sphero edu

ACTIVITY CARDS
GOLF & SPHERO CITY MAT

Welcome to the Sphero Code Mat Activity Cards! In the following cards, you'll find some activities and challenges to promote collaboration, problem solving, and fun with the Sphero Edu Code Mat.

Each card is labeled with the programming type (Draw, Blocks, or Text) to help you and your students understand the level of programming required to complete the activities.

DRAW

BLOCKS

TEXT

As you work through the activities on the cards, we recommend the following:

- Have students work in groups of two or more to complete activities.

- Each group needs one challenge card, one programming device, and one Sphero robot.

- Have students share their solutions with the class when possible.

- Each card has more than one solution. See how many different ways students can solve each activity.

- When using multiple roll blocks, use a delay block in between each Roll block to help with accuracy.

HOLE-IN-ONE CHALLENGE

Fore! Go for glory and try to get a
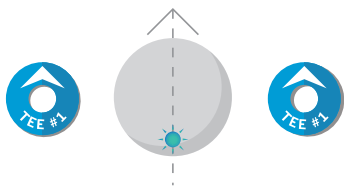hole in one by drawing a program
for your robot to complete.

Draw Program

HOLE-IN-ONE CHALLENGE

1 Place your Sphero robot on Tee #1.

2 Aim your robot and choose your ball color.

Hint: Aim icon is at the top right of the coding screen.

3 Create a new Draw program.

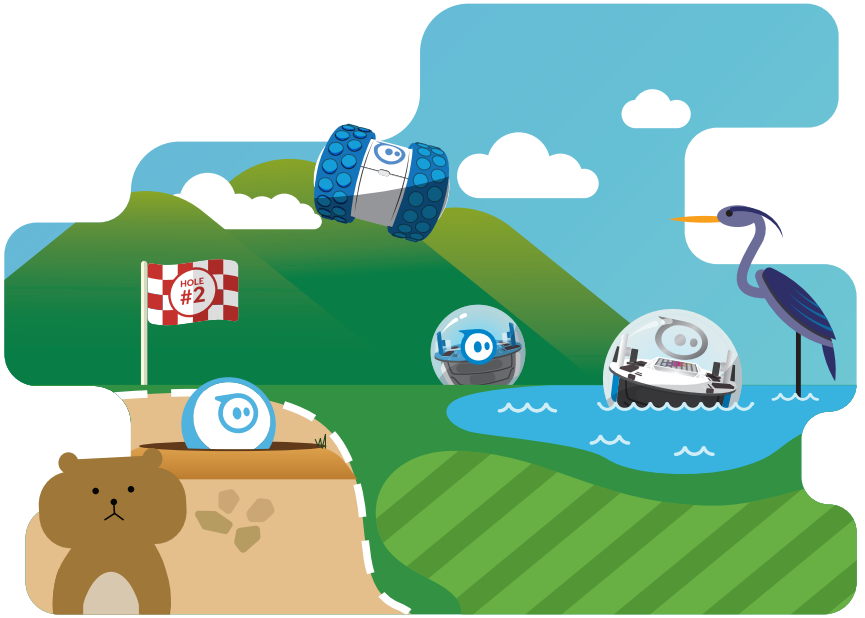**Hint:** Create a new program and choose the Draw icon.

4 Draw your robot's path without going over the lake or crossing the white dashed out of bounds lines.

5 Challenge your classmates and friends for a "closest to the hole" challenge—place stickers or post-it notes where your robot lands to mark your shot.

TARGET PRACTICE

Now is the time to show off your programming accuracy using Roll blocks.

TARGET PRACTICE

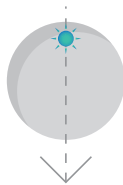**1** Place your robot on Tee #2.

Hint: Aim icon is at the top right of the coding screen.

AIM

TEE #2

TEE #2

2 Use the Roll blocks to create a program to hit each of the Sphero Robots: Mini, SPRK+, Ollie, & BOLT.
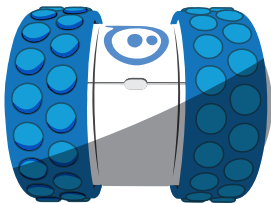
Hint: The Roll block is under the **Movement** category.

⊕ Mini

⊕ SPRK+

⊕ Ollie

⊕ BOLT

EXTENSION:
Now have someone else pick 4 new targets and do the activity again.

a-CUTE Triangle!

TRIANGLES

Create a program that connects three different landmarks to make different types of triangles: acute, obtuse, and right.

