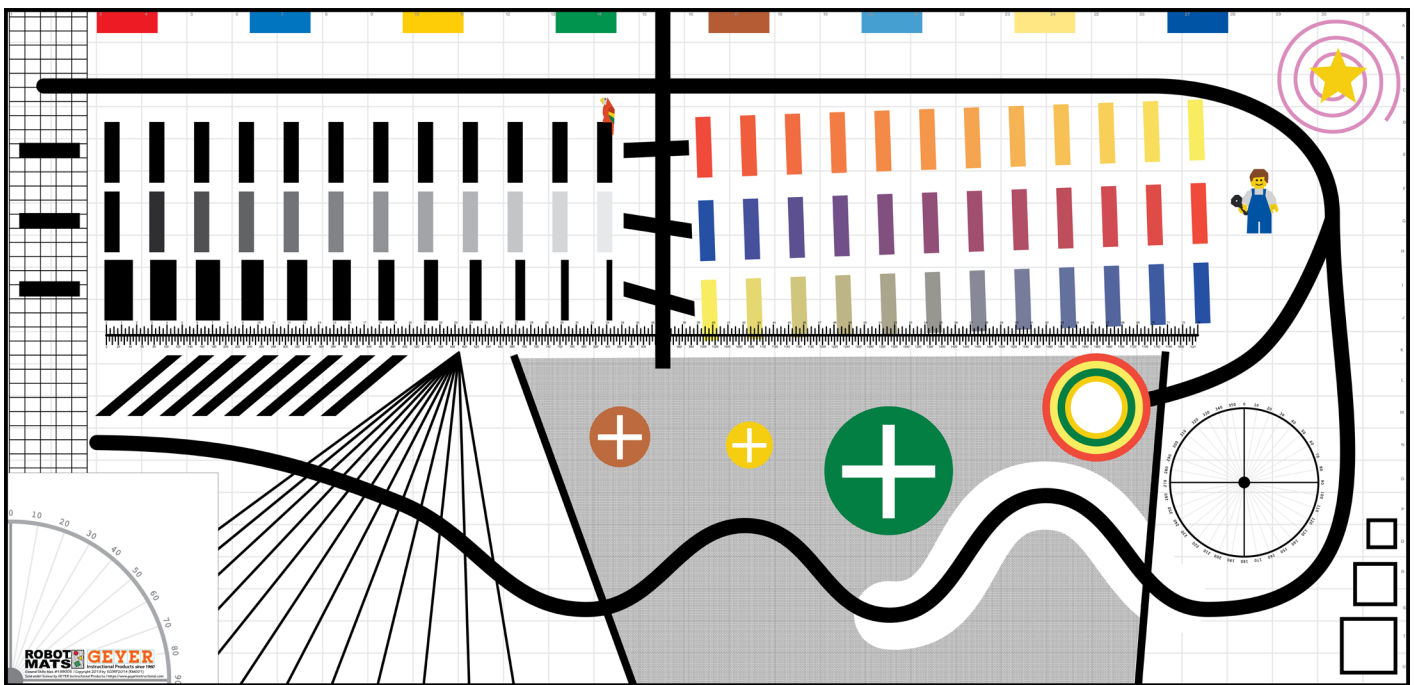


BASIC SKILLS



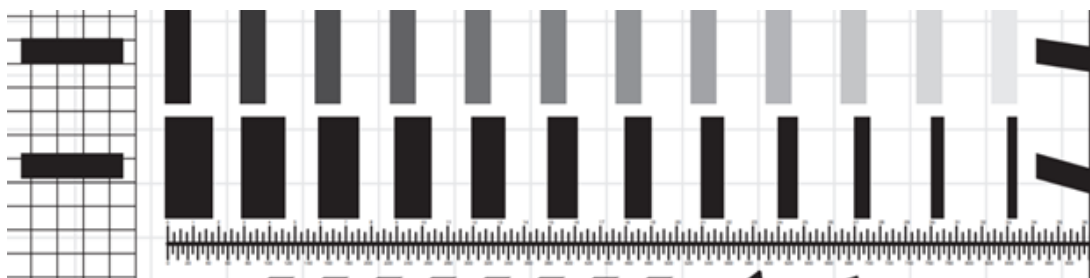
This robotics mat contains every element present in a variety of challenges. Features include varying types of lines, counting blocks in widths and contrasts, a variety of targets, interfering backgrounds, side blocks, aiming compasses, and a 70" ruler (in US and Metric).

One of the most crucial aspects of learning how your robot operates is to understand its movements. This mission packet offers different challenges to help you understand how your robot moves, turns and stops. You'll practice straight moves and turns. You'll program with power levels and time differences. At the end of your time on this mat, you'll be a robot programmer!

