and its importance to the future.

NOVA SCOTIA
GRADE 1 SOCIAL STUDIES
1.1.1 demonstrate an understanding of the importance of interactions between people 1.1.2 demonstrate an understanding of the similarity and diversity of social and cultural groups
1.1.3 demonstrate an understanding that people within groups have rights and responsibilities
1.2.1 recognize that environments have natural and constructed features (local, national, and global)
1.2.2 describe how peoples depend upon and interact with different natural environments
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
1.3.3 demonstrate an understanding that Aboriginal peoples' relationship with place has changed over time
1.3.4 explain how interactions between communities (local, national, and global) have changed over time
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
GRADE 2 SOCIAL STUDIES
2.3.2 explain how supply and demand affects price
2.3.3 demonstrate an understanding of the changing nature of work over time
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 (local, national, and global)

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.
GRADE 1 SOCIAL STUDIES
1.1.1 demonstrate an understanding of the importance of interactions between people 1.1.2 demonstrate an understanding of the similarity and diversity of social and cultural groups
1.1.3 demonstrate an understanding that people within groups have rights and responsibilities
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
1.3.1 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
1.3.3 demonstrate an understanding that Aboriginal peoples' relationship with place has changed over time
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
GRADE 2 SOCIAL STUDIES
2.3.2 explain how supply and demand affects price
2.3.3 demonstrate an understanding of the changing nature of work over time
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 (local, national, and global)

NORTHWEST TERRITORIES
GRADE 1 MATHEMATICS
Shape and Space - Outcome 1 - Demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.
Shape and Space - 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 1 SOCIAL STUDIES
KC-001 Identify the Northwest Territories as their territory and Canada as their country.
KC-002 Recognize English and French as the two official languages of Canada.and that there are nine official Aboriginal languages of the Northwest Territories.
KC-002A Identify the languages spoken in their First Nation, Inuit, or Métis community. KC-003 Sing along with the words to Canada's national anthem in English or French. KC-003A Sing along with the words to Canada's national anthem in one of the nine official Aboriginal languages of the Northwest Territories.
KC-004 Identify Remembrance Day as a time to think about peace and war.
KC-005 Describe their responsibilities and rights in the school and community.
KC-006 Describe various ways in which people
KI-007 Give examples of groups with which they identify. Examples: cultural, linguistic, community...
KI-007A Recognize that they are members of a First Nation, Inuit, or Métis community KI-007F Recognize that they are members of a francophone community
KI-009 Describe ways in which their family expresses its culture and identity
KCC-008 Identify characteristics of communities.
KCC-010 Give examples of diverse ways in which people live and express themselves. Examples: language, clothing, food, art, celebrations...
KCC-011 Identify similarities between diverse communities.
KL-012 Recognize that people depend on the environment for survival.
KL-013 Identify their address or describe the relative location of their home in their community, town, or city.
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. Examples: the statue is in the park beside the river... KL-016A Identify local Aboriginal landmarks and significant places.
KL-016F Identify local francophone landmarks and significant places.
KT-017 Give examples of traditions and celebrations that connect them to the past. KT-017A Recognize that stories, traditions, and celebrations of their Aboriginal community connect them to previous generations. Examples: Chief Jimmy Bruneau— Behchoko; Chief Julius—Fort McPherson)
KT-017F Recognize that stories, traditions, and celebrations of the francophone community connect them to previous generations.
KT-018 Identify family connections to previous generations. Examples: grandparents, parents, aunts, uncles...
KT-019 Describe how the repeating patterns of the seasons influence their lives.
GRADE 2 SOCIAL STUDIES
KC-001 Recognize that all members of communities have responsibilities and rights. KC-001A Recognize that all members of communities have a contribution to make.
KC-002 Identify significant Canadian, and Northwest Territorial symbols, places and monuments. Examples: Canadian flag, NWT flag and floral emblem, Maple Leaf, caribou, polar bear, beaver, buffalo, NWT Legislative Assembly building, National War Memorial, drums, inuksuit, igloo, tipi …
KC-003 Describe Remembrance Day as a time to think about peace and war.
KCC-004 Identify the defining characteristics of communities.
KCC-005 Describe characteristics of their local communities. Examples: transportation, services, schools... KCC-006 Identify cultural and language groups in their local communities.
KCC-009 Describe groups with which they identify. Examples: cultural, linguistic, community, ...
KCC-009A Describe groups with which they identify Examples: cultural, linguistic, community, First Nation, ...
KCC-011 Recognize the diversity that characterizes Canada.
KL-016 Name natural resources in their local community.
KL-017 Give examples of ways in which the natural environment influences their communities.
KL-018 Locate their local community on a map of Canada.
KL-019 Describe natural and constructed features of communities studied. Examples: landforms, climate, waterways; buildings, bridges...
KL-020 Give examples of natural resources in communities studied.
KL-021 Give examples of ways in which the natural environment defines daily life in communities studied.
KL-022 Explain the importance of conserving or restoring natural resources.
KP-033 Identify leaders in their communities. Examples: mayor, reeve, chief, Elders, community volunteers...
KP-034 Give examples of ways in which they may demonstrate leadership.
KE-036 Give examples of goods produced in Canadian communities.
KE-037 Describe different types of work in Canadian communities studied.
KE-038 Give examples of needs common to all Canadians.
KE-039 Give examples of media influences on their choices and decisions.