TRIANGLES

1 Identify three different objects on the Code Mat.

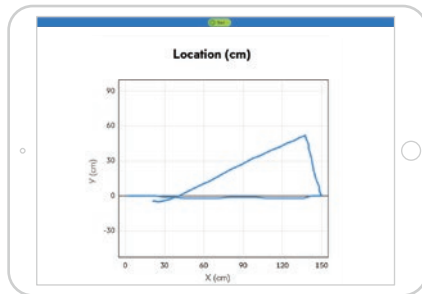**2** Using Roll blocks and Delay blocks, program your robot to draw a path to each object.

Hint: The Roll block is under the **Movement** category.

3 Look at the sensor data and screenshot the path to show each of your triangle types.
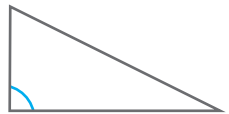
Hint: Click the dotted menu at the top right of the screen and open the 'Sensor Data' to view.
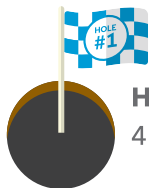

obtuse   acute   right

PLAY GOLF

It's tee time! Create a program using Roll blocks to get your robot to the hole in as few blocks as possible. Each Roll block you use is a "swing" of the club, and each swing should aim for the distance markers ⬖. Each "shot" should land in one of the grids that is surrounding the circle distance markers.

Golf Activity 4

Block Program

PLAY GOLF

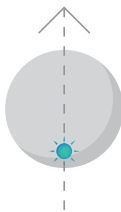**HOLE 1 = PAR 4**
4 Roll blocks for a par
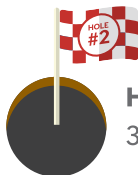
HOLE 2 = PAR 3
3 Roll blocks for a par

1 Set your robot on Tee #1.

Hint: Aim icon is at the top right of the coding screen.

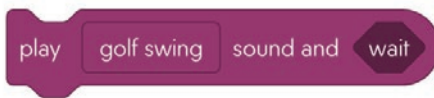**2** Start your program by choosing a main LED color for your "golf ball".

Hint: Find in **Lights** category

main LED

3 Add a Sound block with Golf Swing.

Hint: Find in **Sounds > Sports** category

play golf swing sound and wait

4 Add a Roll block to set the parameters for each shot.

Hint: Find in **Movements** category
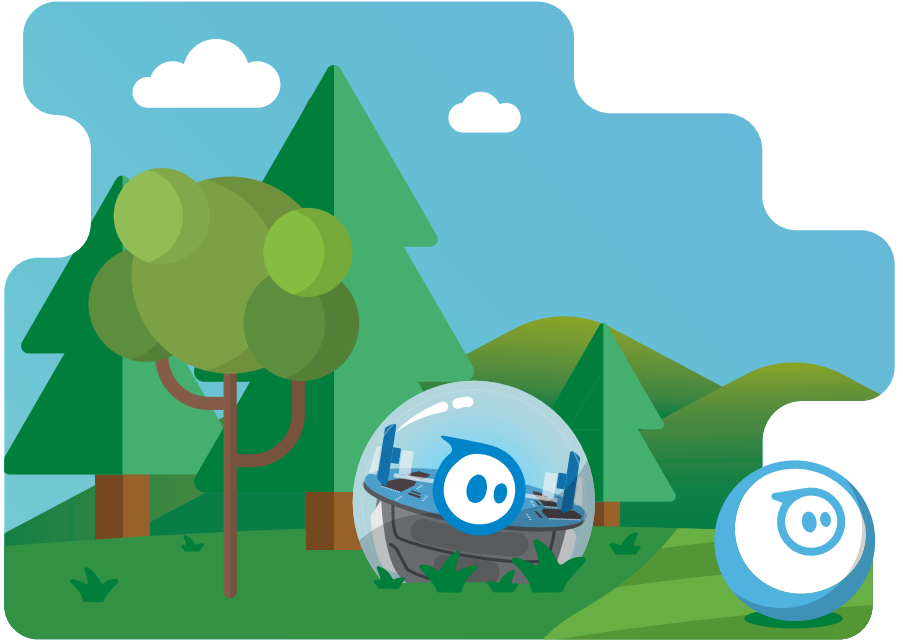
roll 0° at 0 speed for 0s

5 Use a 1-second Delay block to pause between shots.

Hint: Find in **Controls** category

delay for 0s

COLOR CODED SPEED

Using the rules from the Play Golf card, now you have to deal with the different conditions of where your robot lands.

Block Program

COLOR CODED SPEED

Use the following speeds for your next Roll block depending on where your robot landed.

