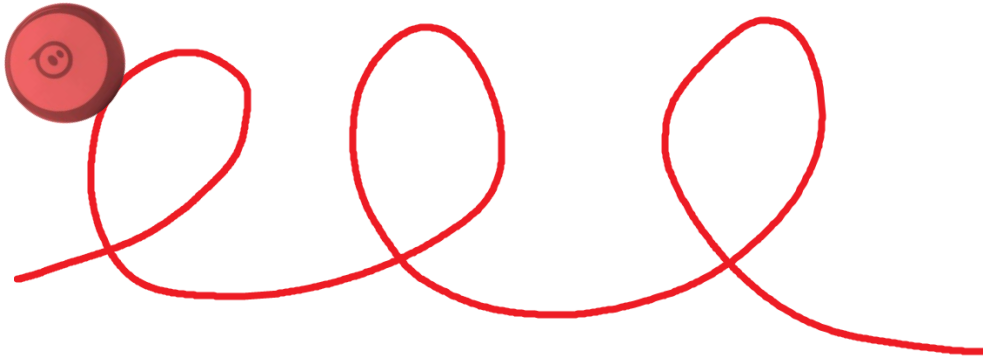
Spheros & Loops

Repeating Code

MTH1W – Day 1, Part B



MTH1W Curriculum Covered in This Lesson:

☐ C2.1a [Coding] Use coding to demonstrate understanding of **variables**
☐ C2.1b [Coding] Use coding to demonstrate understanding of **parameters**
☐ C2.1c [Coding] Use coding to demonstrate understanding of **equations**
☐ C2.1d [Coding] Use coding to demonstrate understanding of **inequalities**

☐ C2.2a [Coding] Create code by decomposing situations into computational steps in order to **represent mathematical concepts and relationships**
☑ C2.2b [Coding] Create code by decomposing situations into computational steps in order to **solve problems**

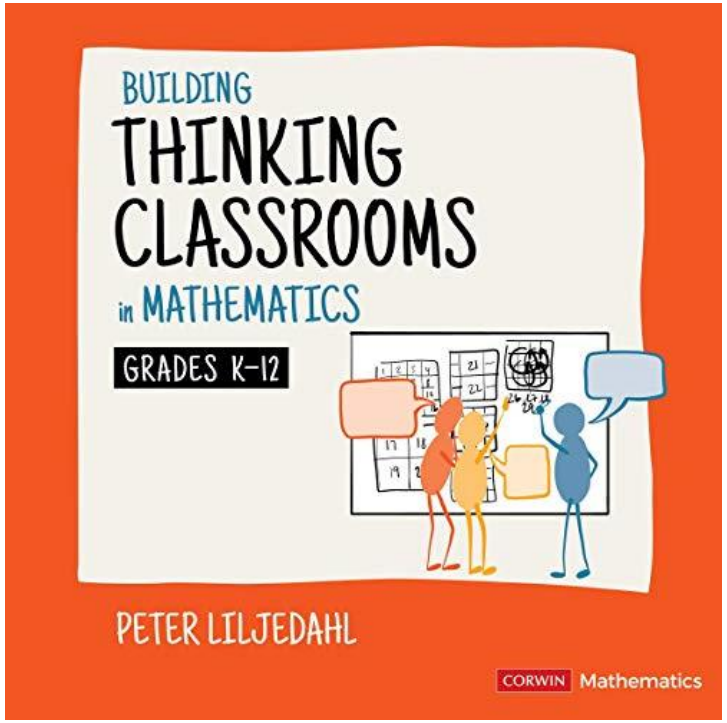
☑ C2.3a [Coding] **Read code to predict** its outcome
☐ C2.3b [Coding] **Alter code** to adjust **constraints, parameters** to represent a similar or new mathematical situation
☑ C2.3c [Coding] **Alter code** to adjust **outcomes** to represent a similar or new mathematical situation