NUNAVUT
CURRICULUM FOR GRADES 1 AND 2,
please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

05.Moving Day

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
INNOVATIVE DESIGNER
4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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.

CREATIVE COMMUNICATOR

6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

6b Students create original works or responsibly repurpose or remix digital resources into new creations.

6c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.

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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

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

K-2-ETS1-1 ENGINEERING DESIGN

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 ENGINEERING DESIGN

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA

APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1

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

APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2

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

GRADE 2 MATHEMATICS

Content: repeating and increasing patterns *https://curriculum.gov.bc.ca/curriculum/mathematics/2*

GRADE 3 MATHEMATICS

Content: pattern rules using words and numbers, based on concrete experiences *https://curriculum.gov.bc.ca/curriculum/mathematics/3*

ALBERTA

GRADE 2 MATHEMATICS

SHAPE & SPACE - MEASUREMENT

- 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 or using a single copy of a unit (iteration process).

PATTERNS & RELATIONS - PATTERNS

- Specific Outcome 1: Demonstrate an understanding of repeating patterns (three to five elements) by: describing, extending, comparing, creating patterns using manipulatives, diagrams, sounds and actions.

GRADE 2 AND 3 ART

Component 10 (i) - PURPOSE 2: Students will illustrate or tell a story.

A. A narrative can be retold or interpreted visually.

B. An original story can be created visually.

Component 10 (i) - PURPOSE 3: Students will decorate items personally created.

A. Details, patterns or textures can be added to two-dimensional works.

Component 10 (i) - PURPOSE 5: Students will create an original composition, object or space based on supplied motivation.

A. Outside stimulation from sources such as music, literature, photographs, film, creative movement, drama, television and computers can be interpreted visually.

B. Details, patterns or textures can be added to the surface of three-dimensional works.

SASKATCHEWAN

GRADE 2 MATHEMATICS

- SS2.4 - 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).
- P2.1 - Demonstrate understanding of repeating patterns (three to five elements) by: • describing • representing patterns in alternate modes • extending • comparing • creating patterns using manipulatives, pictures, sounds, and actions.

MANITOBA

GRADE 2 MATHEMATICS

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).

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).

2.RR.1. Predict an element in a repeating pattern using a variety of strategies.

ONTARIO

GRADE 2 MATHEMATICS

- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.
- Identify repeating, growing, and shrinking patterns found in real-life contexts (e.g., a geometric pattern on wallpaper, a rhythm pattern in music, a number pattern when counting dimes);***GRADE 3 MATHEMATICS***
- Represent simple geometric patterns using a number sequence, a number line, or a bar graph.
- Demonstrate, through investigation, an understanding that a pattern results from repeating an action

QUEBEC

GRADE 1, 2 & 3 MATHEMATICS

Geometry

C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines

Measurement

A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units

Arithmetic

A. Natural Numbers - 9. Describes number patterns, using his/her own words and appropriate mathematical vocabulary

13. Using his/her own words and mathematical language that is at an appropriate level for the cycle, describes a. non-numerical patterns (e.g. series of colours, shapes, sounds, gestures) b. numerical patterns (e.g. number rhymes, tables and charts) c. series of numbers and family of operations

NEW BRUNSWICK

GRADE 2 MATHEMATICS

SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.

