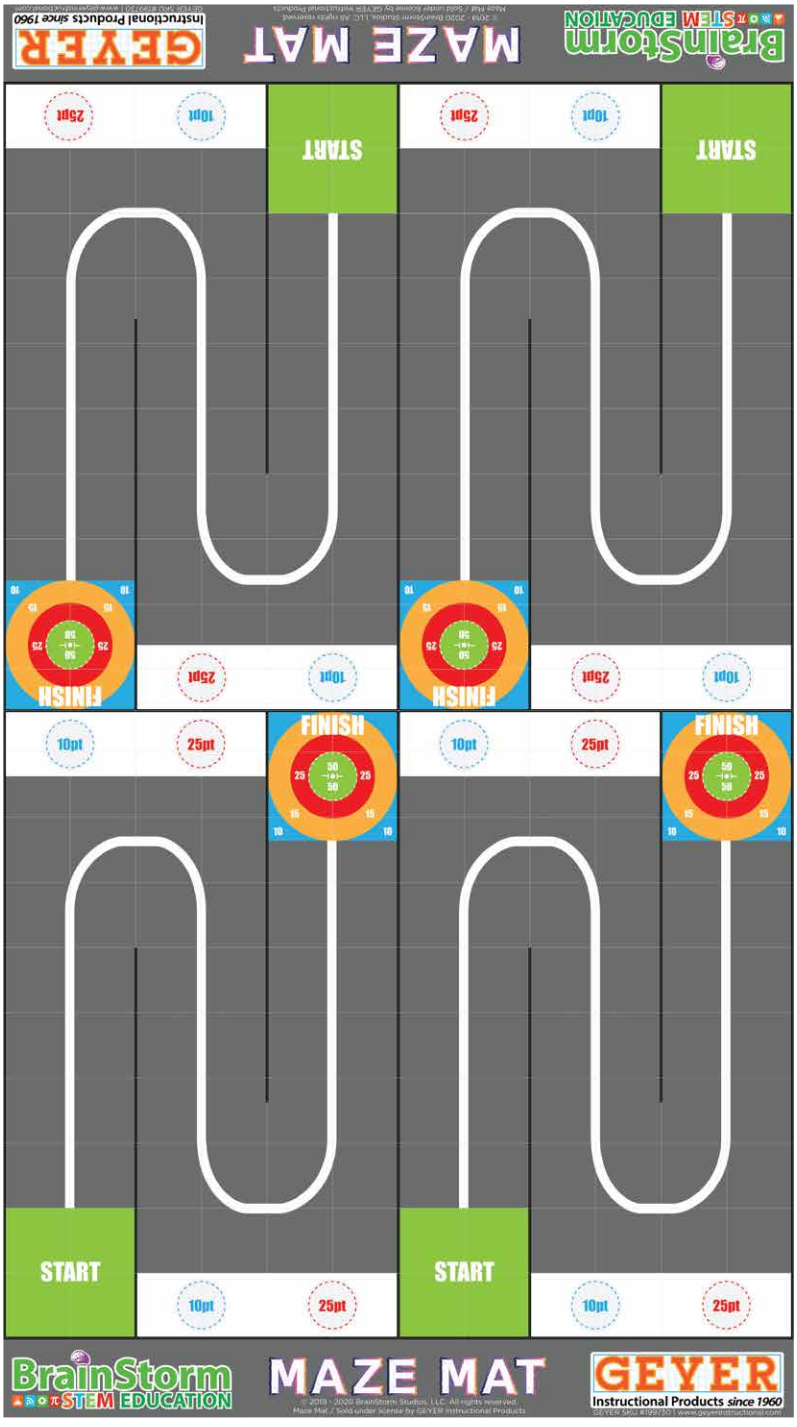
ROBOTIC ACTIVITY MAT

MAZE MAT



Summary: The Robotics Maze Mat is a great first step for students to establish a foundation in programming and robotics while also developing problem solving and critical thinking skills at the same time. This mat is thoughtfully designed with teachers in mind and allows multiple student groups to use the mat simultaneously.