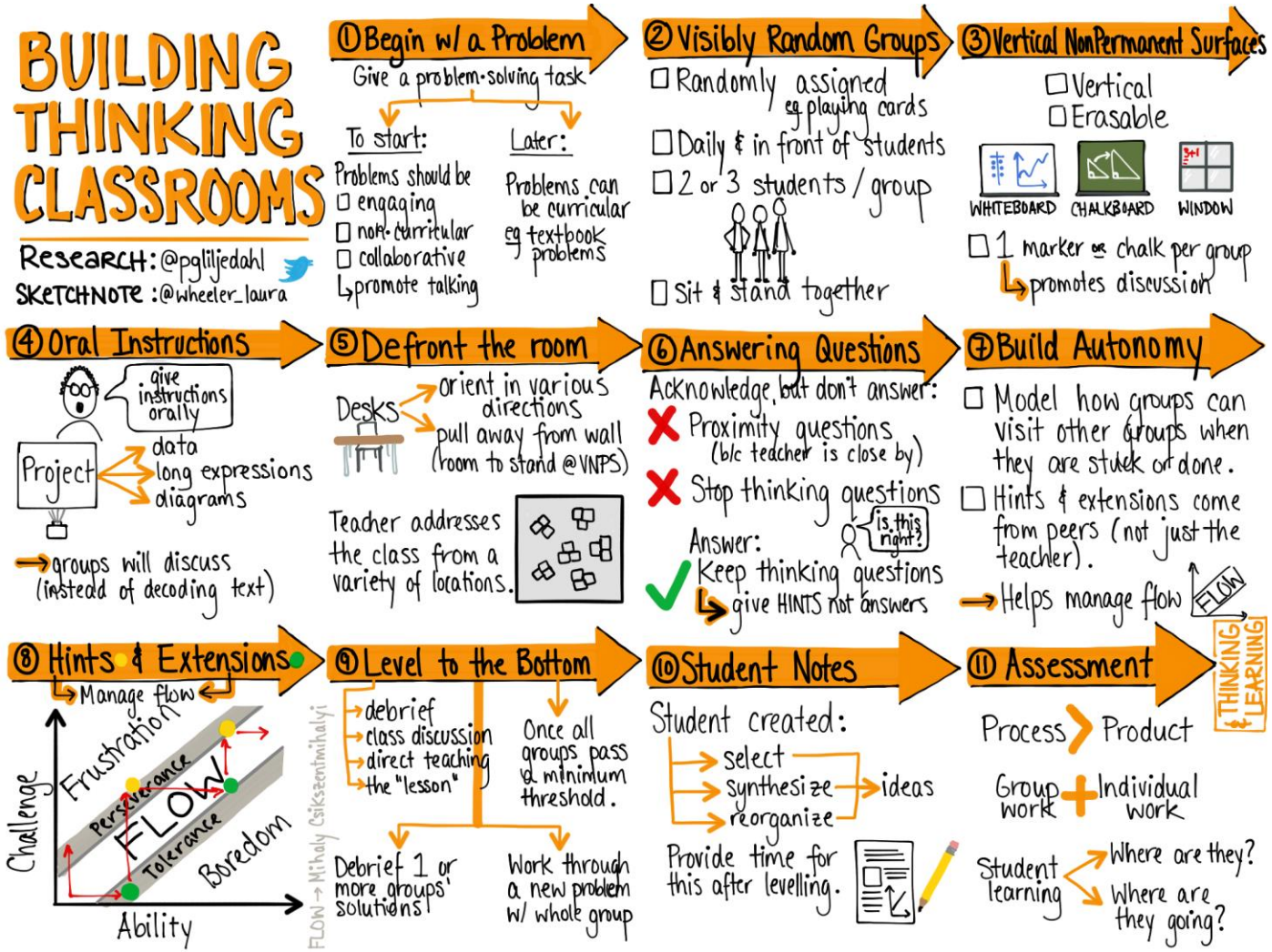
Sequencing and Timing:

- On Day 1, students will cover Part A, Part B (this lesson), and some of Part C.
- On Day 2, students finish Part C and cover Part D.

Original Curriculum Language:
C2.1 [Coding] use coding to demonstrate an understanding of algebraic concepts including variables, parameters, equations, and inequalities
C2.2 [Coding] create code by decomposing situations into computational steps in order to represent mathematical concepts and relationships, and to solve problems
C2.3 [Coding] read code to predict its outcome, and alter code to adjust constraints, parameters, and outcomes to represent a similar or new mathematical situation

This lesson is set up to follow the format of Building Thinking Classrooms by Peter Liljedahl.