Hint: Adjust speed in the Roll block
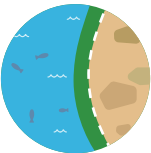
Tee Box Speed = 180

Fairway Speed = 150

Green Speed = 125
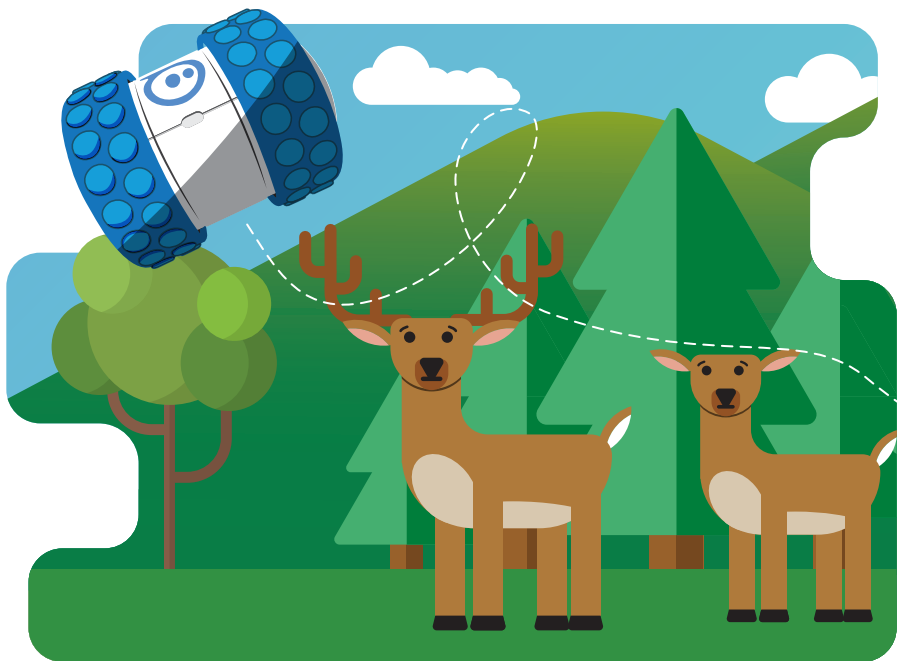
Rough Speed = 100

Sand Speed = 70

Water & OB speed = 40

TRICK SHOT MASTER

"Off the deer, around the turtle, and into the hole!"
Use the same rules as the Play Golf activity card, but
this time, you will call your shots as you play.

TRICK SHOT MASTER

1 For this program, you will need to use the Speak Block in addition to the Roll block from the Play Golf activity card.

2 Your program must have at least one trick for it to be considered a valid trick shot.

Hint: Use Speak blocks under the **Sounds** category.

speak | Off the turtle | and | wait

3 There's no limit to the types of tricks you can do. Combine different types of blocks to come up with amazing tricks!

Hint: Check out the Spin and Raw Motor blocks in the **Movements** category and the Strobe block in the **Lights** category.

raw motor left | 0 | right | 0 | for | 0s

spin | 0° | for | 0s

strobe | | for | 0s | 0 | times
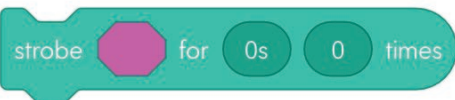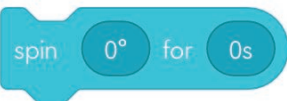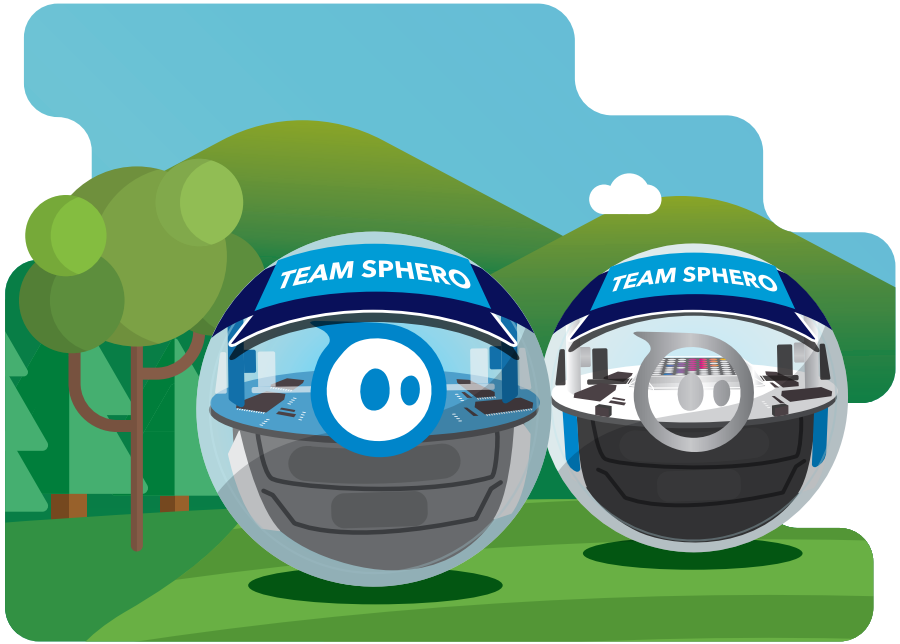
TEAM SCRAMBLE

