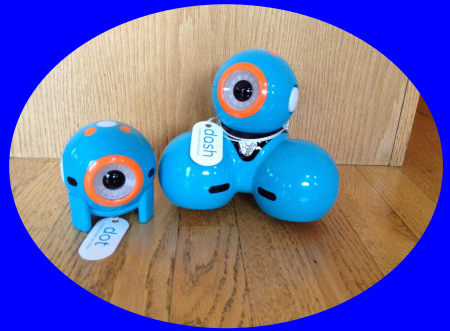
Geometry with Dash



Differentiated Task Cards

- Scaffolded
- On Level
- Challenge
- Hint
- Think Beyond

Common Core Standards

CCSS.MATH.CONTENT.3.MD.D.8 Geometric measurement: recognize perimeter.

Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

CCSS.MATH.CONTENT.3.G.A.1 Reason with shapes and their attributes.

Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

Computer Science Standards

ISTE Standard 4: Critical thinking, problem solving, and decision making

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

a. Identify and define authentic problems and significant questions for investigation
b. Plan and manage activities to develop a solution or complete a project
c. Collect and analyze data to identify solutions and/or make informed decisions
d. Use multiple processes and diverse perspectives to explore alternative solutions

Learning Goals

- ❑ I can measure and draw quadrilaterals.
- ❑ I can write algorithms to create quadrilaterals.

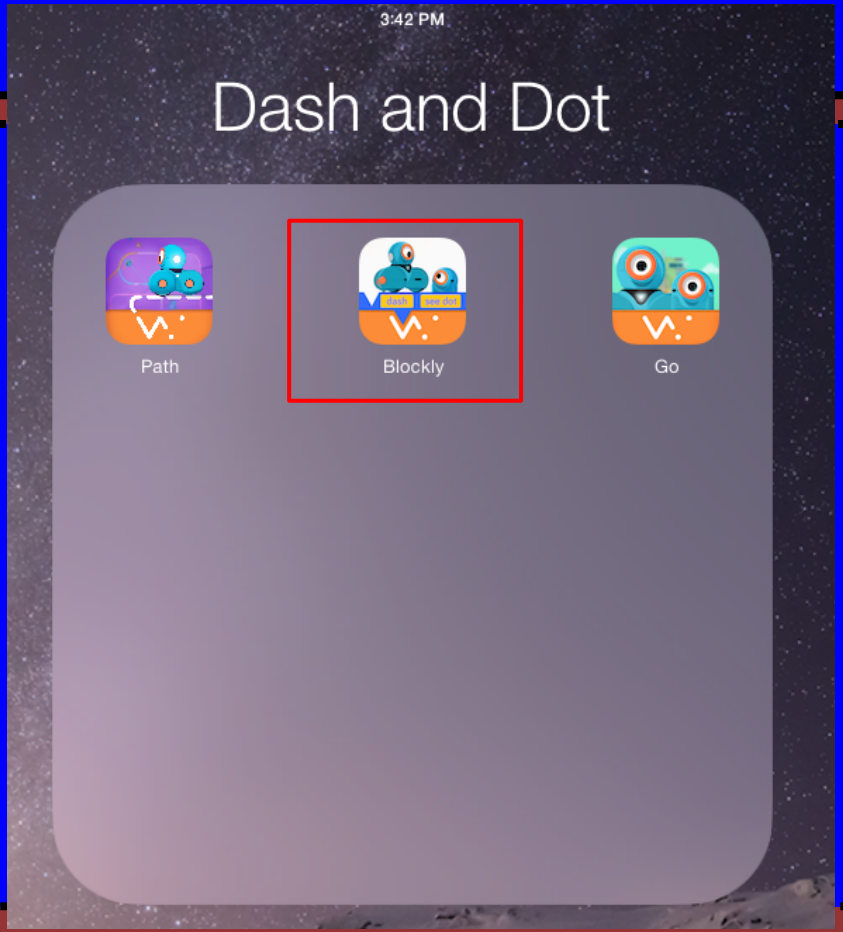
Introduction

This lesson is designed to support geometry lessons in identifying, classifying and describing quadrilaterals and finding the perimeter of quadrilaterals.