PR1: Demonstrate an understanding of repeating patterns (three to five elements)

NOVA SCOTIA

GRADE 2 MATHEMATICS

PR01 Students will be expected to demonstrate an understanding of repeating patterns (three to five elements) by describing, extending, comparing, and creating patterns using manipulatives, diagrams, sounds, and actions.

PRINCE EDWARD ISLAND

GRADE 2 MATHEMATICS

SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).

SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.

PR1: Demonstrate an understanding of repeating patterns (three to five elements)

NORTHWEST TERRITORIES

GRADE 2 MATHEMATICS

Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.

Shape and Space - 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).

Patterns and Relations - Outcome 1 - Demonstrate an understanding of repeating patterns (three to five elements) by: • describing • extending • comparing • creating patterns using manipulatives, diagrams, sounds and actions

GRADE 3 MATHEMATICS

Shape and Space - 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.

NUNAVUT

CURRICULUM FOR GRADES 2 AND 3,

please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

06.Light at the End of the Tunnel

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
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4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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4c Students develop, test and refine prototypes as part of a cyclical design process.
CREATIVE COMMUNICATOR
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
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6d Students publish or present content that customizes the message and medium for their intended audiences.
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

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
GRADE 1 SCIENCE
Content: properties of light and sound depend on their source and the objects with which they interact. *https://curriculum.gov.bc.ca/curriculum/science/1*
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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).

MANITOBA
GRADE 2 SCIENCE
2-0-4a. Follow simple directions, and describe the purpose of steps followed
2-0-4f. Work in a variety of cooperative partnerships and groups

GRADE 3 SCIENCE
3-0-4f. Assume roles and share responsibilities as group members
GRADE 2 MATHEMATICS
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).
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).

ONTARIO
GRADE 2 MATHEMATICS
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- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.

QUEBEC
GRADE 1 & 2 SCIENCE
A. Matter
1. Properties and characteristics of matter Classifies objects according to their properties (e.g. colour, shape, size, texture, smell)
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and mea
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NEW BRUNSWICK
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.

NORTHWEST TERRITORIES
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.
Shape and Space - 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).

NUNAVUT
CURRICULUM FOR GRADES 1, 2 AND 3,
please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

07.Relay Race

COMMON CORE

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CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
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Ask and answer questions about key details in a text.

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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

GRADE 3/4 SCIENCE

Content: sending and responding to other animals e.g., echolocation, UV sensors, magnetoreception, infrared sensing, etc. *https://curriculum.gov.bc.ca/curriculum/science/4*

ALBERTA

GRADE 1 SCIENCE

1-9 Use the senses to make general and specific observations, and communicate observations orally and by producing captioned pictures.

1-10 Describe the role of the human senses and the senses of other living things, in enabling perception and action.

SASKATCHEWAN

GRADE 3/4 SCIENCE

LI4.2 Analyze how light interacts with different objects and materials to create phenomena such as shadows, reflection, refraction, and dispersion.

LI4.3 Assess personal, societal, and environmental impacts of light-related technological innovations including optical devices.

MANITOBA

GRADE 3/4 SCIENCE

4-2-16 Identify different uses of light at home, at school, and in the community, and explain how the brightness and colour of the light are appropriate for each use

ONTARIO

GRADE 3/4 SCIENCE

Understanding Matter and Energy

3.3 - Describe properties of light, including the following: light travels in a straight path; light can be absorbed, reflected, and refracted

QUEBEC

GRADE 3/4 SCIENCE

Material World - B. Energy

3.d. Describes the transformations of energy from one form to another

NEW BRUNSWICK

GRADE 3/4 SCIENCE

Physical Science - Light

106-1 describe examples of tools and techniques that extend our senses and enhance our ability to gather data and information about the world

NOVA SCOTIA

GRADE 3/4 SCIENCE

Physical Science - Light

107-1, 205-10, 303-8: compare and describe how light interacts with a variety of optical devices.

