Project 3.2

Connect the Dots

Age: Elementary, Middle   **Duration:** 25 mins.

Overview

Create a Connect-the-Dot Bot with your robot! In this activity, learners will code the robot to move and turn at more precise angles and distances to create a simple shape.

Objectives

- I can control how far my robot moves and the angle it turns by editing Move and Turn Bocks
- I can code my robot to move diagonally on the grid

Prepare

- Charge Root Coding Robots and open code.irobot. com or the iRobot Coding App on students' devices
- Prepare materials for student groups including a whiteboard grid, dry erase marker, and eraser cloth

Block Spotlight

Intro:

Ask students if anyone has completed a Connect the Dot activity. Let students give examples of Connect the Dot activitites that lead by numbers or letters. By themselves, the dots might not look like a detailed picture, but when you follow a specific sequence to connect them, they can reveal a bigger picture.

Explore:

Draw a dot design on your whiteboard. The example demonstrated is a heart. Keep shapes simple to avoid frustration. The important piece to encourage experimentation.
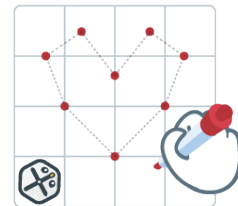
Build a program to code the robot's bumpers to lift and lower the marker.

Program the robot's touch sensors to drive forward, turn slightly left, turn slightly right, and stop. Use the vinyl clings or draw these commands on top of the robot.

Place a marker in your robot, then place the robot near the dot design. Press the Play button to run the program.

Use the touch sensors and bumpers on your Connect-the-Dot Bot to connect the dots in the drawing. Tap the touch sensors to move and turn the robot and use the bump sensors to control when the marker is raised or lowered.

As the robot begins to move and switch directions, it may be challenging for students to visualize where the robot needs to move next. Model each step by thinking aloud, "Which way do I need to turn next?" and ask for solutions. Remember to reference the visual cues on top of the robot to help guide the path. Even if you or students turn or move the wrong way, think through what will get you back in the direction you want your robot to go.
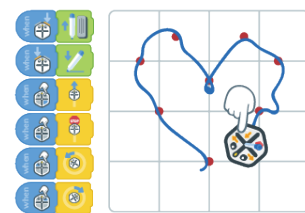
Skill Development:

Divide students into small groups to practice transforming their robot into a Connect-the-Dot Bot. Guide students to unfold their whiteboards. Students will need to first decide on a shape and map it with dots. Then, they will program their robot to become a Connect-the-Dot Bot.

For guided practice, use the following shapes as connect the dot examples:
- triangle
- hexagon
- star

Share:

Let students showcase their Connect-the-Dot shape creations. Did any group decide to program their robot in a different way? What were the success points? What was the most challenging part of the shape to make?

If you use any digital platforms for student work or portfolios, have students take a picture of their final connect the dot drawings. They can upload their photos and write small reflections about their experience, what they would do differently, and how they could improve their precision.

Assessment:

Create a shape with dots and use the code generated with the touch and bump sensors. Let students write out directions on how to connect the dots and reveal the shape.

Cross Curricular Connections

Plotting Points: Preplan the connect-the-dot shape in advance! Give students ordered pairs to practice plotting on graph paper. Then, let them complete the picture with their Connect-the-Dot Bot!

Constellation Connection: Let students research different constellations to recreate with their robot. Map out the stars as dots and code the robot to connect them together. As an extension, students can create their own constellations and complementary stories that represent themselves. Compile the constellations and invite students to connect the dots with the robot.
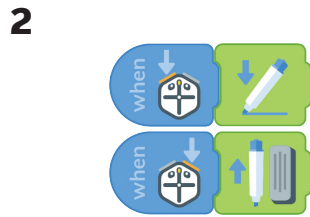
Looking Ahead:

Using your robot to connect the dots helps practice visualizing the robot's movements. One of the new blocks introduced in Level 2 of the iRobot Coding App is the Coordinate Block. This allows coders to tell the robot to go to specific x and y values.
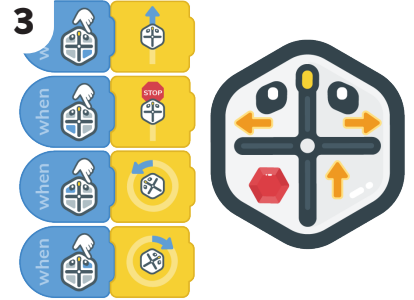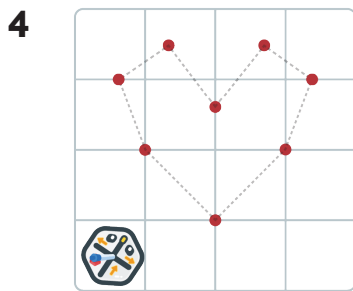
Activity Card: Connect the Dots

1

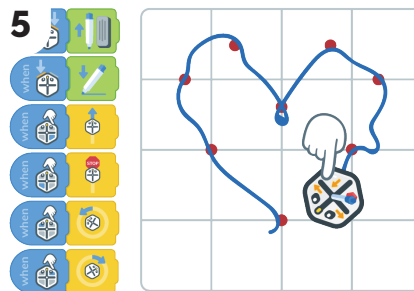Draw a dot design on your whiteboard.

2
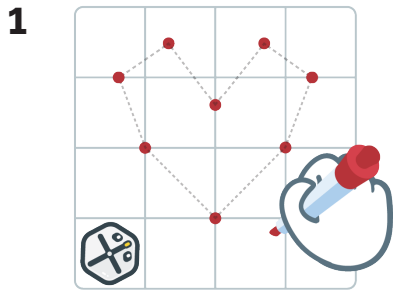
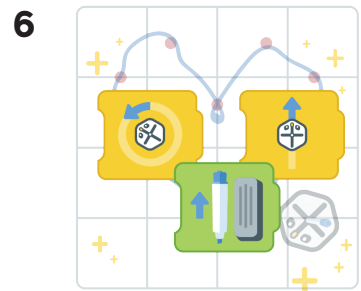Program Root's bumpers to make the marker go up and down.

3

Program Root's touch sensors to drive forward, turn slightly left, turn slightly right, and stop.

4

Place a marker in Root, then put Root on your whiteboard. You've made a Connect-the-Dot Bot!

5

Use the touch sensors and bumpers on your Connect-the-Dot Bot to connect the dots in your drawing.

6

You used the Move, Turn, and Marker Blocks to complete your connect-the-dots drawing!