Grab a partner and get ready to play a team scramble. In a scramble, you and a partner are going to use Roll blocks to alternate shots and play golf.

TEAM SCRAMBLE

Use the same rules from the Play Golf! Activity card (Golf Activity 4). Instead of using a list of commands under the "on start program", create a Function for every shot.

1 Create a Function for each shot: (shotOne, shotTwo, shotThree, etc.).

Hint: Find in **Functions** category. Functions cannot have spaces.

2 Program the commands you want and put the blocks under the shotOne Function block to define the Function.
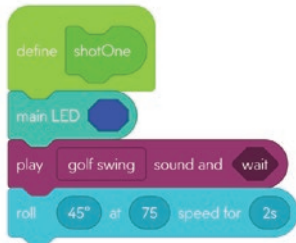
3 Drag the shotOne Function block under the "on start Program" block to call the Function.

4 Repeat these steps for each Function.

Hint: Your "on start program" should only have Function blocks listed underneath it when you run your program.
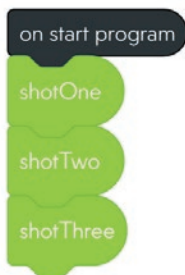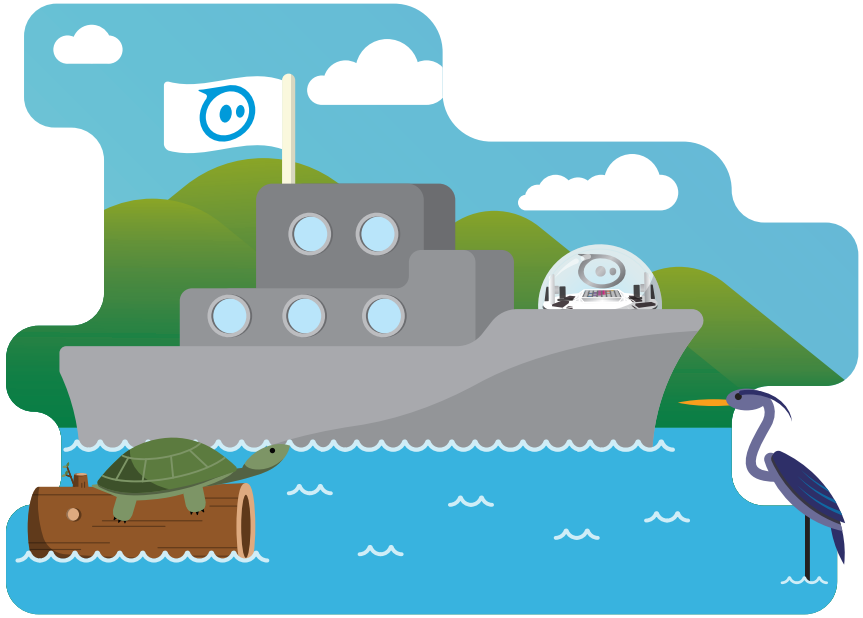
LOCATION BATTLESHIP

In the Battleship style game, you are going to play against three teams to use your Sphero robot to program an "attack" on your enemy's grid.

Golf Activity 8

Block Program

LOCATION BATTLESHIP

1 Assign each team a quadrant on the Code Mat.

2 Each team places a sticky note on 3 different grids in their quadrant.

3 After each team has their grids chosen, begin play with the team whose birthday is the closest to today.

QUADRANT **1** QUADRANT **2**

QUADRANT **3** QUADRANT **4**

SPHERO GOLF

4 Each turn will begin with your robot on coordinate (0, 0). Program your Sphero robot to land in a grid where your enemy's sticky notes are.