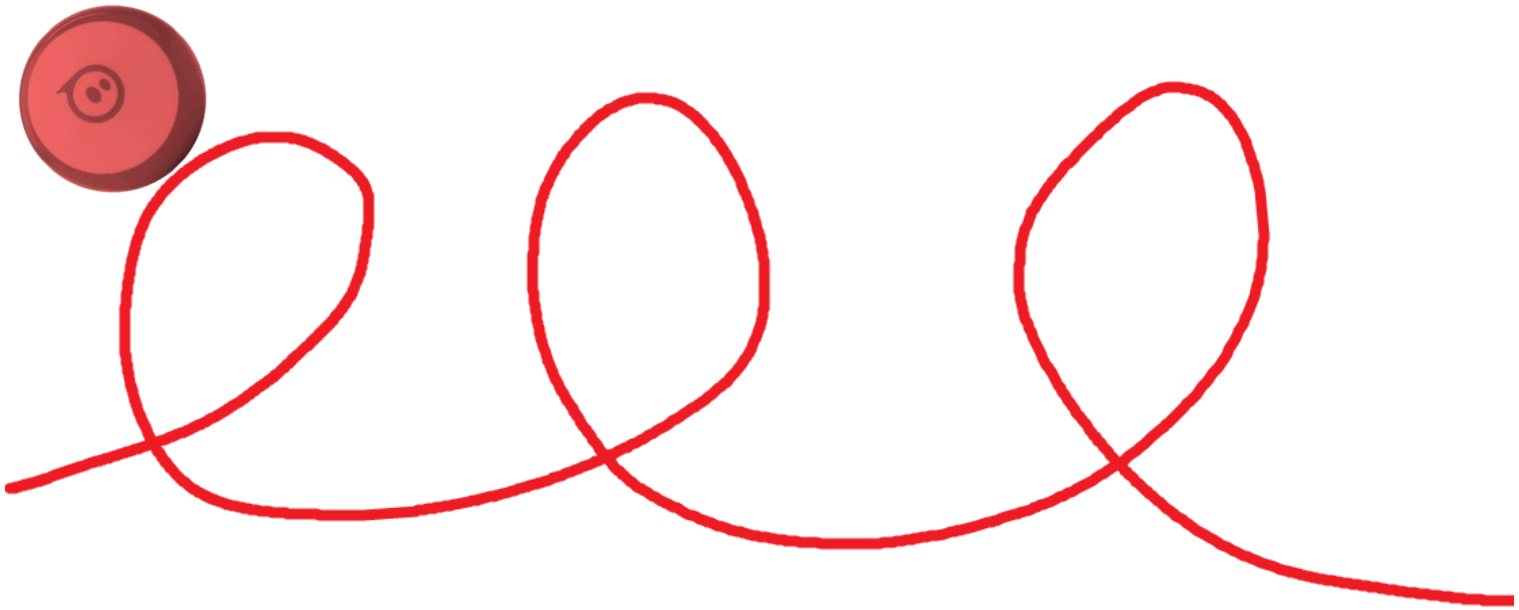


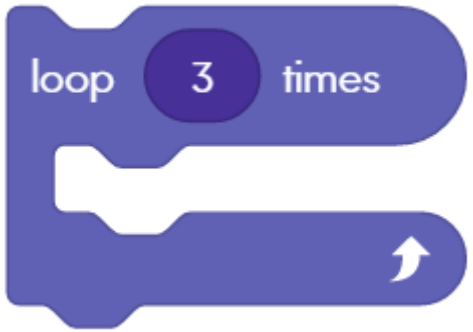


Basic Coding Components

Output	*Changes the robot:* Moves. Spins. Re-directs to a new angle. Makes sound. Speeds up. Lights up.	
Math	*Calculation that results in a number:* +, - , *, /, square root	
Boolean Expressions	*Calculation that results in **true or false**:* >, <, =, >=, <=, and, or, not	
Control	Ifs — ***Decides** which piece of code to run:* Uses a Boolean expression and output or math.	Let's look at loops!
	Loops — ***Repeats** code:* Uses a Boolean expression and output or math.	
Variables	Named pieces of memory where you can store things to use later OR to store calculation results.	
Functions	Named pieces of code where you can group code together to use it later.	

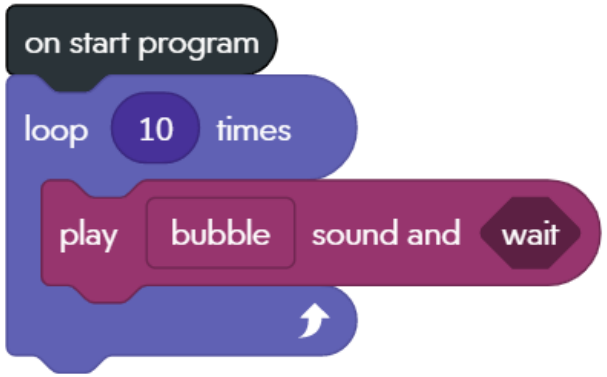
Loops repeat the same code over and over again so you don’t have to cut and paste!





1st

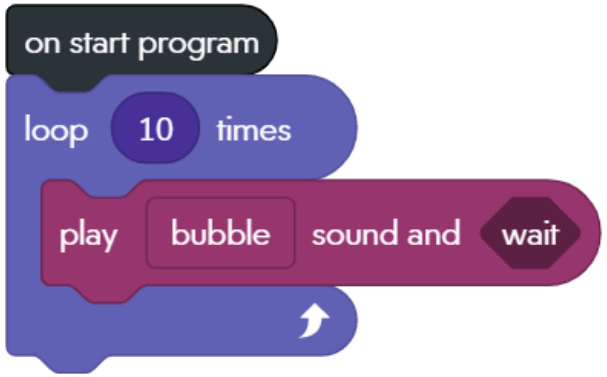
2nd



These programs would produce the same result.

1st

2nd

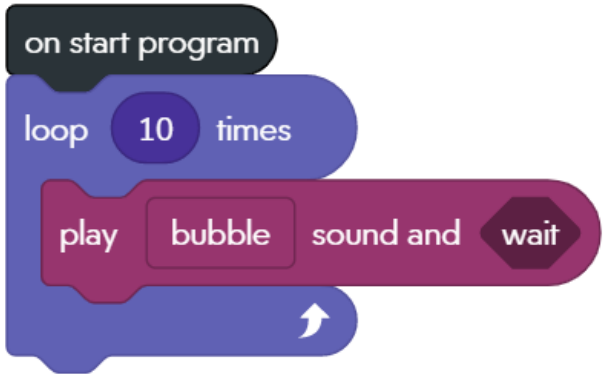


These programs would produce the same result.

What are some reasons that the second is better?

1st

2nd



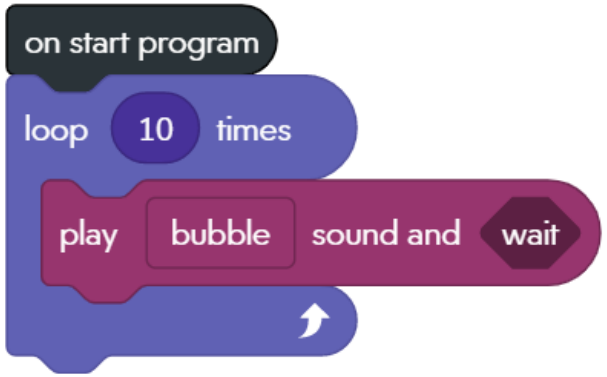
These programs would produce the same result.

What are some reasons that the second is better?

2nd has fewer lines of code.

1st

2nd



These programs would produce the same result.

What are some reasons that the second is better?

Shorter = quicker to code.

2nd has fewer lines of code.

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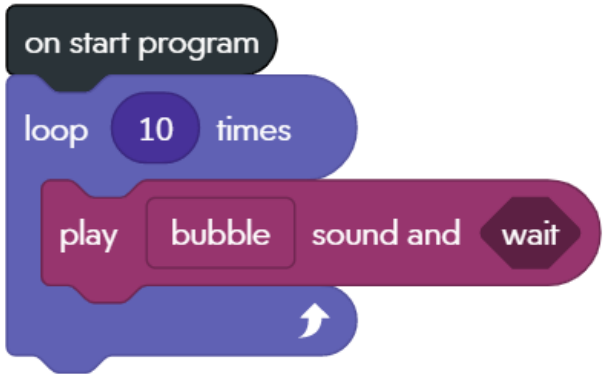


These programs would produce the same result.

What are some reasons that the second is better?