SKILL 1 - BASIC DRIVE STRAIGHT

Distance Challenges – 12", 24" 36" , 48" and back to starting position

Use the blocks on the left side of mat as your starting positions. Distances are listed by the ruler in the center of the mat. (Zoomed image below)



Can you move your robot an exact distance using the power levels?

1. Set your robot to 100% power for 5 seconds. How far did it go? _____
2. Program your robot to run the power levels at the time intervals below. Start your robot at 0 on the ruler and measure the distance that your robot travels at each power level.

	100% Power	75% Power	50% Power	25% Power	10% Power
2 Seconds					
5 Seconds					
10 Seconds					
12 Seconds					
15 Seconds					

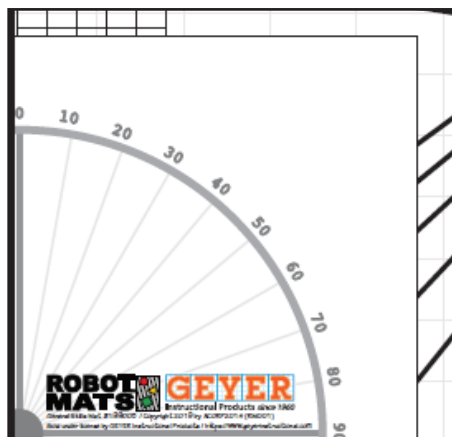
3. Explain how this chart would aid you in programming your robot to solve a big challenge like in a robot competition.

How do I program my robot to move an exact distance?

1. Define "circumference."
2. How will knowing the circumference of my wheels affect how I program when I use "rotations" in the programming block?
3. Power Level is represented as a percentage. Percentage of what? Why is that important?

SKILL 2 - PROGRAMMING BASIC ACCURATE TURNS

Attachment - use an axle sticking out on the left side of the robot, place robot in the compass section of the mat.



Use compass on mat to practice turning with degrees. 20° , 45° , 60° , 90° .

Use the chart below to draw the program block that you used to accomplish the turns.

Degrees Turned	20°	45°	60°	90°
Program Block				

Now, use your knowledge of degrees to make other degree turns. Use the chart below to draw the program block that you used to accomplish the turns.

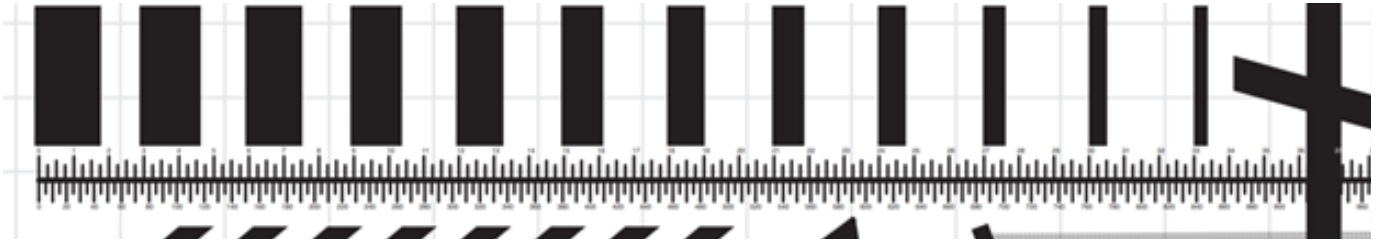
Degrees Turned				
Program Block				

How does the power setting affect how your robot turns?