5 If your robot lands with the majority of the robot in the grid with a sticky note, it's a hit; remove the sticky note.

6 Keep rotating turns until there is only one team left with their sticky notes.
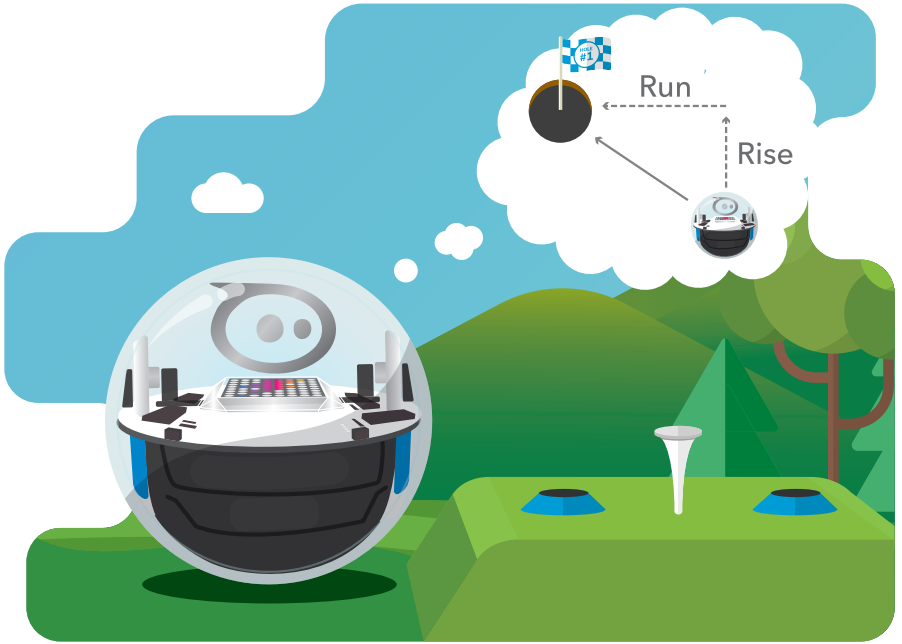
SLOPE WITH SPHERO

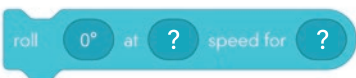Can you find the slope for two points on the golf Code Mat?

Block Program

SLOPE WITH SPHERO

1 Use a Roll block to figure out the speed and duration needed to roll the length of one grid square of the Code Mat.

Hint: Find in **Movements** category

roll 0° at ? speed for ?

Grid square
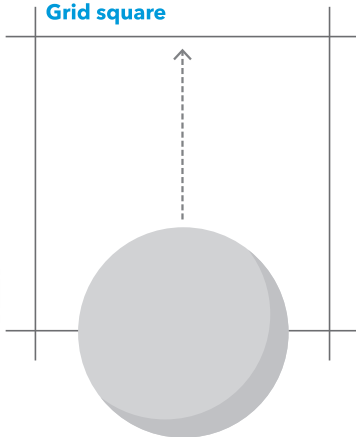
2 Once you have figured out how long it will take to do one grid, use your programming and math skills to program your robot from the tee to hole #1, tee (5, -7) with the hole (-5, -8).

3 Find the slope of the line that connects these two points.

Hint: Slope is measured as the rise/run

Run

Rise
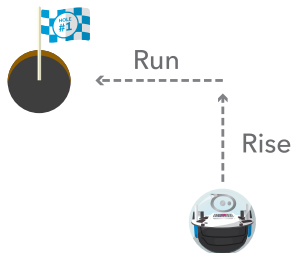
EXTENSION:
Pick two other landmarks from the Code Mat to test out your method and determine the slope of those coordinates.

WIND VARIABLES

One of the hardest things to account for in golf is unexpected wind—You don't always know where your ball will land. In this activity, you will use a Roll command with variables to create the swing.

Golf Activity 10

Text Program

WIND VARIABLES

1 Create a Variable called "wind" and set it to a random integer between -5 and 5. This will change the heading plus or minus 5 degrees.

Hint: Create a new program and choose the 'Text' icon. `</>`

2 Create another Variable called "swing" that has your heading direction and a (+) Operator to add your wind variable.

3 In your Roll command, use the swing Variable for your heading parameter.

4 For each shot, adjust the number in your swing variable to match the heading you want your ball to go.
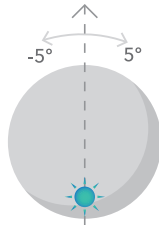
```
async function startProgram() {
    wind = getRandomInt(5, -5);
    swing =  0  + wind;
    await Sound.Sports.GolfSwing.play(true);
    await roll(swing, 99, 0.5);
    await delay(1);
}
```

EXTENSION:

If you want to increase the challenge of the game, change the strength of the wind variable by as many degrees as you want.

