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ACTIVITY CARDS
GOLF & SPHERO CITY MAT
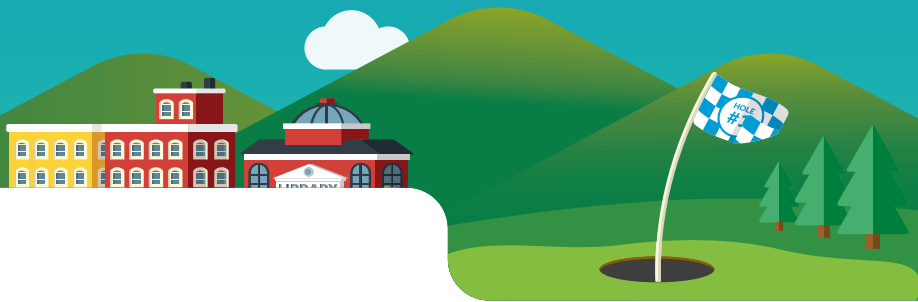
Welcome to the Sphero Code Mat Activity Cards! In the following cards, you'll find some activities and challenges to promote collaboration, problem solving, and fun with the Sphero Golf & Sphero City Code Mat.

◀ Students should scan the QR code on the front of each card to access the program associated with the activity.

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 BOLT 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.

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.

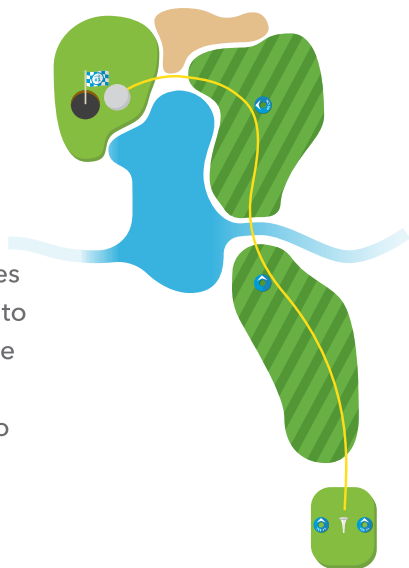**3** Scan the QR code to open a Draw program.

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.
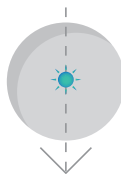
TARGET PRACTICE

Now is the time to show off your programming accuracy using the roll block.

TARGET PRACTICE

1 Scan the QR code to open the Block program.

TEE #2   TEE #2

2 Use the roll block to create a program to hit each of the Sphero Robots: Mini, indi, RVR+, & BOLT.
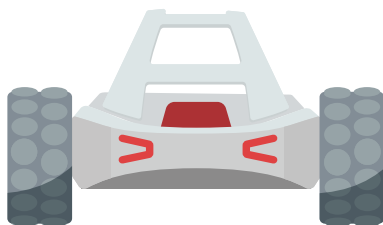
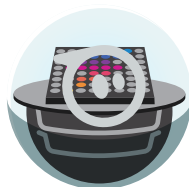**Hint:** The roll block is under the **Movement** category.

⊕ Mini

⊕ indi

⊕ RVR+

⊕ BOLT

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

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a-CUTE Triangle!