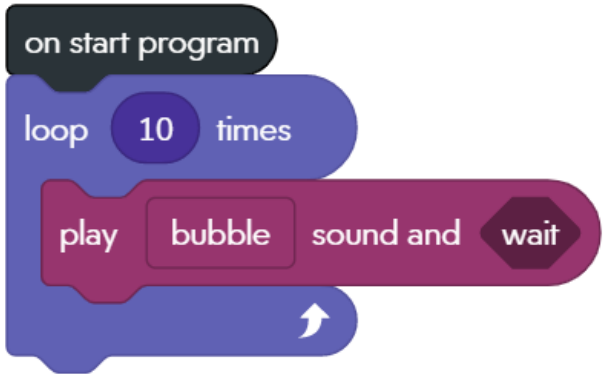
Shorter = quicker to code.

Shorter = quicker to test.

2nd has fewer lines of code.

1st

2nd



These programs would produce the same result.

What are some reasons that the second is better?

2nd has fewer lines of code.

Shorter = quicker to code.

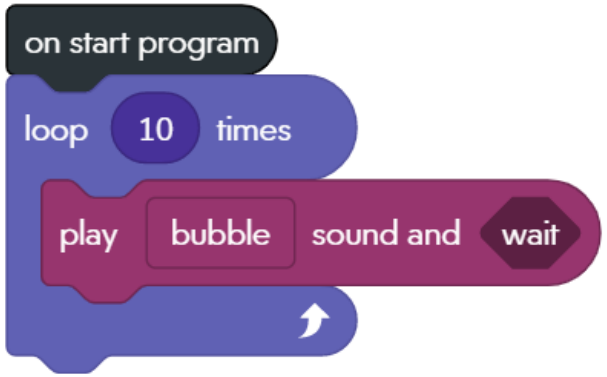
Shorter = quicker to test.

Shorter = quicker to fix bugs.

Don't have to cut and paste fix multiple times.

1st

2nd



These programs would produce the same result.

What are some reasons that the second is better?

2nd has fewer lines of code.

Shorter = quicker to code.

Shorter = quicker to test.

Shorter = quicker to fix bugs.

Shorter = easier to scale up to 1000 times.

Don't have to cut and paste fix multiple times.

Basic Coding Components

Output	*Changes the robot:* Moves. Spins. Re-directs to a new angle. Makes sound. Speeds up. Lights up.	
Math	*Calculation that results in a number:* +, - , *, /, square root	
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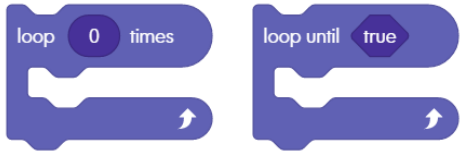
	Loops — ***Repeats** code:* Uses a Boolean expression and output or math.	
Variables	Named pieces of memory where you can store things to use later OR to store calculation results.	
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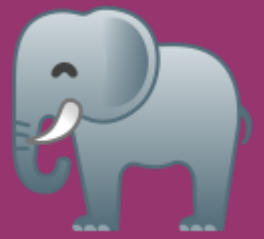
Group Activities

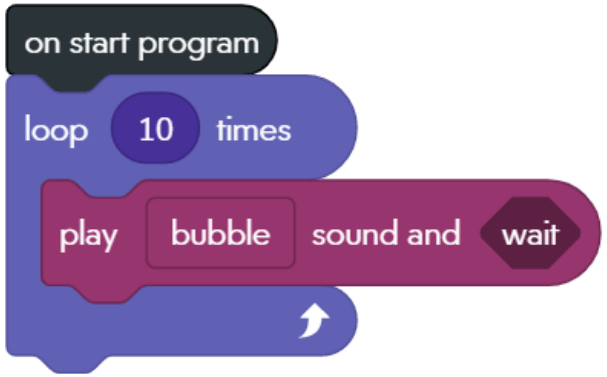
We won't complete all of the following problems.

Your group will only complete one or two.

Start with Alligator. After you are done, we will discuss which one you should do next.

	Practice	More Practice
Problem 1	 A - Alligator	 B - Bat	 C - Cat
Problem 2	 D - Dog	 E - Elephant	 F - Fish
Problem 3	 G - Giraffe	 H - Horse	 I – Iguana
TIPS		J - Jaguar

Write a program that says hello in three different languages 10 times. Each member of your group should pick one of the languages.