HOT AIR BALLOON

Time to float away. Draw a program for your robot to navigate from hot air balloon to hot air balloon.

Draw Program

HOT AIR BALLOON

1 Place your Sphero robot on the red hot air balloon.

Hint: Create a new program and choose the Draw icon.
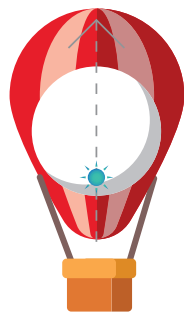
2 Aim your robot and change color to match a different balloon.

Hint: Choose your color by opening the color wheel in the bottom left corner of the draw canvas.

3 Draw your robot's path to each hot air balloon. For each stop on the robot's path, change the color of your robot.
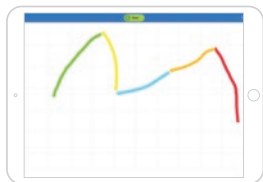
EXTENSION:

After you've hit all of the hot air balloons, create a Draw program for airplanes & helicopters.

I SPY - FIELD TRIP

I spy with my little eye, a hamster,
a cat, and a dog.

City Activity 2   Block Program

I SPY - FIELD TRIP

1 Place your robot on the school bus.

2 Pick an object or landmark on the code mat.

3 Give your partner a color based clue.
Example: *"I spy something blue and white"*

4 Program the robot to what you think the clue is.
Hint: Use Roll blocks under **Movements** to get around the city.

5 Give your partner a more specific clue.
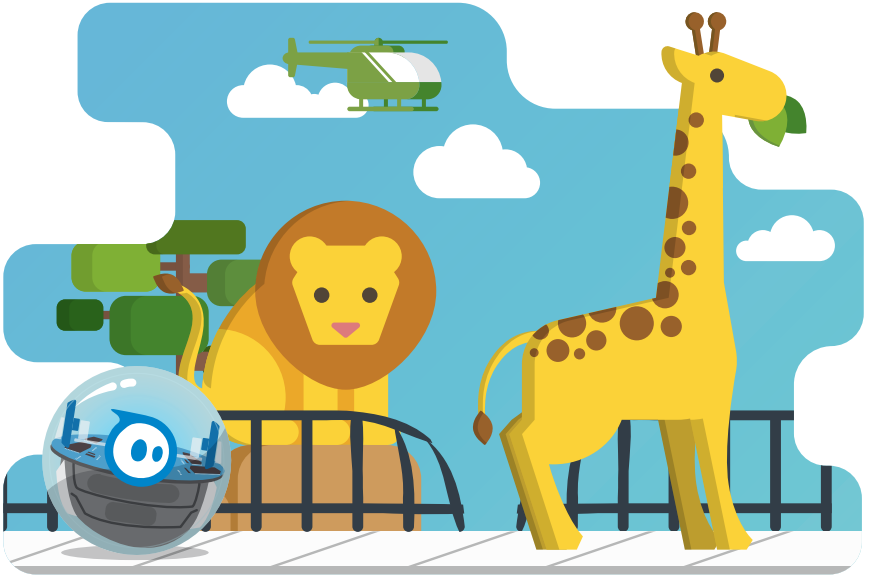**Example:** *"I spy something blue and white that flies"*

6 Program the robot to what you think the clue is.

7 Give your partner a final clue that is even more specific.
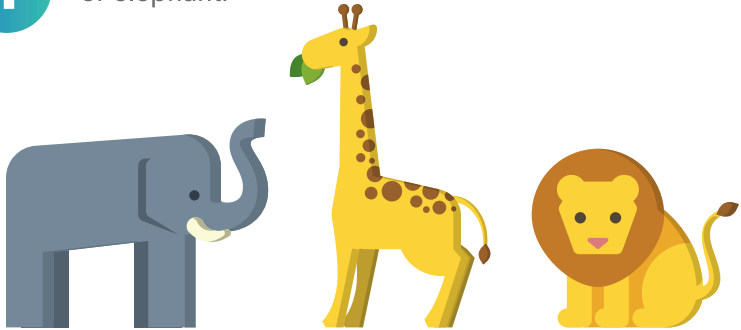**Example:** *"I spy something blue that flies into space"*

ZOO ESCAPE

If a zoo animal were to escape the zoo,
what would they do?