Features:
- Fits up to 8 students
- 3 Activities

Objective: Reach the finish square with the most possible amount of points. Do not cross any black boundary lines.

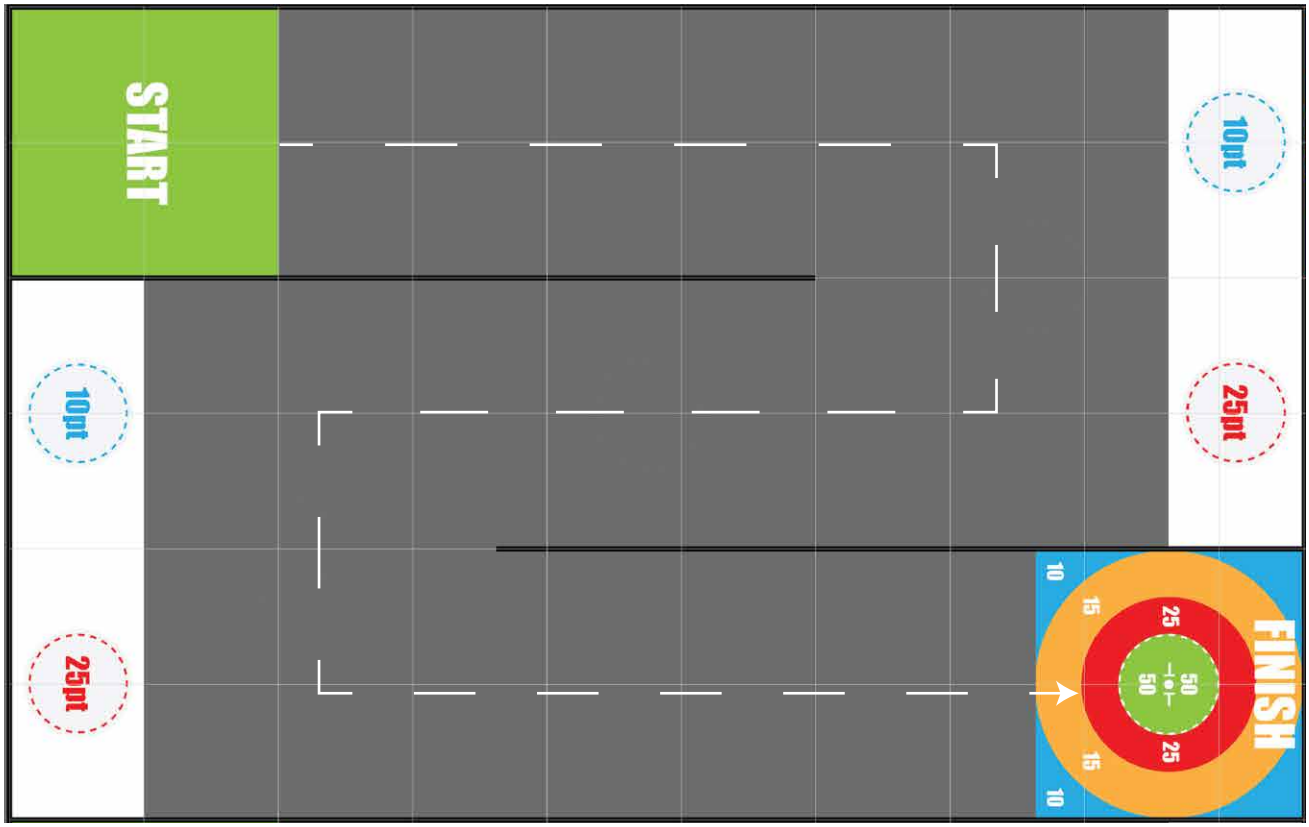
Skills taught: Students will learn Programming, Problem Solving, and Critical Thinking.