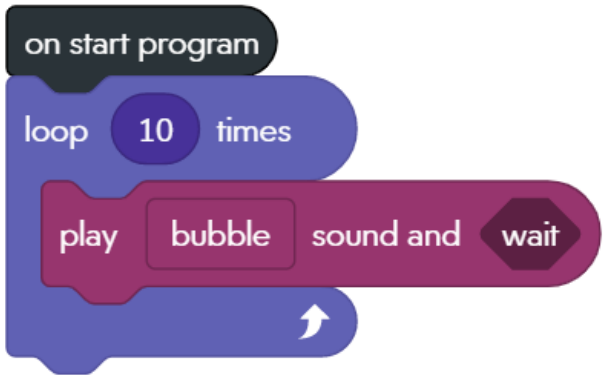


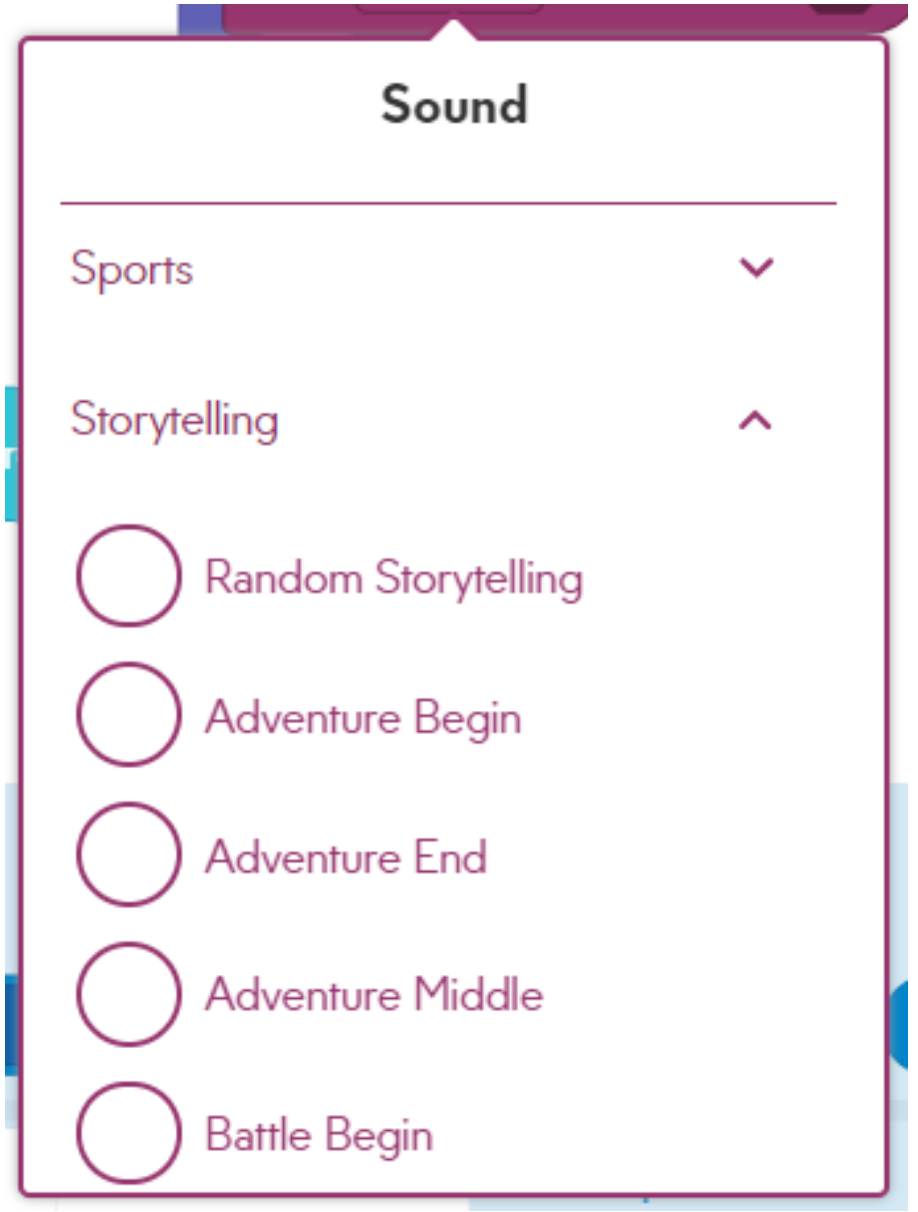
Make sure that you have coded it efficiently.

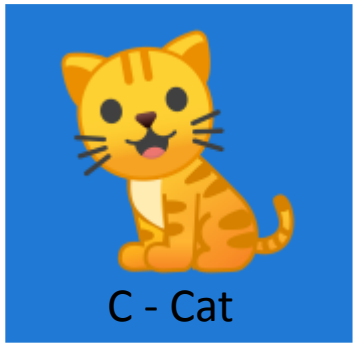
B - Bat

Write a program that plays a story from the storytelling section of the sound library. Play your story 3 times.

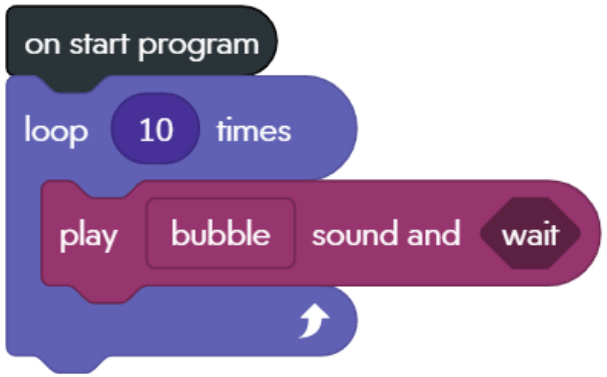
Test it on your Sphero.