PRINCE EDWARD ISLAND

GRADE 3/4 SCIENCE

Physical Science - Light

303-8 compare how light interacts with a variety of optical devices

NORTHWEST TERRITORIES

GRADE 3/4 SCIENCE

Light and Sound Energy

- Investigate and compare how light interacts with a variety of optical devices

NUNAVUT

CURRICULUM FOR GRADES 1, 2 AND 3,

please refer to the Alberta Curriculum

YUKON TERRITORIES

PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

08.Broken Telephone Signal

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A

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CCSS.ELA-LITERACY.SL.1.2

Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

CCSS.ELA-LITERACY.SL.1.4

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CCSS.ELA-LITERACY.RI.1.1

Ask and answer questions about key details in a text.

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ALBERTA
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1-9 Use the senses to make general and specific observations, and communicate observations orally and by producing captioned pictures.
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SASKATCHEWAN
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4-2-16 Identify different uses of light at home, at school, and in the community, and explain how the brightness and colour of the light are appropriate for each use

ONTARIO
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3.3 - Describe properties of light, including the following: light travels in a straight path; light can be absorbed, reflected, and refracted
QUEBEC
GRADE 3/4 SCIENCE
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NEW BRUNSWICK
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NOVA SCOTIA
GRADE 3/4 SCIENCE
Physical Science - Light
107-1, 205-10, 303-8: compare and describe how light interacts with a variety of optical devices.

PRINCE EDWARD ISLAND
GRADE 3/4 SCIENCE
Physical Science - Light
303-8 compare how light interacts with a variety of optical devices

NORTHWEST TERRITORIES
GRADE 3/4 SCIENCE
Light and Sound Energy
- Investigate and compare how light interacts with a variety of optical devices

NUNAVUT
CURRICULUM FOR GRADES 1, 2 AND 3,
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YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

09.Matata Light Twister

COMMON CORE

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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.

NGSS

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
GRADE 1 SCIENCE
Content: properties of light and sound depend on their source and the objects with which they interact. https://curriculum.gov.bc.ca/curriculum/science/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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).

MANITOBA
GRADE 2 SCIENCE
2-0-4a. Follow simple directions, and describe the purpose of steps followed
2-0-4f. Work in a variety of cooperative partnerships and groups
GRADE 3 SCIENCE
3-0-4f. Assume roles and share responsibilities as group members
GRADE 2 MATHEMATICS
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).
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).

ONTARIO
GRADE 2 MATHEMATICS
- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.

QUEBEC
GRADE 1 & 2 SCIENCE
A. Matter
1. Properties and characteristics of matter Classifies objects according to their properties (e.g. colour, shape, size, texture, smell)
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units

NEW BRUNSWICK
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.
PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.

NORTHWEST TERRITORIES
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.
Shape and Space - 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).

NUNAVUT
CURRICULUM FOR GRADES 2 AND 3,
please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

10.Natural Disaster Rescue

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
INNOVATIVE DESIGNER
4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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.
CREATIVE COMMUNICATOR
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
6b Students create original works or responsibly repurpose or remix digital resources into new creations.
6c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
6d Students publish or present content that customizes the message and medium for their intended audiences.
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

COULD BE ADAPTED TO SOME STRANDS IN SOCIAL STUDIES:
PEOPLE, PLACES AND ENVIRONMENT
SCIENCE, TECHNOLOGY AND SOCIETY

NGSS

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2
GRADE 3/4 SCIENCE
Content: sending and responding to other animals e.g., echolocation, UV sensors, magnetoreception, infrared sensing, etc. https://curriculum.gov.bc.ca/curriculum/science/4
GRADE 2 SOCIAL STUDIES
Content: diverse features of the environment in other parts of Canada and the world
https://curriculum.gov.bc.ca/curriculum/social-studies/2