Game Pieces(8 Total)**:**

Activity 1 : Distance Based Navigation

Distance Based Navigation

Students will program robots to navigate from the Green START square to the Bullseye FINISH square without touching or crossing any black lines.



How to Use:

1. Place your robot on the Green START square.

2. Program your robot to navigate and avoid touching or crossing any black boundary lines.

3. Land the robot in the Finish square.

The next page features an optional activity worksheet that will help students map out a robots movement along the maze. Students can print out the page and fill in their answers as a warm up activity before beginning programming (see page 3).

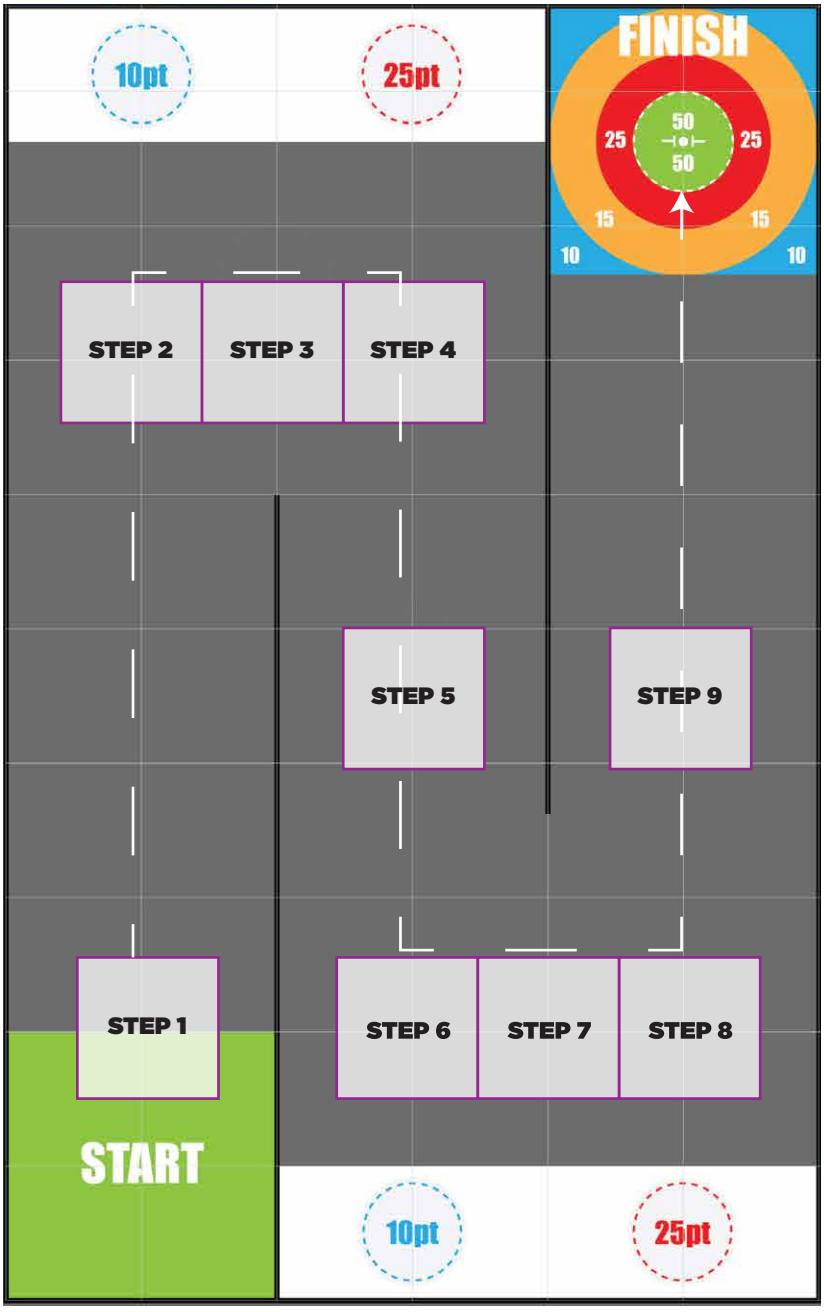
Worksheet 1 : Distance Based Navigation

Distance Based Navigation

Maze Map Activity Worksheet: Fill in the boxes with steps 1-9 below in which direction the robot should move to get to the green FINISH square. Be careful not to touch any black lines!