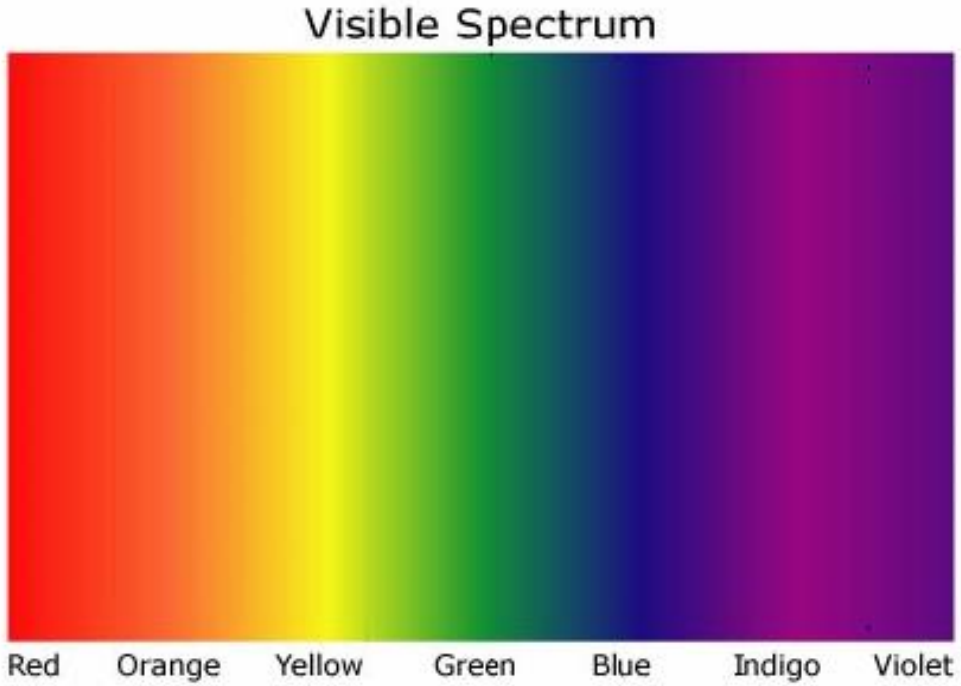


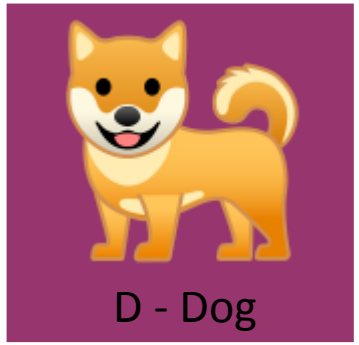




Write a program that fades through the colours of a rainbow – 5 times. Test it on your Sphero.

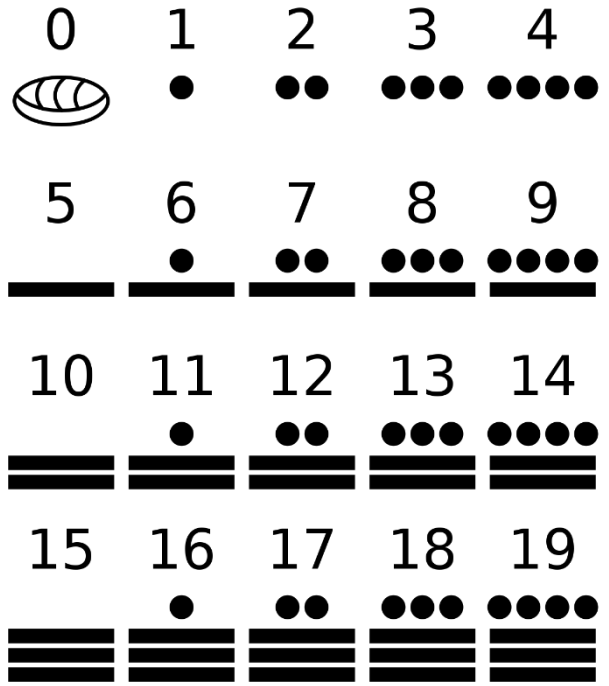


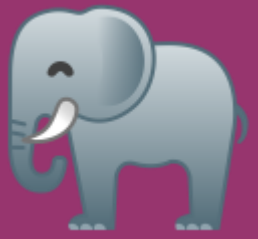




Choose a Mayan number. How will you represent the lines and dots? Have your Sphero output your chosen number 6 times.

Test it on your Sphero.

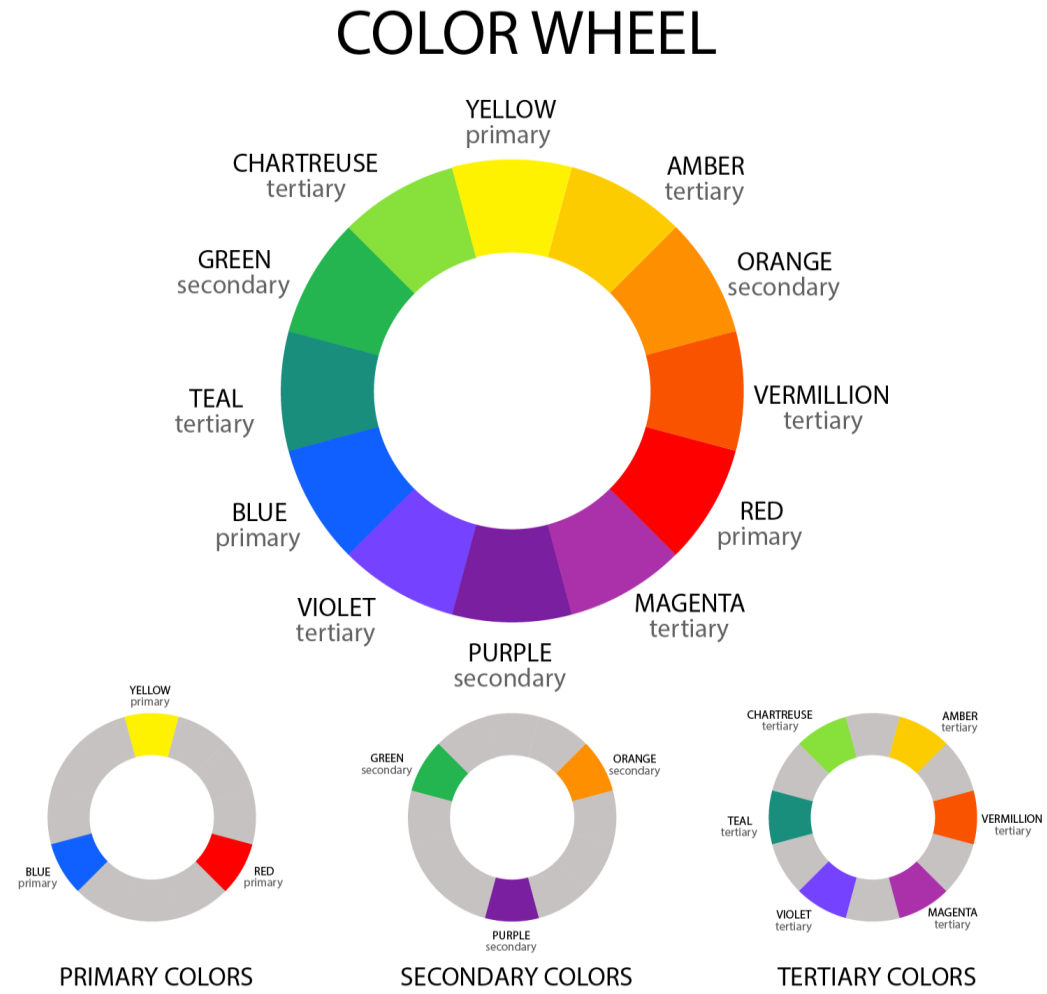




E - Elephant

Write a program that flashes a three colour sequence over and over again forever.