TRIANGLES

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

TRIANGLES

**1** Scan the QR code to open the Block program. 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.
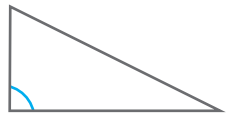
Hint: Click the dotted menu at the top right of the screen and open the 'Sensor Data' to view.
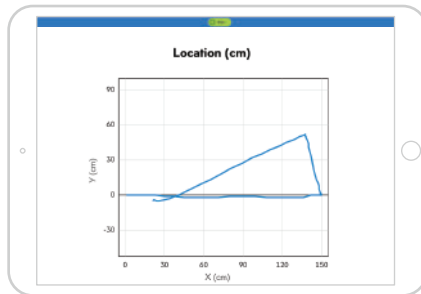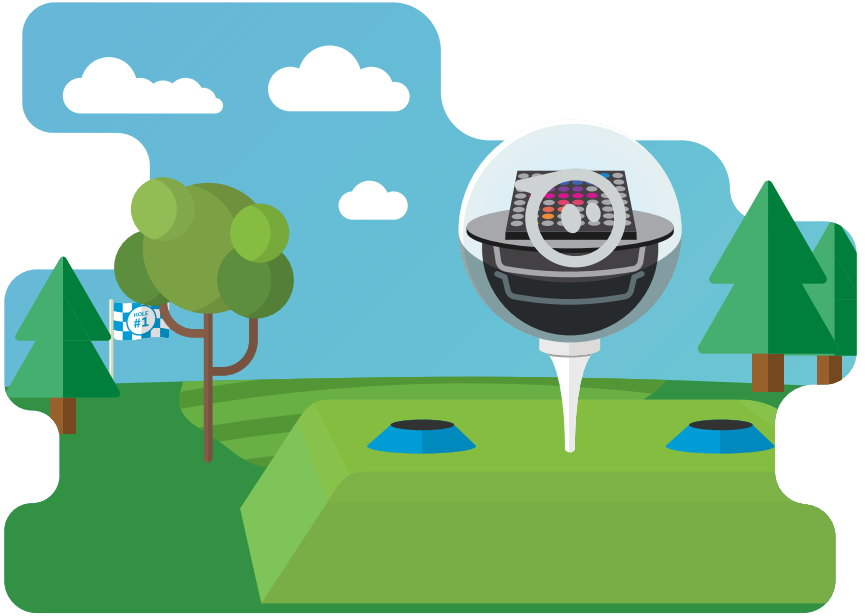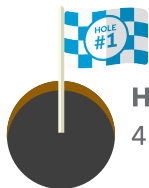

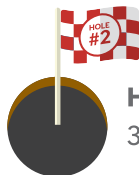obtuse   acute   right

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.

PLAY GOLF

HOLE 1 = PAR 4
4 roll blocks for a par

HOLE 2 = PAR 3
3 roll blocks for a par

1 Scan the QR code to open the Block program and set your robot on Tee #1.

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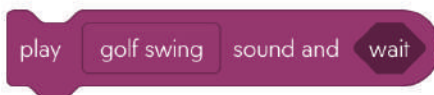
4 Add a roll block to set the parameters for each shot.

Hint: Find in **Movements** category.

roll 0° at 0 speed for 0s
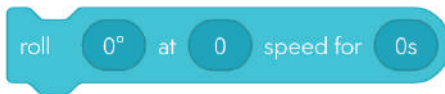
5 Use a 1-second delay block to pause between shots.

Hint: Find in **Controls** category.

delay for 0s

COLOR CODED SPEED

Use the rules from the Play Golf card to play more rounds of golf. This time, you'll have to deal with the different conditions of where your robot lands.

Golf Activity 5

Block Program

COLOR CODED SPEED

Scan the QR code to open the Block program and play another round of golf. Change the speed of your roll blocks according to where your robot is on the course!

Hint: Adjust speed in the roll block.

Tee Box Speed = 180

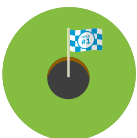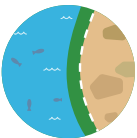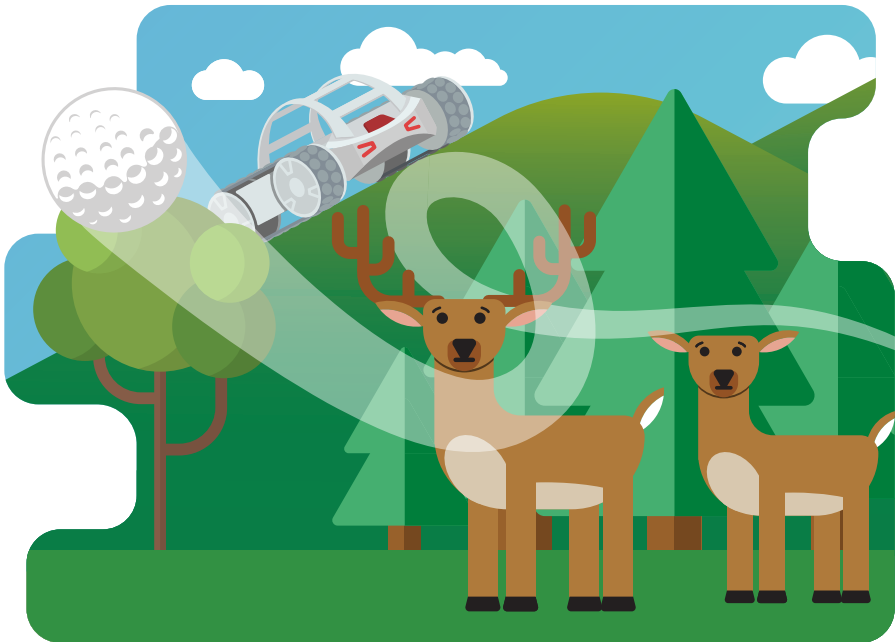Fairway Speed = 150