Before beginning the Dash Geometry Task Cards, explore the Math is Fun site http://www.mathsisfun.com/quadrilaterals.html

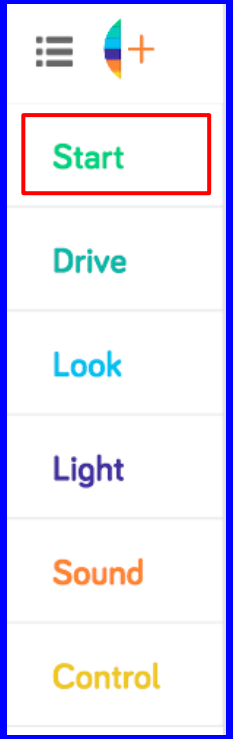
Give students the Graphic Organizer on Quadrilaterals to scaffold the coding experience.

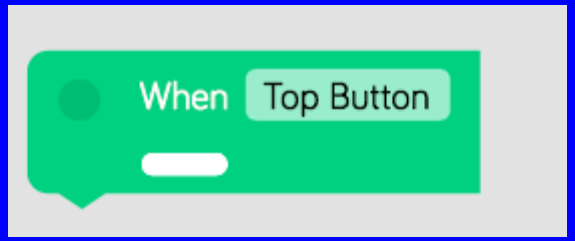
The Apps



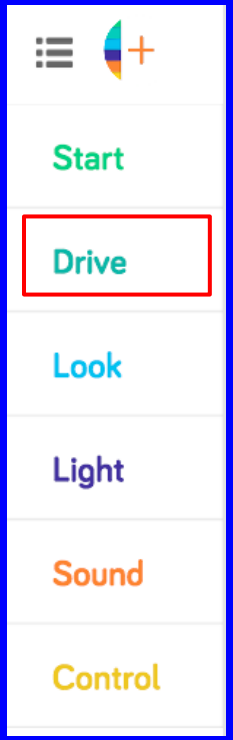
Connecting

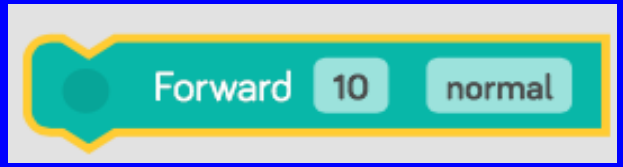
Writing an Algorithm

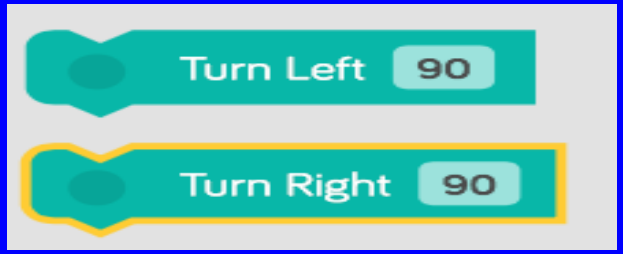




Drive


Start
Drive
Look
Light
Sound
Control


Forward 10 normal


Turn Left 90
Turn Right 90

Tasks

You will be writing algorithms to create different quadrilaterals.

- square
- rectangle (that is not a square)
- rhombus (that is not a square)

Create a Square

Using a meter stick and masking tape, measure and tape out a 50 cm x 50 cm square on the floor.

1. Use the Go App to follow the square.
2. Write an algorithm using Blockly to have Dash follow the taped line.

Challenge: Can you write the algorithm using a loop?

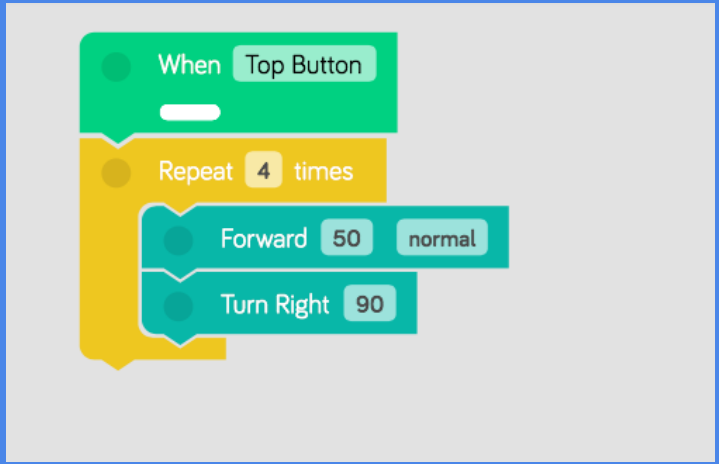
Two Ways to Create a Square

Create a Square

Using a meter stick and masking tape, measure and tape out a 50 cm x 50 cm square on the floor.