Test it on your Sphero.



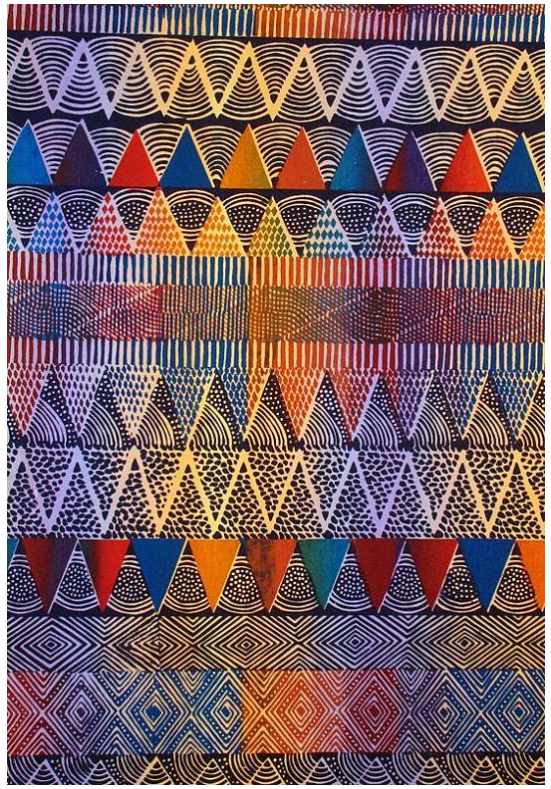
F - Fish

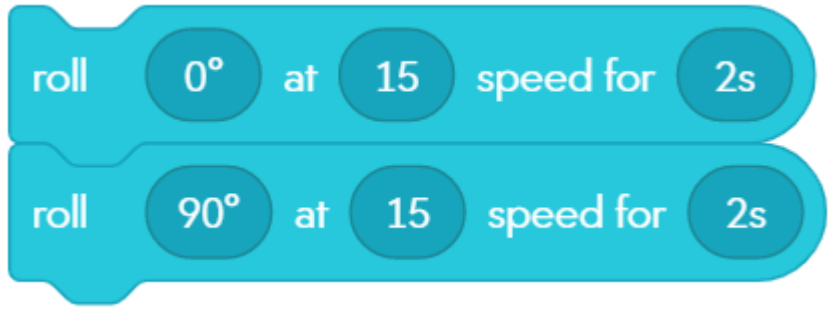
Write a program that makes a random number of bubble sounds (or whatever sound you like). Your Sphero should be red during the loop and yellow afterward.

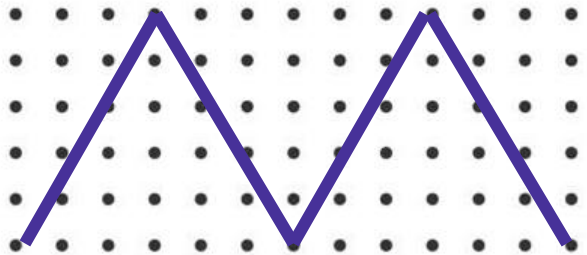
Test it on your Sphero.

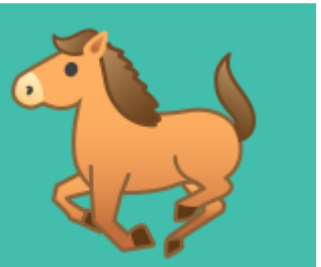
You will need a new block for this.

Write a program that allows the Sphero to travel in zig zag pattern like the ones on these African fabrics. Make each side of the line light up in a different colour.



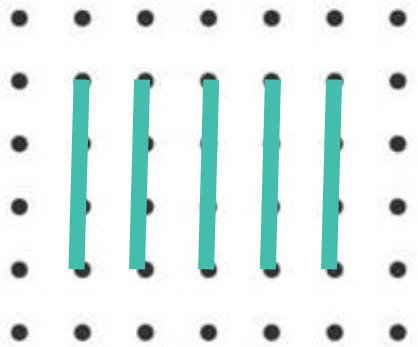


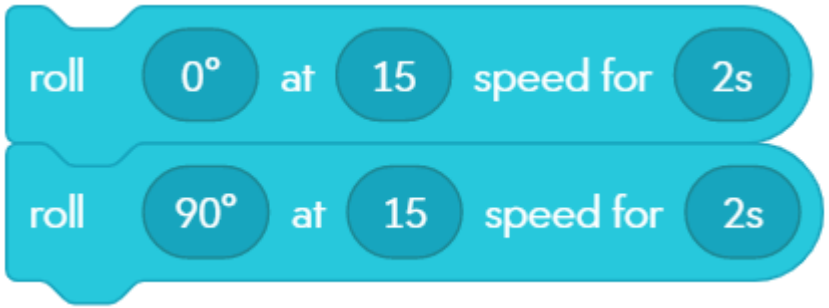




Write a program that makes 5 lines in a row (sort of like stitches on an Anishinaabe birch bark basket)