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.

Block Program

TRICK SHOT MASTER

1 Scan the QR code to open the Block program. For this program, you will need to use the speak block in addition to the roll block.

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
```
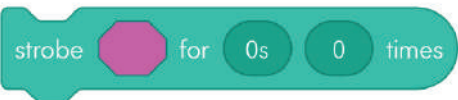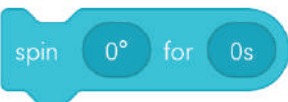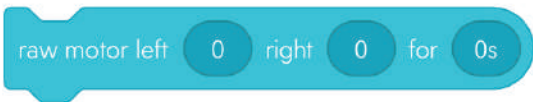
TEAM SCRAMBLE

Scan the QR code, grab a partner, and get ready to play a team scramble. In a scramble, you and a partner are going to use functions to alternate shots and play golf.

Golf Activity 7

Block Program

TEAM SCRAMBLE

Use the same rules as the Play Golf activity card. Instead of using a sequence of blocks under "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. Function names cannot have spaces.

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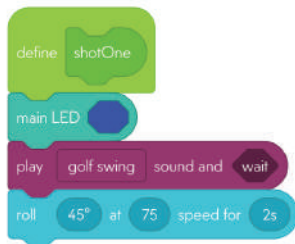
3 Drag the shotOne function block under the "on start Program" block to call the function.

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 SEEKER

In this game, you are going to play against three teams using your Sphero robot to find and sink your opponents' ships.

LOCATION SEEKER

1 Scan the QR code to open a Block program and assign each team a quadrant on the Code Mat.

2 Each team places a sticky note on three 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 **2**   QUADRANT **1**

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 any sticky notes still left on the Code Mat.
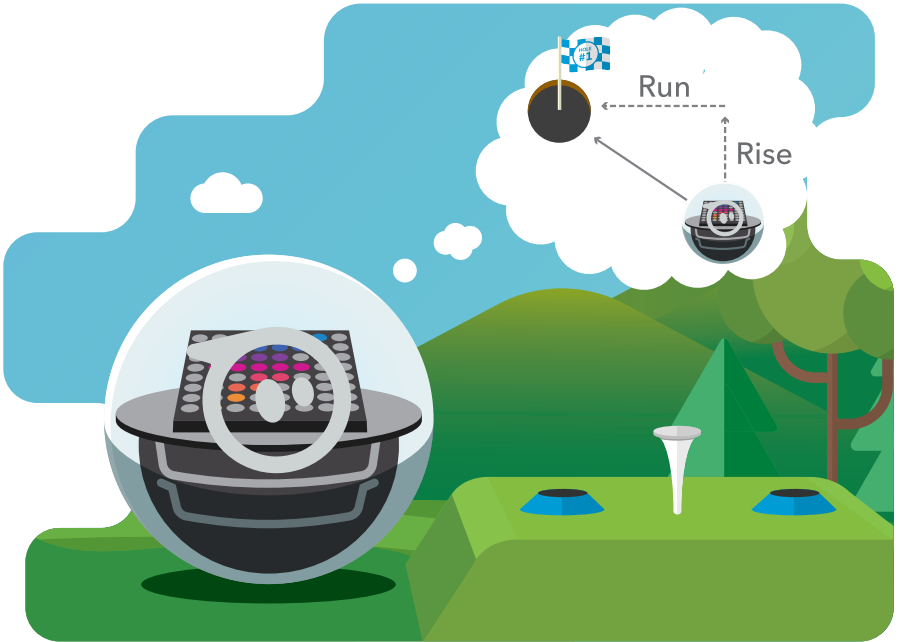
SLOPE WITH SPHERO

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

SLOPE WITH SPHERO

1 Scan the QR code to open the Block program.

2 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.

Grid square

roll 0° at ? speed for ?
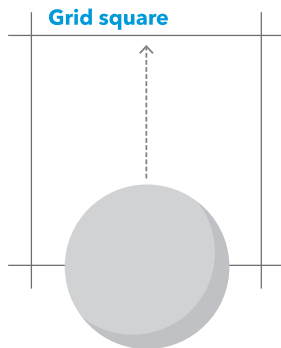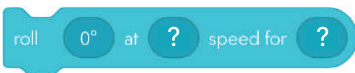
3 Once you have figured out how long it will take to do one grid, use your programming and math skills to program your robot from the tee (5, -7) to hole #1 (-5, 8).

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

Hint: Slope is measured as the rise/run.

Run

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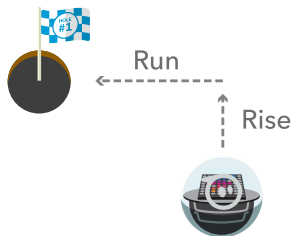
EXTENSION:
Pick two other landmarks from the Code Mat to test out your method and determine the slope of those coordinates.

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.

WIND VARIABLES

1 Scan the QR code to open the Text program.

2 Find the variable called "wind". This is set to a random integer between -5 and 5.

3 Find the second variable called "swing". Change the "0" to the heading you want your robot shot to roll. Notice that the value of "swing" will be changed by the value of "wind".

4 Add sound, roll, and delay commands according to the image below. For each shot, adjust the number in your swing variable to match the heading to the direction you want your robot to roll.