1. Write an algorithm using Blockly to have Dash follow the taped line.
2. Write a second algorithm using Blockly to have Dash follow the taped line.
3. How are the algorithms different?

Two Ways to Create a Square



Create a Square

Using a meter stick and masking tape, measure and tape out a square with an area of 2500 square cm on the floor.

1. Write an algorithm using Blockly to have Dash follow the taped line.
2. Write a second algorithm using Blockly to have Dash follow the taped line.
3. How are the algorithms different?
4. What are the dimensions of the shape?
5. What is the perimeter of the shape?

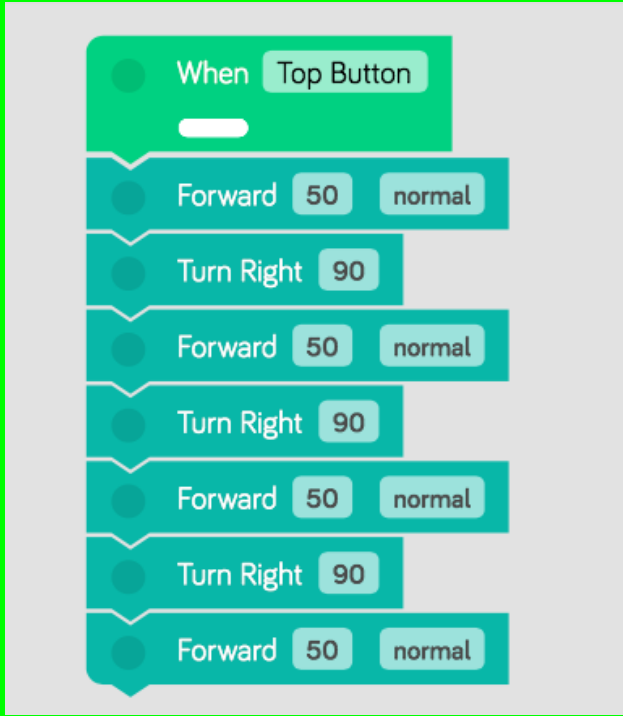
Hint

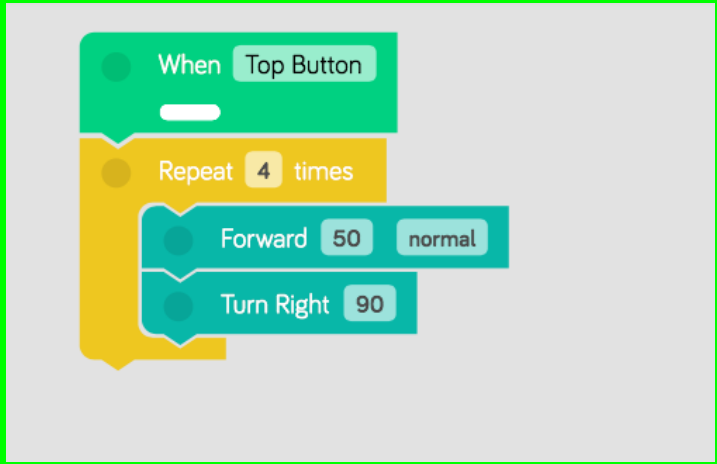
What are the possible lengths of a square with a 2500 square cm area?

- Use this math fact to help.