ALBERTA
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).
GRADE 2 SCIENCE
1-9 Use the senses to make general and specific observations, and communicate observations orally and by producing captioned pictures.
1-10 Describe the role of the human senses and the senses of other living things, in enabling perception and action.
GRADE 2 SOCIAL STUDIES
VALUES AND ATTITUDES
- 2.1.1 - appreciate the physical and human geography of the communities studied
- 2.1.2 - investigate the physical geography of an Inuit, an Acadian, and a prairie

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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 3/4 SCIENCE
LI4.2 Analyze how light interacts with different objects and materials to create phenomena such as shadows, reflection, refraction, and dispersion.
LI4.3 Assess personal, societal, and environmental impacts of light-related technological innovations including optical devices.
GRADE 2 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
GRADE 2 MATHEMATICS
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).
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).
GRADE 3/4 SCIENCE
4-2-16 Identify different uses of light at home, at school, and in the community, and explain how the brightness and colour of the light are appropriate for each use.
GRADE 2 SOCIAL STUDIES
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-019 Describe natural and constructed features of communities studied. Examples: landforms, climate, waterways; buildings, bridges…
2-KL-020 Give examples of natural resources in communities studied.

ONTARIO
GRADE 2 MATHEMATICS
- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.
GRADE 3/4 SCIENCE
Understanding Matter and Energy
3.3 - Describe properties of light, including the following: light travels in a straight path; light can be absorbed, reflected, and refracted.
GRADE 2 SOCIAL STUDIES
B1.2 describe some of the ways in which two or more distinct communities have adapted to their location, climate, and physical features

QUEBEC
GRADE 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units
GRADE 3/4 SCIENCE
Material World - B. Energy
3.d. Describes the transformations of energy from one form to another
GRADE 2 SOCIAL SCIENCES
A.2 Human Elements
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)1. Interprets simple maps
a. Reads the title
b. Decodes the legend
c. Reads the scale
d. Uses the points of the compass
e. Uses spatial reference points

NEW BRUNSWICK
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.
GRADE 3/4 SCIENCE
Physical Science - Light
106-1 describe examples of tools and techniques that extend our senses and enhance our ability to gather data and information about the world.
GRADE 2 SOCIAL STUDIES
2.5.1 describe how air and water interact in the environment and how these elements impact people and places.

NOVA SCOTIA
GRADE 3/4 SCIENCE
Physical Science - Light
107-1, 205-10, 303-8: compare and describe how light interacts with a variety of optical devices.
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 (local, national, and global).

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.
GRADE 3/4 SCIENCE
Physical Science - Light
303-8 compare how light interacts with a variety of optical devices

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 (local, national, and global)
NORTHWEST TERRITORIES
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.
Shape and Space - 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 3/4 SCIENCE
Light and Sound Energy
- Investigate and compare how light interacts with a variety of optical devices.
GRADE 2 SOCIAL STUDIES
KL-017 Give examples of ways in which the natural environment influences their communities.
KL-018 Locate their local community on a map of Canada.
KL-019 Describe natural and constructed features of communities studied. Examples: landforms, climate, waterways; buildings, bridges...
KL-020 Give examples of natural resources in communities studied.
KL-021 Give examples of ways in which the natural environment defines daily life in communities studied.
KL-022 Explain the importance of conserving or restoring natural resources.

NUNAVUT
CURRICULUM FOR GRADES 2 AND 3,
please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

11.Treasure Hunt

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
INNOVATIVE DESIGNER
4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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.
CREATIVE COMMUNICATOR
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
6b Students create original works or responsibly repurpose or remix digital resources into new creations.
6c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
6d Students publish or present content that customizes the message and medium for their intended audiences.
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

COULD BE ADAPTED TO SOME STRANDS IN SOCIAL STUDIES:
CULTURE
TIME, CONTINUITY AND CHANGE
PEOPLE, PLACES AND ENVIRONMENT
INDIVIDUAL, DEVELOPMENT AND IDENTITY
INDIVIDUALS, GROUPS AND INSTITUTIONS

NGSS

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2
GRADE 2 SOCIAL STUDIES
Content: diverse features of the environment in other parts of Canada and the world
https://curriculum.gov.bc.ca/curriculum/social-studies/2