```
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);
}
```

-5°   5°
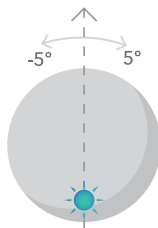
EXTENSION:
If you want to increase the challenge of the game, change the strength of the wind variable by as many degrees as you want.

HOT AIR BALLOON

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

City Activity 1

Draw Program

HOT AIR BALLOON

1 Open the Draw program with the QR code on the front of this card and place your Sphero robot on the red hot air balloon.
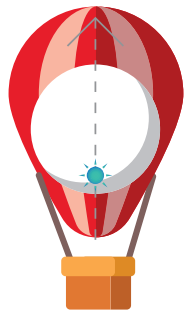
2 Aim your robot and change color to match a different balloon.

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. Play a game of "I Spy" with your Sphero robot.

I SPY FIELD TRIP

1 Scan the QR code to open the Block program. 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 roll to what you think is the object or location.
Hint: Use roll blocks under **Movements** to get around the city.

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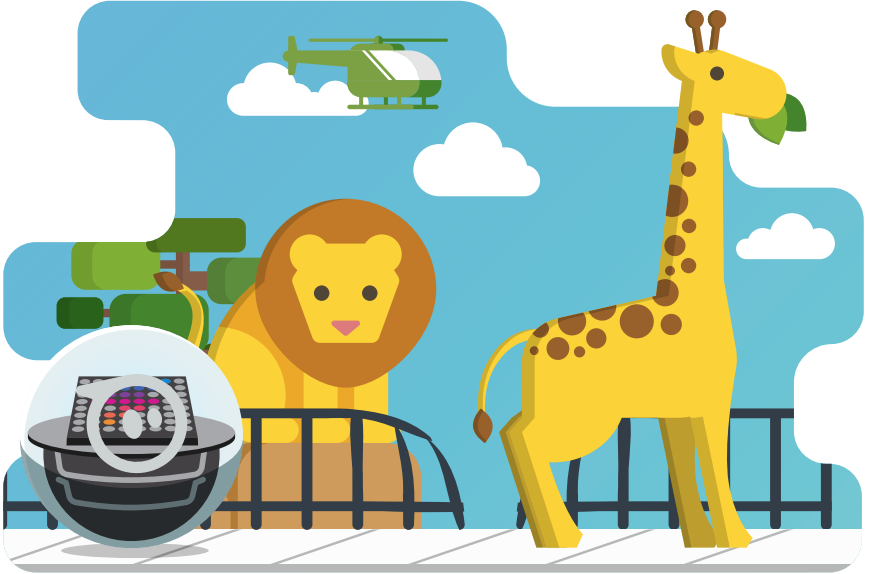**Example:** *"I spy something blue and white that flies"*

6 Program the robot to roll to what you think is the object or location.

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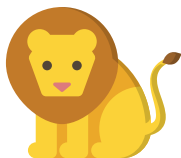**Example:** *"I spy something blue that flies into space"*

ZOO ESCAPE

If a zoo animal were to escape the zoo, what would they do? Program your Sphero robot to tell a story.

Block Program

ZOO ESCAPE

1 Scan the QR code to open the Block program. Choose one of the animals in the zoo.
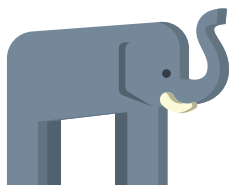
2 Using roll blocks, program four stops the animal would make if they were to escape.

Hint: Use roll blocks under **Movements** to get around the city and a delay block from the **Controls** category at each stop.

roll 0° at 0 speed for 0s   delay for 0s
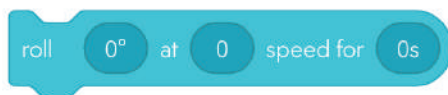
3 At each stop on the journey, use a speak block to tell what each stop is.

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