  5 * 5 = 25

Two Ways to Create a Square



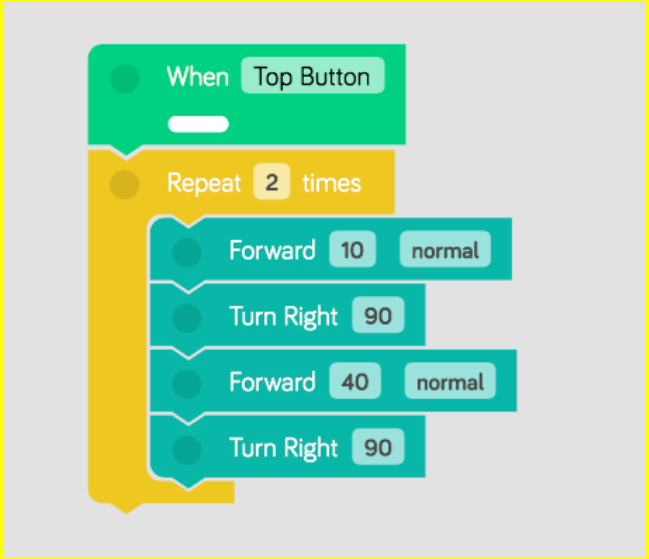


Perimeter

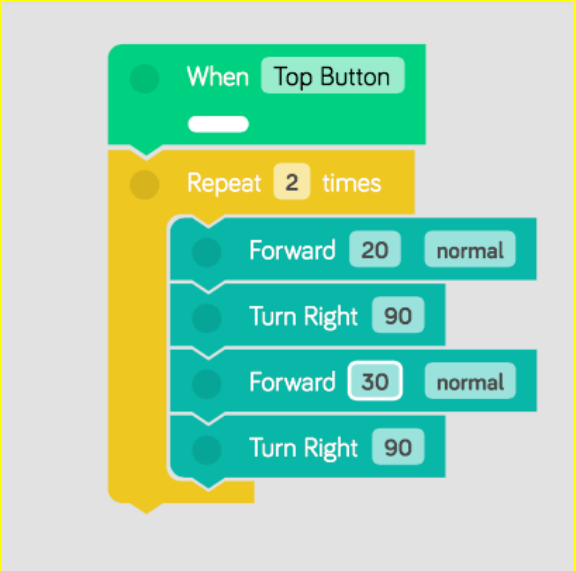
1. Using a meter stick and masking tape, measure and tape two rectangles.
   a. 10 cm by 40 cm rectangle
   b. 20 cm by 30 cm rectangle
2. Use Blockly to write an algorithm for Dash to follow the tape for each drawing.
3. How many centimeters did Dash travel in each shape?

Perimeter

10 cm by 40 cm rectangle



20 cm by 30 cm rectangle

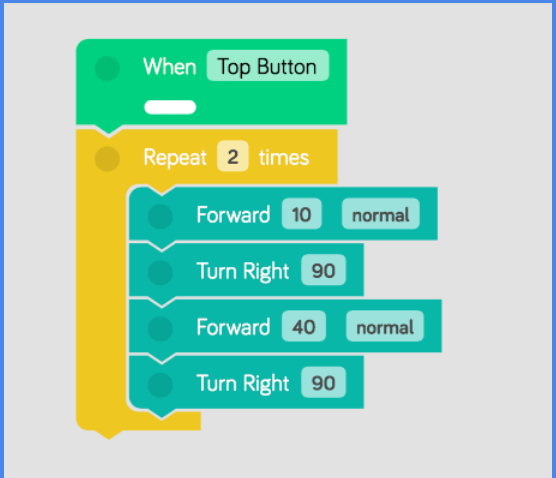


Perimeter

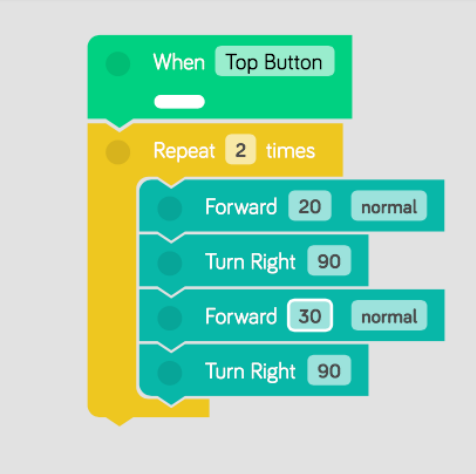
1. Using a meter stick and masking tape, tape two rectangles each with the 100 cm perimeter on the floor.
2. Use Blockly to write an algorithm for Dash to follow the tape for each drawing.
3. Can you create a square with 100 cm perimeter using Blockly and Dash? Why or why not?

Perimeter

10 cm by 40 cm rectangle



20 cm by 30 cm rectangle



The 100 cm square would be 25 cm by 25 cm and cannot be created using Blockly.

Perimeter

1. Using a meter stick and masking tape, tape two shapes with the same perimeter on the floor.
2. Use Blockly to write an algorithm for Dash to follow the tape for each drawing.
3. How many centimeters did Dash travel in each shape?
4. Are there any other polygons that you can create with the same perimeter using Dash and Blockly? Why or why not?

Draw a Quadrilateral

1. Using a meter stick and masking tape, tape the following quadrilaterals on the floor.
   a. rectangle that is not a square
   b. rhombus that is not a square
   c. square

   Label each shape with the name of the shape.
2. Using the Go App, have Dash follow the outline for each shape.