ALBERTA
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).
GRADE 2 SOCIAL STUDIES
VALUES AND ATTITUDES
- 2.1.1 - appreciate the physical and human geography of the communities studied
- 2.1.2 - investigate the physical geography of an Inuit, an Acadian, and a prairie

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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 1 & 2 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
GRADE 1 MATHEMATICS
1.SS.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
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).
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).***GRADE 2 SOCIAL STUDIES***
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-019 Describe natural and constructed features of communities studied. Examples: landforms, climate, waterways; buildings, bridges…
2-KL-020 Give examples of natural resources in communities studied.

ONTARIO
GRADE 1 MATHEMATICS
- Describe the relative locations of objects or people using positional language.
GRADE 2 MATHEMATICS
- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.
GRADE 1 SOCIAL STUDIES
B3.4 demonstrate an understanding of the basic elements of a map
GRADE 2 SOCIAL STUDIES
B1.2 describe some of the ways in which two or more distinct communities have adapted to their location, climate, and physical features

QUEBEC
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units
GRADE 1 & 2 SOCIAL SCIENCES
A.2 Human Elements
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)
1. Interprets simple maps
a. Reads the title
b. Decodes the legend
c. Reads the scale
d. Uses the points of the compass
e. Uses spatial reference points

NEW BRUNSWICK
GRADE 1 MATHEMATICS
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
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.
GRADE 1 SOCIAL STUDIES
1.4.2 demonstrate an understanding that signs, symbols, direction and scale are used to represent landmarks and locations;
GRADE 2 SOCIAL STUDIES
2.5.1 describe how air and water interact in the environment and how these elements impact people and places.

NOVA SCOTIA
GRADE 1 SOCIAL STUDIES
1.2.1 recognize that environments have natural and constructed features (local, national, and global)
1.2.2 describe how peoples depend upon and interact with different natural environments
1.3.1 demonstrate an understanding that signs, symbols, direction, and scale are used to represent landmarks and locations
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 (local, national, and global)

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.
GRADE 2 SCIENCE
100-23/203-2: Use the directions on a treasure map to find the treasure. (Hide a variety of objects, and write simple directions to give to students) or make a flight plan for your airplane then have another student follow your plan.
GRADE 1 SOCIAL STUDIES
1.2.1 recognize that environments have natural and constructed features (local, national, and global)
1.2.2 describe how peoples depend upon and interact with different natural environments
1.3.1 demonstrate an understanding that signs, symbols, direction, and scale are used to represent landmarks and locations
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 (local, national, and global)

NORTHWEST TERRITORIES
GRADE 1 MATHEMATICS
Shape and Space - Outcome 1 - Demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.

Shape and Space - 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 1 SOCIAL STUDIES

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. Examples: the statue is in the park beside the river...
KL-016A Identify local Aboriginal landmarks and significant places.
KL-016F Identify local francophone landmarks and significant places.

GRADE 2 SOCIAL STUDIES

KL-017 Give examples of ways in which the natural environment influences their communities.
KL-018 Locate their local community on a map of Canada.
KL-019 Describe natural and constructed features of communities studied. Examples: landforms, climate, waterways; buildings, bridges...
KL-020 Give examples of natural resources in communities studied.
KL-021 Give examples of ways in which the natural environment defines daily life in communities studied.
KL-022 Explain the importance of conserving or restoring natural resources.

NUNAVUT

CURRICULUM FOR KINDERGARTEN TO GRADES 1 AND 2, please refer to the Alberta Curriculum

YUKON TERRITORIES

PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

12.MatataBot Says

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
INNOVATIVE DESIGNER
4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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.
CREATIVE COMMUNICATOR
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
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6d Students publish or present content that customizes the message and medium for their intended audiences.
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

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADE 1 SCIENCE
1-10 Describe the role of the human senses and the senses of other living things, in enabling perception and action.

SASKATCHEWAN
GRADE 1 SCIENCE
SE1.1 Investigate characteristics of the five traditional external senses (i.e., sight, sound, smell, touch, and taste) in humans and animals.
GRADE 2 SCIENCE
MP2.1 Analyze methods of determining the position of objects relative to other objects.