speak Elephant and wait

EXTENSION:

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

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AMUSEMENT PARK

ROBOT'S DAY OUT

Program your robot's day in the city. Take it to four stops and use those four stops to tell a story!

City Activity 4   Block Program

ROBOT'S DAY OUT

1 Scan the QR code to open the Block program. Use the following blocks to tell the story:

ROLL
Hint: Find in **Movements** category

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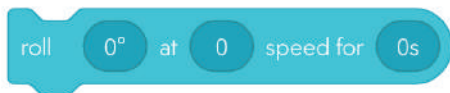
DELAY
Hint: Find in **Controls** category

delay for 0s

SPEAK
Hint: Find in the **Sounds** category

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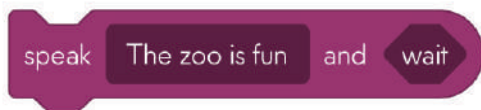
2 Continue this pattern until you have visited at least four locations.

EXTENSION:
Select "wait" in a speak block to toggle it to "continue". How does this affect how your program executes—or runs?

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 Scan the QR code to open the Block program. Place your robot on the farm.

2 Aim your robot.

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

3 Use roll blocks and delay blocks to program your Sphero robot's path to the Farmer's Market without touching any other buildings.
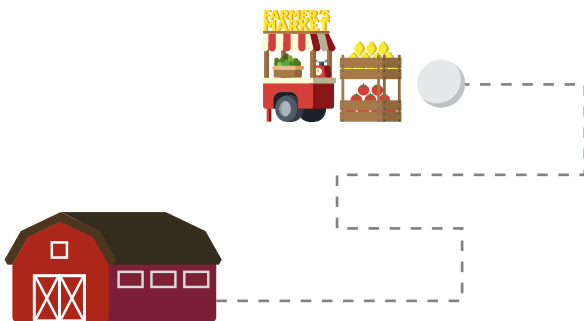
EXTENSION:

Program your BOLT to perform a celebration when it makes it to its final destination. Try out the raw motor and strobe blocks.

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 Scan the QR code to open the Block program. Place your robot on the house and aim your robot.

2 Place objects like books or binders on the Code Mat.

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 collision block with a sound block to notify you when your robot has hit an object.

Hint: Use collision blocks under the **Events** category.

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 Scan the QR code to open the Block program. Start at the restaurant and aim your robot.