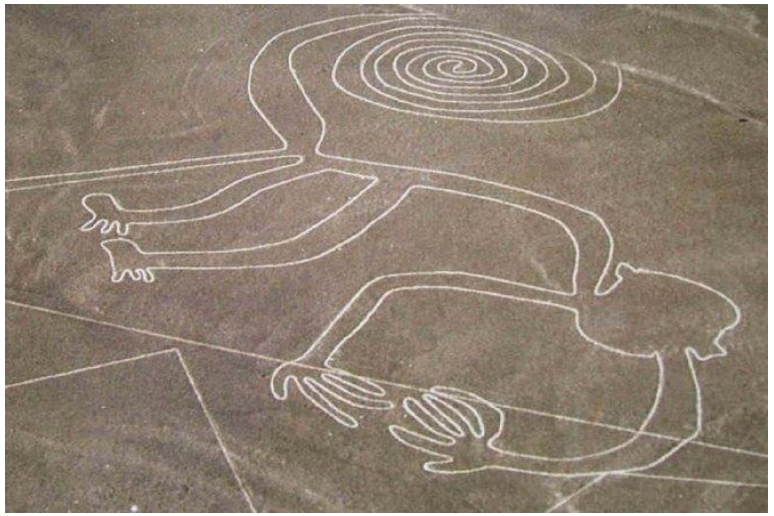
Test it on your Sphero.

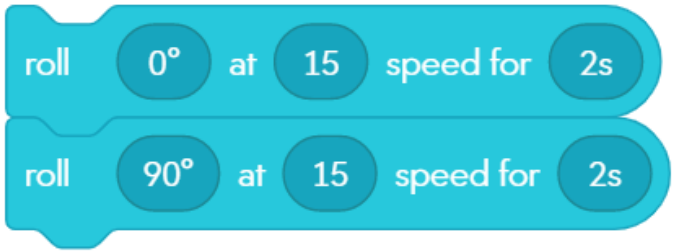




I – Iguana

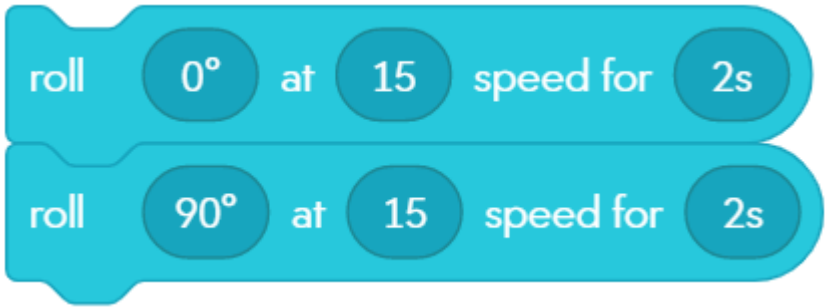
Write a program that has the Sphero travel around the edges of a shape. These might be similar to the famous Nazca lines in Peru's desert.

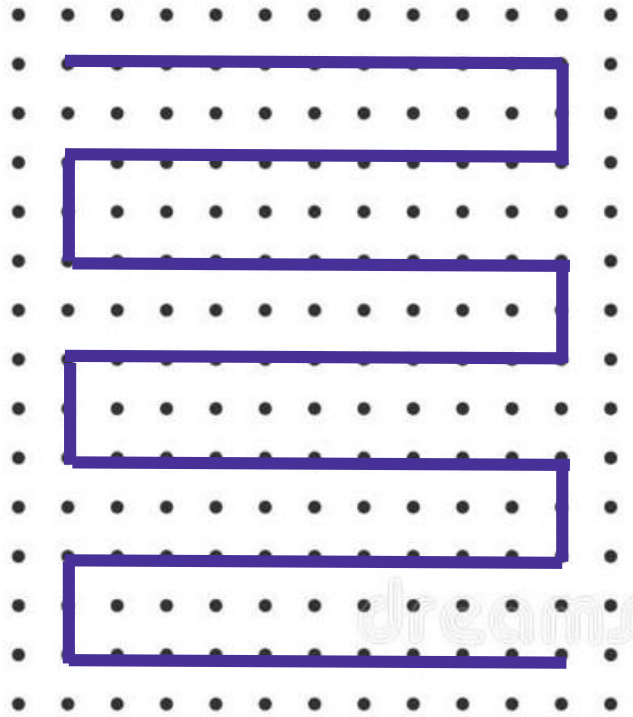




Write a program that weaves back and worth emulating the Haudenosaunee weaving.

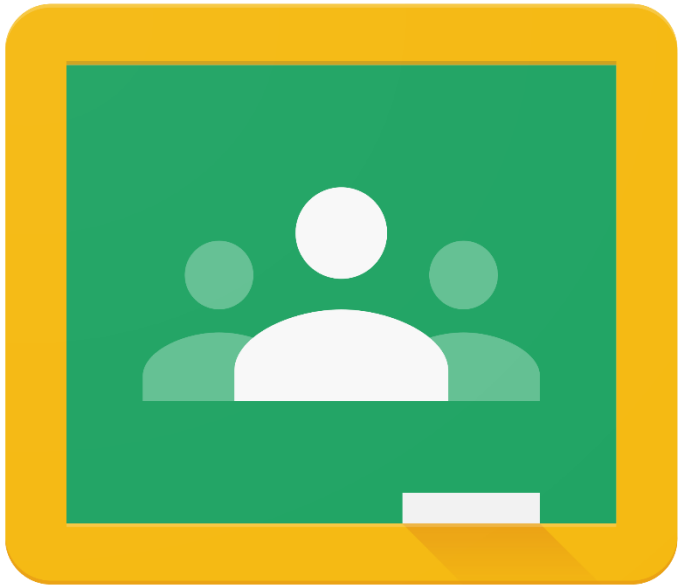
Test it on your Sphero.





Haudenosaunee Wampum

When you are done, there are check-your-understanding questions on Google Classroom.



Google Classroom