MANITOBA
KINDERGARTEN SCIENCE
K-0-4d. Respond to the ideas and actions of others
K-0-4e. Participate in cooperative group learning experiences
GRADE 1 SCIENCE
1-0-4f. Work in cooperative partnerships and groups
GRADE 2 SCIENCE
2-0-4a. Follow simple directions, and describe the purpose of steps followed
2-0-4f. Work in a variety of cooperative partnerships and groups
GRADE 3 SCIENCE
3-0-4f. Assume roles and share responsibilities as group members

ONTARIO
KINDERGARTEN
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

NEW BRUNSWICK
ENGLISH LANGUAGE ARTS
KINDERGARTEN - GRADE 1
2.1 - Participate in conversation and in small- and whole-group discussion
2.2 - Begin to use gestures and tone to convey meaning
2.3 - Respond to and give simple directions or instructions
GRADE 1 & 2
2.1 - Sustain one-to-one conversations and contribute to small- and large-group interactions
2.2 - Use intonation, facial expressions, and gestures to communicate ideas and feelings
2.3 - Respond to and give instructions or directions that include two or three components
GRADE 3
2.1 - Participate in conversation, small group and whole-group discussion, understanding when to speak and when to listen
2.2 - Adapt volume, projection, facial expression, gestures, and tone of voice to the speaking occasion
2.3 - Give and follow instructions and respond to questions and directions

PRINCE EDWARD ISLAND
KINDERGARTEN MATHEMATICS
Oral Language - Speaking & Listening
1.3 develop spatial sense, including position-in-space, and the language associated with it
1.3 Set up an obstacle course and have children follow directions provided by the educator or other children (H&PD 1.1). Include a variety of appropriate spatial language.
1.4 follow and give directions in different contexts
GRADE 2 SCIENCE
MOTION
- Follow a simple procedure where instructions are given to move a person or object in a certain way, or in a specified direction (201-1)
GRADE 3 SCIENCE
Scientific Inquiry
- Choose to follow directions when they complete a simple investigation (403, 404, 405)

NORTHWEST TERRITORIES
KINDERGARTEN SCIENCE
- Identify instances where we use our senses to investigate the world around us; Identify instances where our senses help us appreciate the world around us;
- Compare ways in which people and other animals use their senses to meet their needs; - Describe ways in which our senses can protect us.
GRADE 2 SCIENCE
MOVEMENT
- Describe the position and movement of objects and demonstrate an understanding of how simple mechanisms enable an object to move;
- Design and make simple mechanisms, and investigate their characteristics;
- Recognize that different mechanisms and systems move in different ways, and that the different types of movement determine the design and the method of production of these mechanisms and systems.

NUNAVUT
CURRICULUM FOR KINDERGARTEN TO GRADES 1, 2 AND 3, please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

13.Marco Polo

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.2
Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

ISTE

KNOWLEDGE CONSTRUCTOR
3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
INNOVATIVE DESIGNER
4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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.
CREATIVE COMMUNICATOR
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
6b Students create original works or responsibly repurpose or remix digital resources into new creations.
6c Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
6d Students publish or present content that customizes the message and medium for their intended audiences.
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

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

ALBERTA
GRADE 3 SCIENCE
3-9 Describe the nature of sound, and demonstrate methods for producing and controlling sound.

SASKATCHEWAN
GRADE 1 SCIENCE
SE1.1 Investigate characteristics of the five traditional external senses (i.e., sight, sound, smell, touch, and taste) in humans and animals

QUEBEC
GRADE 3 SCIENCE
MATERIAL WORLD - ENERGY
1. A. Forms of energy: Describes different forms of energy (mechanical, electrical, light, chemical, heat, sound, nuclear)
NUNAVUT
CURRICULUM FOR GRADES 1, 2 AND 3, please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

14.Not Afraid of the Dark

COMMON CORE

CCSS.ELA-LITERACY.SL.1.1.A
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Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
CCSS.ELA-LITERACY.SL.1.4
Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
CCSS.ELA-LITERACY.RI.1.1
Ask and answer questions about key details in a text.