2 Visit the library to get a new cookbook.

3 Go to the farm to get fresh milk.

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 Scan the QR code to open the Block program.

2 Pick one of the words and record the letters.

CAT   SEA

DOG   CAR

BOT

3 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.

4 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.

5 Add creativity with movements, lights, and sounds. Try the spin block, sound block, and strobe block. How could you use these in your story?

6 Make your story more interesting by coming up with other words that you can spell with the labeled columns.

LOST IN THE CITY

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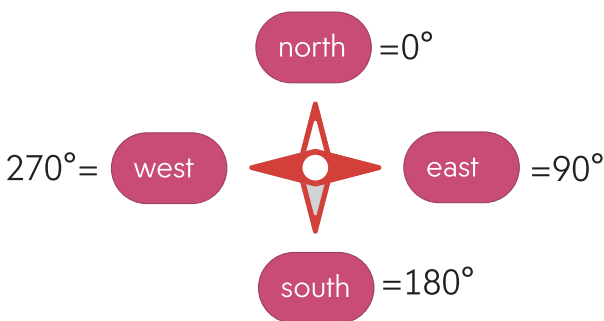
LOST IN THE CITY

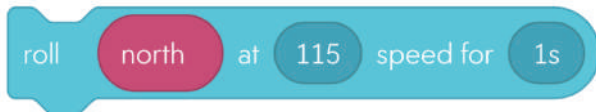**1** Scan the QR code to open the Block program. Choose two landmarks on the Code Mat.

2 Set the number variables at the top of the program to the values shown in the compass rose.
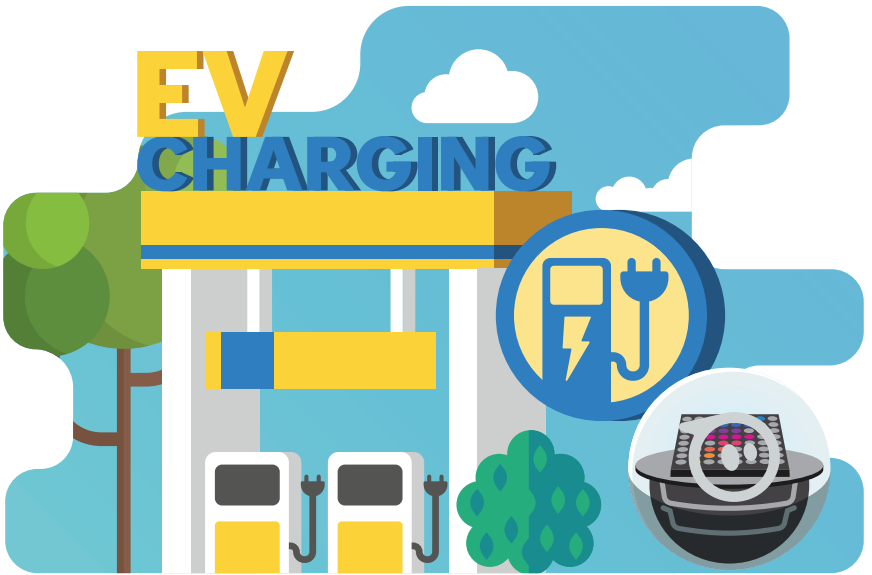
north $=0°$

$270°=$ west

east $=90°$

south $=180°$

3 Drag the direction variables into the heading input on the roll block.

Hint: Find the direction variables in the **Variables** category.

roll north at 115 speed for 1s

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

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.

City Activity 10

Text Program

ELECTRIC VEHICLE

1 Scan the QR Code to open the Text program. Place your robot on the Maker Space.

2 The variable, called batteryLevel, is set to 50 at the start of the program. After every roll command, it decreases by 10. A speak command lets you know how much battery is remaining.

3 Continue the program to get your robot from the Maker Space to the EV Charging Station before its battery runs out!

```
async function startProgram() {
    batteryLevel = 100;
    await delay(0.750;
    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.

Start batteryLevel = 50%

EV CHARGING

Final batteryLevel = 10%

-10%

-10%

-10%

-10%