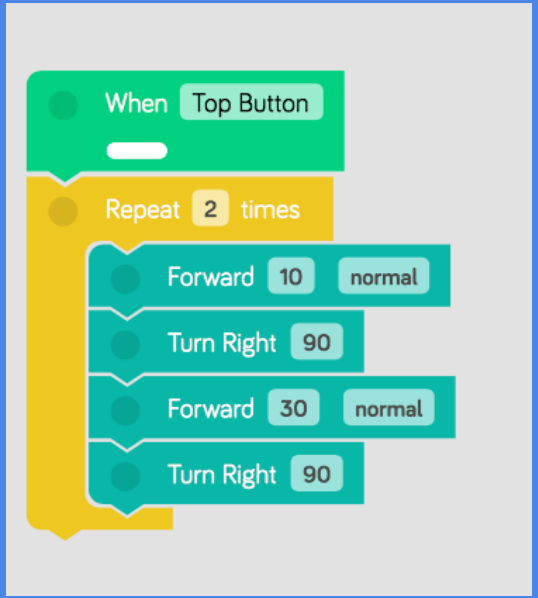
Draw a Quadrilateral

1. Using a meter stick and masking tape, tape the following quadrilaterals on the floor.
    a. rectangle that is not a square (10 cm by 30 cm)
    b. rhombus that is not a square (20 cm by 20 cm)
    c. square (40 cm by 40 cm)

2. Write an algorithm using Blockly for Dash to follow the outline of each of the quadrilaterals.

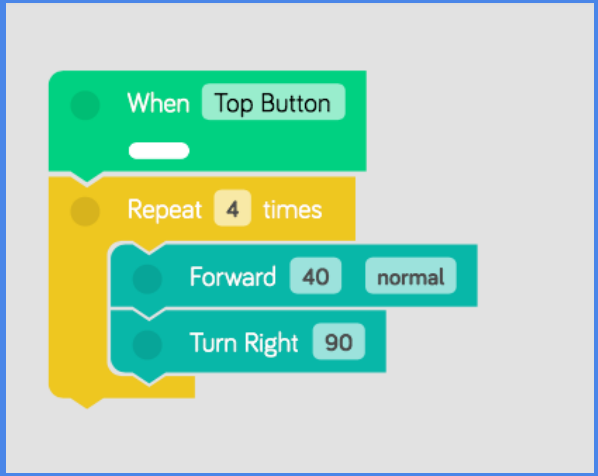
Quadrilateral

rectangle that
is not a square



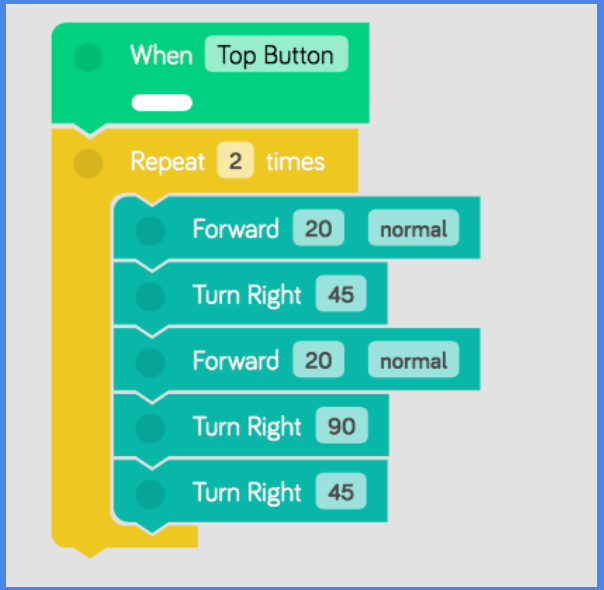
Quadrilateral

square



Quadrilateral

rhombus



Draw a Quadrilateral

1. Using a meter stick and masking tape, tape the following quadrilaterals on the floor. rectangle that is not a square
   - rhombus that is not a square
   - square
   - parallelogram that is not a rectangle or rhombus
2. Label each drawing with the name of the shape, the length of each side, and the angle measure of each angle.
3. Write an algorithm using Blockly to create each of the following quadrilaterals:

Hint - Quadrilaterals

Can you use a loop?

- If your sides and angles are all the same you can use a loop.

Think Beyond

- Which shapes are easier to create using loops?
- Which shapes can only be created with individual lines of code and no loops?
- What patterns do you notice?
- Are there any quadrilaterals that cannot be drawn using Blockly and Dash?