Block Program

ZOO ESCAPE

1 Choose one of the animals in the zoo: lion, giraffe, or elephant.

2 Using Roll blocks, program 4 stops the animal would make if they were to escape.

Hint: Use Roll blocks under **Movements** to get around the city and a Delay block at each stop in the **Controls** category

roll 0° at 0 speed for 0s   delay for 0s

3 At each stop on the journey, use a Speak block to tell what each stop is.

Hint: Use Speak blocks under the **Sounds** category

EXTENSION:

Now write a creative story about the animal escaping from the zoo!

ROBOT'S DAY OUT

Program the robot in the city. Take it to 4 stops and use those 4 stops to tell a story about the Robot's day out!

City Activity 4　　　　　　　　　Block Program
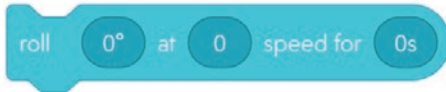
ROBOT'S DAY OUT

1 Use the following blocks to tell the story:

ROLL
Hint: Find in **Movements** category

roll 0° at 0 speed for 0s

DELAY
Hint: Find in **Controls** category

delay for 0s

SPEAK
Hint: Use Speak blocks under the **Sounds** category

speak The zoo is fun and wait
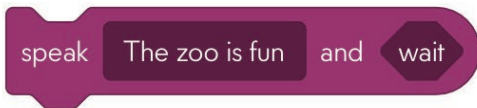
2 Continue this pattern until you have visited at least 4 locations.

FARM TO TABLE

The farmer has to take his vegetables to the Farmers' Market to sell. Navigate the robot from the farm to the Farmers' Market without running into any buildings.

City Activity 5

Block Program

FARM TO TABLE

1 Place your robot on the farm.

2 Aim your robot.

Hint: Aim icon is at the top right of the coding canvas.

(AIM)

3 Create a program that navigates between the buildings to get the robot to the Farmers' Market without touching any of the other buildings.

Hint: Use Roll blocks under **Movements** to get around the city.

ROAD BLOCK

The city is under construction, but your robot has to get to school! Place objects on the code mat for your Sphero Robot to navigate around.
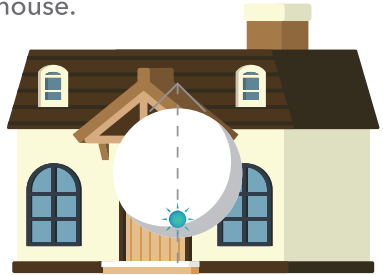
ROAD BLOCK

1 Place your robot on the house.

2 Aim your robot.

Hint: Aim icon is at the top right of the coding canvas.
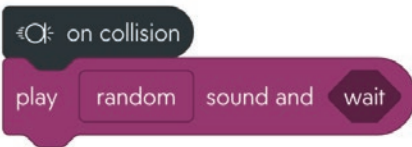
(AIM)

3 Create a Block program that navigates around the roadblocks on the mat.

Hint: Make sure your objects are heavy enough so your Sphero Robot recognizes the collision.

4 Use the On Event: On Collision block with a Sound block to notify you when your robot has hit an object.

Hint: Use Collision blocks under the **Events** category

on collision

play random sound and wait

5 If your robot hits an object, return to the house. Adjust your program and restart.

BON APPETIT

You are a master chef at the restaurant, but you are all out of ingredients for the dinner rush. Create the quickest program you can to pick up all of the ingredients you need to cook your famous dinner.

BON APPETIT

1 Start on the restaurant and aim your robot.

Hint: Aim icon is at the top right of the coding screen.

AIM

2 Visit the library to get a new cookbook.

Hint: Use Roll blocks under the **Movements** category

3 Go to the farm to get fresh milk.

Hint: Add a Delay block between stops. Find in the **Controls** category.

4 Get your fresh peppers and tomatoes from the Farmers' Market.

5 Visit the grocery store to get pasta and return to the restaurant.

SPELL YOUR STORY

Work with a partner to create a story based on randomly chosen coordinates.

Block Program

SPELL YOUR STORY

1 Pick one of the words and record the letters.

CAT   SEA

DOG   CAR

BOT

2 After writing down the letters, ask your partner to pick a random number between 1-10 for each letter. Write that number next to the letter:

Example: C-3, A-9, T-5.

3 Program your robot using blocks to visit the coordinates that you chose. Tell a story based on the buildings or objects that show up in the grid coordinates that you travel to.