Robots are preprogrammed with a set of specific instructions. They do not inherently know what to do or learn. If I gave you a potato and called it a tomato, chances are you would correct me and know it was still a potato, but robots are different. They only do exactly what we tell them. We must program and tell them what to do step by step in order to complete a task the way we want them to.

This activity will help you understand how the maze works and how robots need step by step instructions in perfect order to complete a task.

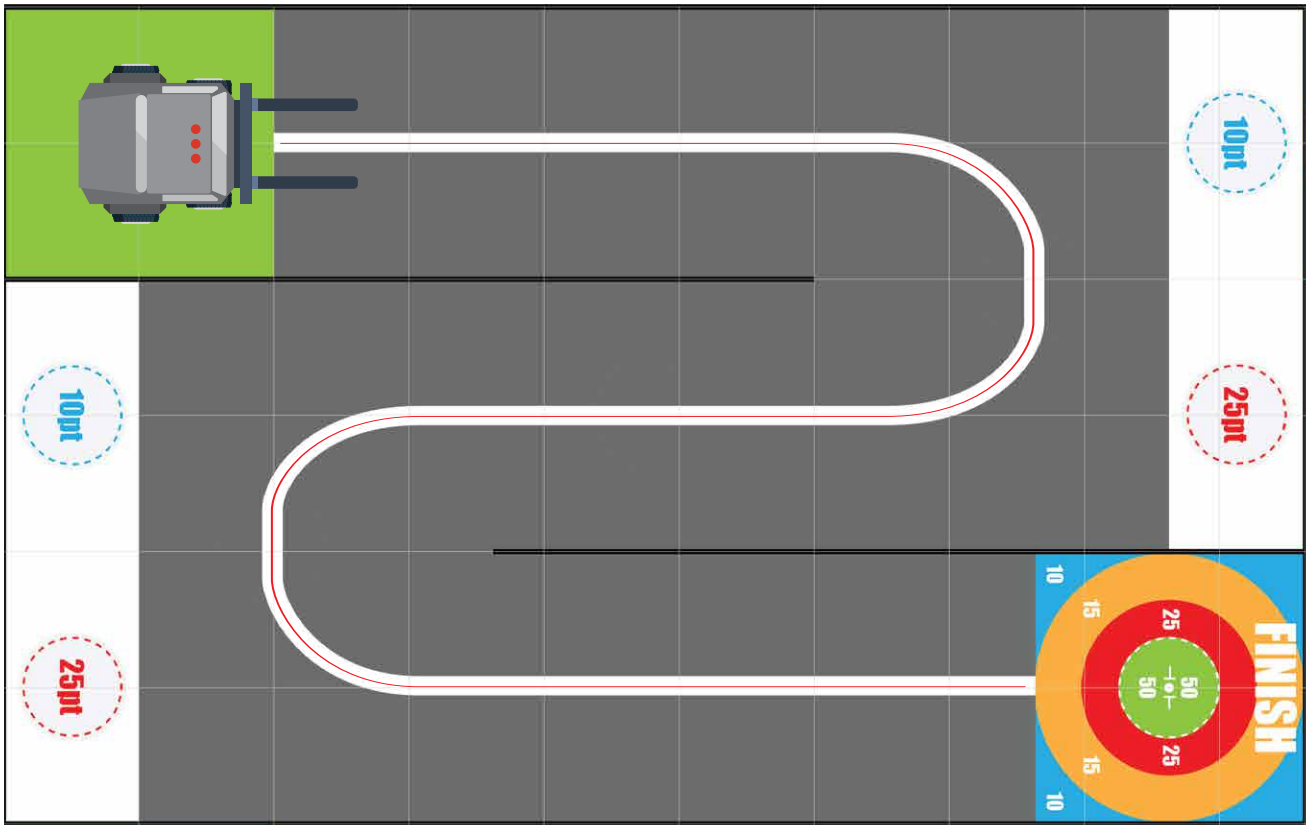


STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7	STEP 8	STEP 9

Activity 2 : Sensor Line Follow

Line Follow Based Navigation

Students will program robots to navigate from the Green START square to the Bullseye FINISH square without touching or crossing any black lines.