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GLOBAL COLLABORATOR
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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

K-2-ETS1-1 ENGINEERING DESIGN
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
GRADE 1 SCIENCE
Content: properties of light and sound depend on their source and the objects with which they interact. https://curriculum.gov.bc.ca/curriculum/science/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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).

MANITOBA
GRADE 2 SCIENCE
2-0-4a. Follow simple directions, and describe the purpose of steps followed
2-0-4f. Work in a variety of cooperative partnerships and groups
GRADE 3 SCIENCE
3-0-4f. Assume roles and share responsibilities as group members
GRADE 2 MATHEMATICS
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).
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).

ONTARIO
GRADE 2 MATHEMATICS
- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.

QUEBEC
GRADE 1 & 2 SCIENCE
A. Matter
1. Properties and characteristics of matter Classifies objects according to their properties (e.g. colour, shape, size, texture, smell)
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units

NEW BRUNSWICK
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.

NORTHWEST TERRITORIES
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.
Shape and Space - 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).

NUNAVUT
CURRICULUM FOR GRADES 1, 2 AND 3,
please refer to the Alberta Curriculum

YUKON TERRITORIES
PLEASE REFER TO BRITISH COLUMBIA'S CURRICULUM

15.Maze Master

COMMON CORE

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NGSS

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K-2-ETS1-2 ENGINEERING DESIGN
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps its function as needed to solve a given problem.

PROVINCIAL STANDARDS

BRITISH COLUMBIA
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 1
https://curriculum.gov.bc.ca/curriculum/adst/1
APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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 or using a single copy of a unit (iteration process).

SASKATCHEWAN
GRADE 2 MATHEMATICS
- SS2.4 - 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).

MANITOBA
GRADE 1 MATHEMATICS
1.SS.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
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).
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).

ONTARIO
GRADE 1 MATHEMATICS
- Describe the relative locations of objects or people using positional language.
GRADE 2 MATHEMATICS
- Describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map.
- Draw simple maps of familiar settings, and describe the relative locations of objects on the maps.

QUEBEC
GRADE 1 & 2 MATHEMATICS
Geometry
C. Plane Figures - 1. Compares and constructs figures made with closed curved lines or closed straight lines
Measurement
A. Lengths - 1. Compares lengths, 3. Estimates and measures the dimensions of an object using unconventional units

NEW BRUNSWICK
GRADE 1 MATHEMATICS
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GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard units, and make statements of comparison.

PRINCE EDWARD ISLAND
GRADE 2 MATHEMATICS
SS3 Compare and order objects by length, height, distance around and mass (weight) using non-standard 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).
SS5: Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.

NORTHWEST TERRITORIES
GRADE 1 MATHEMATICS
Shape and Space - Outcome 1 - Demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared
GRADE 2 MATHEMATICS
Shape and Space - Outcome 3 - Compare and order objects by length, height, distance around and mass (weight), using nonstandard units, and make statements of comparison.
Shape and Space - 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
Shape and Space - 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.

NUNAVUT
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YUKON TERRITORIES
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16.MatataBot Soccer

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APPLIED DESIGN, SKILLS, AND TECHNOLOGIES 2
https://curriculum.gov.bc.ca/curriculum/adst/2

ALBERTA
GRADE 1 SCIENCE
1-5 Identify and evaluate methods for creating colour and for applying colours to different materials.

GRADE 2 MATHEMATICS
SHAPE & SPACE - MEASUREMENT
- 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).
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GRADE 2 MATHEMATICS
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MANITOBA
GRADE 1 SCIENCE
1-0-4f. Work in cooperative partnerships and groups
GRADE 2 SCIENCE
2-0-4a. Follow simple directions, and describe the purpose of steps followed
2-0-4f. Work in a variety of cooperative partnerships and groups
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NORTHWEST TERRITORIES
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Shape and Space - Outcome 1 - Demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared
GRADE 2 MATHEMATICS
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Shape and Space - Outcome 4 - Measure length to the nearest nonstandard unit by:
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