4 Tell a story.

5 Make your story more interesting by coming up with other words that you can spell from the Code Mat.

LOST IN THE CITY

Your Sphero Robot is lost in the city. Use the compass rose at the top of the mat to give directions from one point to another.
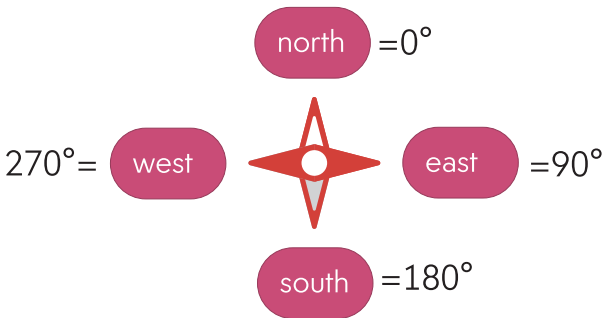
LOST IN THE CITY

1 Choose two landmarks on the Code Mat.

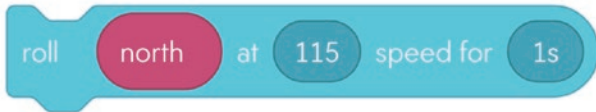**2** Create 4 number variables called North, East, South, and West.

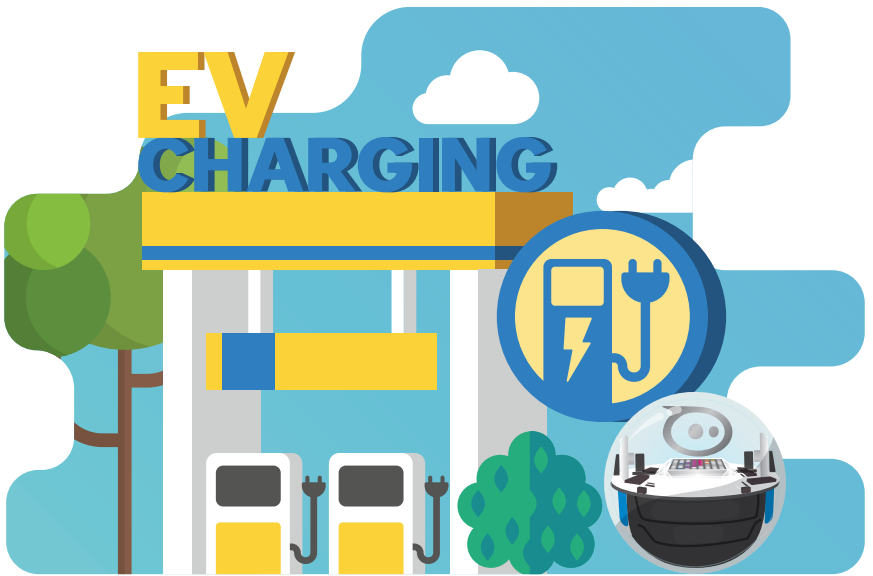**Hint:** Create a new variable under the **Variables** tab.

north $=0°$

$270°=$ west east $=90°$

south $=180°$

3 With your program, use the Variable to establish your heading.

Hint: Drag the Variables you created into the heading of the Roll command

roll north at 115 speed for 1s

4 Write your program to give directions from point A to B.

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EV CHARGING

ELECTRIC VEHICLE

Your robot just had a new battery installed at the Maker Space, but it wasn't fully charged! Navigate to the EV Charging station before your battery runs out and make sure not to hit any buildings on your way. Create a program in which your robot loses battery power with every Roll command.

ELECTRIC VEHICLE

1 Create a Variable called 'batteryLevel'.

Hint: Variable names cannot have spaces.

2 Set the Variable to 50% inside of the Start Program function.

3 After each Roll command, decrease the value of the 'batteryLevel' Variable by 10.

4 Then use a Speak command to let you know how much battery is remaining.

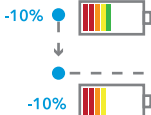**Hint:** Create a new program and choose the 'Text' icon. `</>`

```
async function startProgram() {
    batteryLevel = 50;
    await delay(0.2);
    await roll(0, 147, 1.5);
    batteryLevel = batteryLevel - 10;
    await speak(buildString('Your battery has ', batteryLevel, 'percent remaining'), true);
    await delay(0.2);
    await roll(90, 145, 1);
    batteryLevel = batteryLevel - 10;
    await speak(buildString('Your battery has ', batteryLevel, 'percent remaining'), true);
```
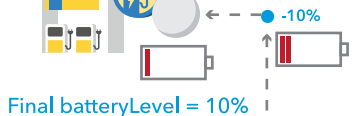
EXAMPLE PATH

The blue dots represent `await roll` statements.
Be sure to miss the buildings on the way.

EV CHARGING

-10%

Start batteryLevel = 50%

MAKER SPACE

Final batteryLevel = 10%

-10%

-10%

-10%