How to Use:

1. Place your robot on the Green START square.

2. Program your robot to sense and follow the white line .

3. Land the robot in the Finish square.

The next page features an optional activity worksheet that will help students understands the robots movement along the maze. Students can print out the page and fill in their answers as a warm up activity before beginning programming (see page 5).

Activity 2 (cont.):

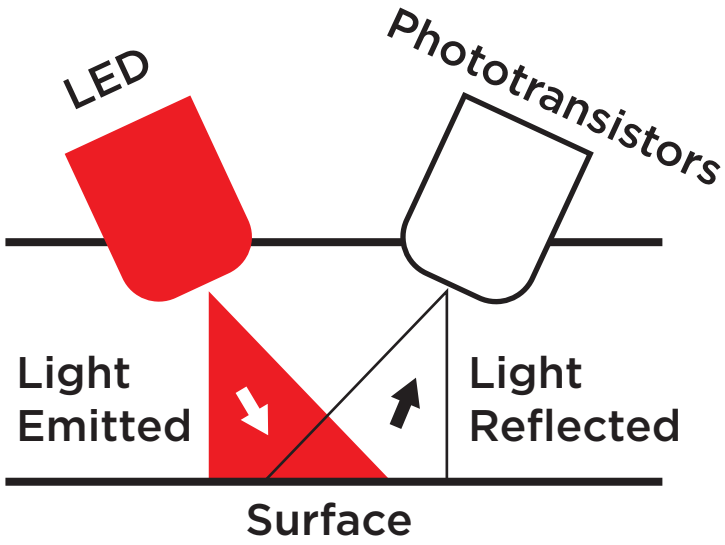
Sensor Line Follow

Phototransistor: a phototransistor is a light sensor that detects and measures the amount of light that has been reflected from a surface.

Most robots are equipped with a light sensor. This sensor is made up of two main electronic components:

1. Red Light Emitting Diode (LED)

2. Phototransistor (light sensor)



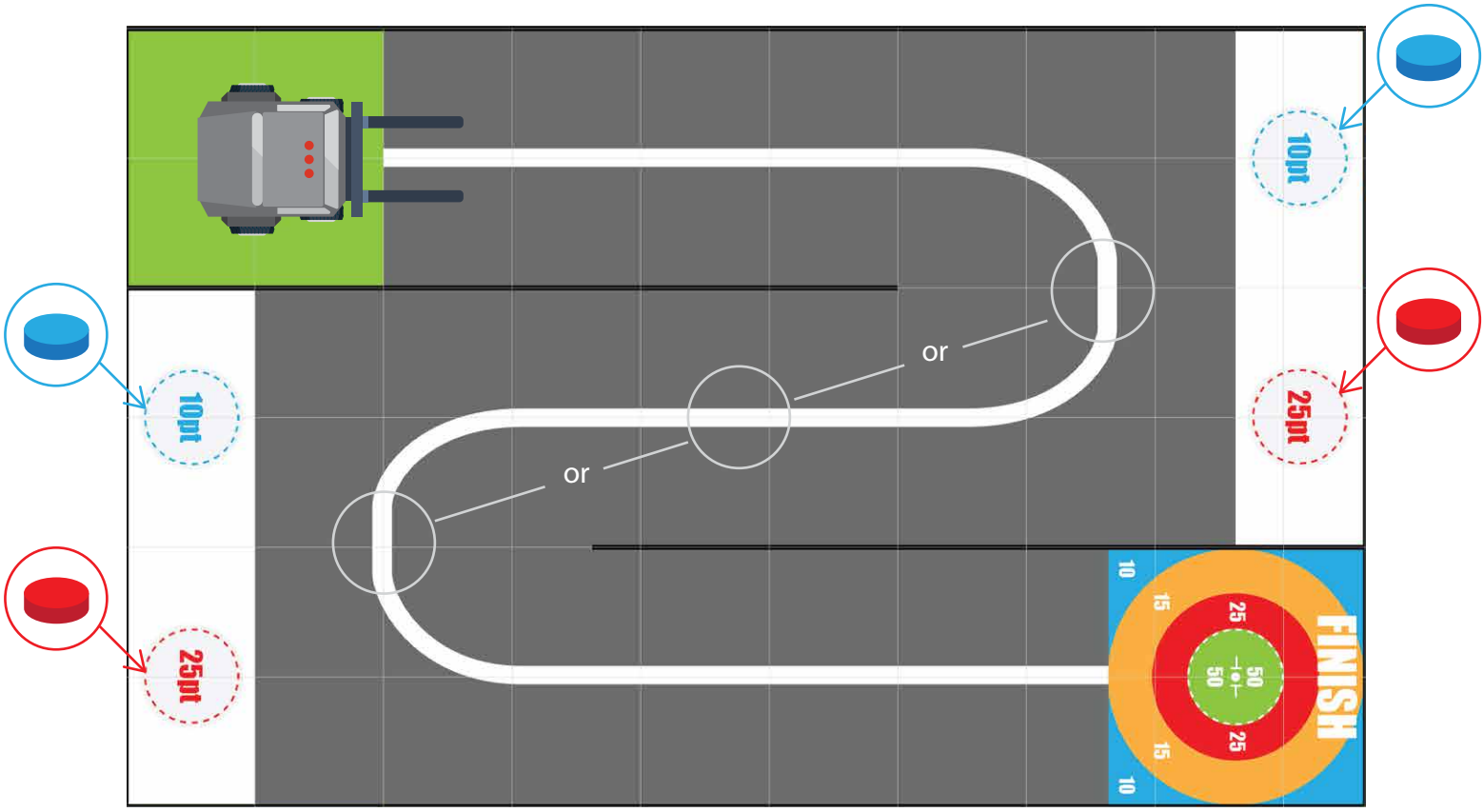
The LED shines light on the surface its driving on and reflects that light into the phototransistor. Try lifting up the robot slightly and have a closer look at the LED light it produces on the surface. Compare how bright the spot of light is when placed on a white surface vs a black surface.

When light is emitted, some of its energy is reflected and absorbed by objects it strikes. White light holds all the wavelengths of the visible spectrum, so when the color white is being reflected, that means all wavelengths are being reflected and none of them absorbed. This makes white the most reflective color. Therefore the phototransistor gives the robot a higher light reading when reflecting off a white surface than on a black surface. A black surface is considered to be 'non-reflective' and a white surface is considered 'reflective'.

Activity 3 : Object Manipulation

Object Manipulation

Students will program robots to pick up and move game pieces using a robotic arm to bring them to the target. The objective is to score the most amount of points in a try. Students have as much time as they, or their instructor allows them to accomplish this objective.



Place 1 red and 1 blue game piece in any of the placements zones shown above. Game pieces placed in the 'Grey zones' are worth 5pts. Game pieces placed in the 'Blue zones' are worth 10pts. Game pieces placed in the 'Red zones' are worth 25pts.

The locations closest to the start are the easiest while the ones closest to the finish are considered hard. For this activity your robot will need a arm to either scoop or push the puck to the finish target. The robot must still avoid crossing any black lines along the way. When you bring the game piece to the target, add the amount of the game piece plus whatever number you landed on in the target range 10-50.