SKILL 3 - STRAIGHT MOVE AND TURN

The 3 Foot Challenge

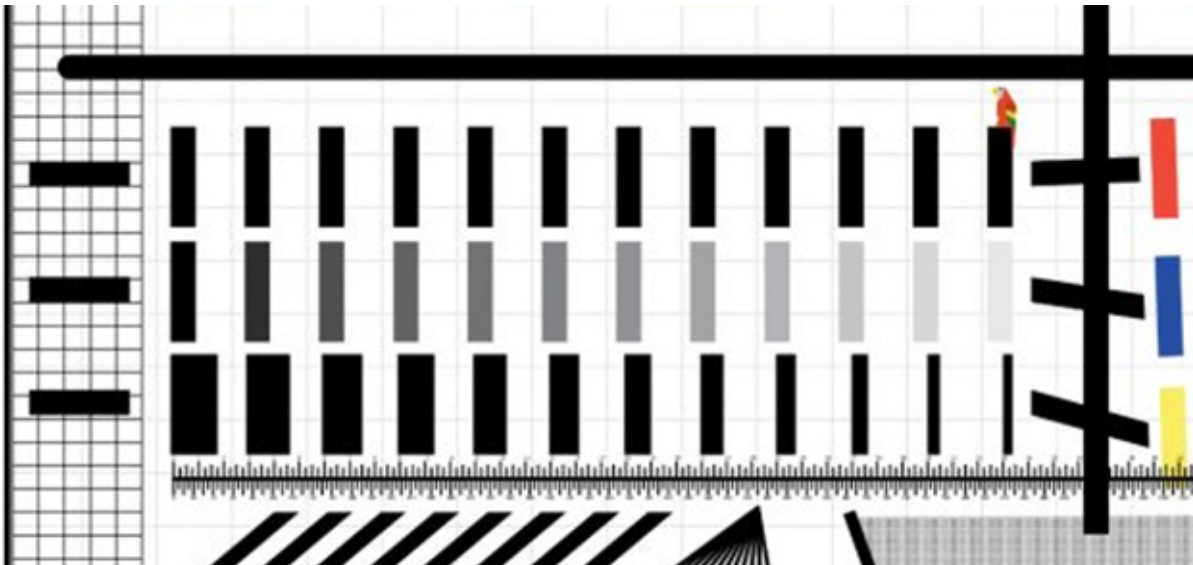
Program your robot to run 36" along ruler, turn 180° and return. (As a bonus, build a wall out of blocks and set it at the 3' mark.) Can you program your robot to touch the wall without knocking it over?



Draw your program block(s) here:

The Out and Back

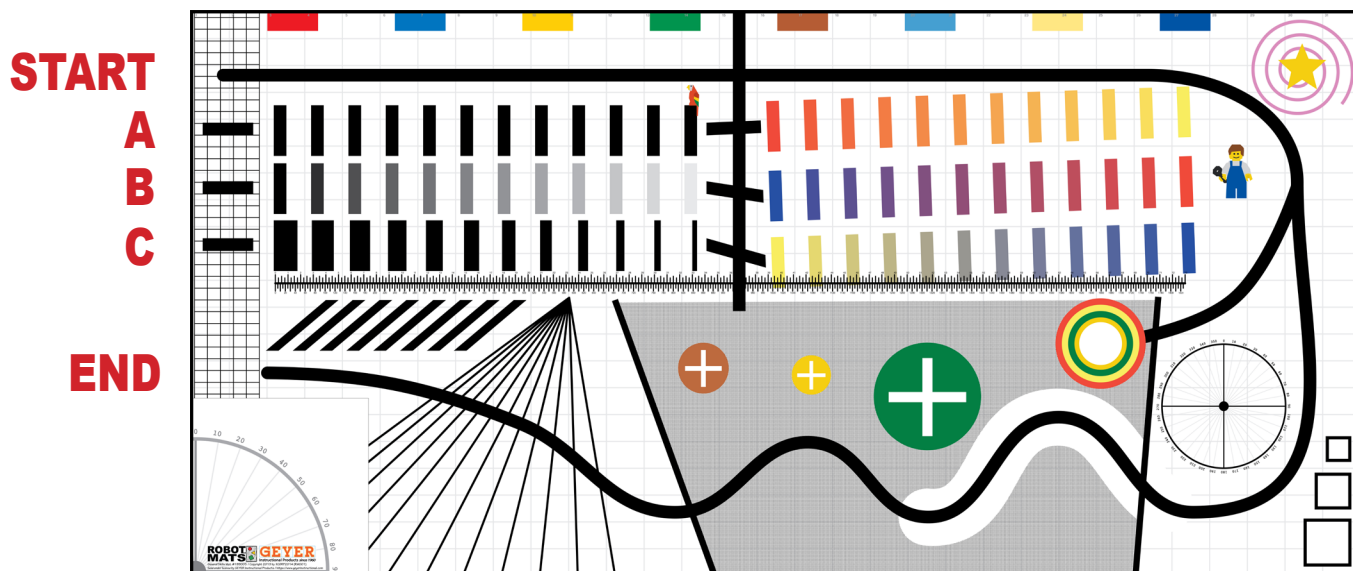
Program your robot to follow the black line on the mat. Start in the grid area, follow the line, make a 90° turn to the right, go to the end of the line, then return back to where you started.



Draw your program block(s) here:

SKILL 4 - USING SENSORS

Use sensors and program your robot to complete the challenges below.



Line Follower

Using a light sensor, program your robot to follow the black line on the robot mat.

Verbal Skills - Explain to a “non-robot programmer” how you programmed your robot to follow the line?

Color Sensor

Attach the color sensor to your robot. Program your robot to start at lines A, B, or C (indicated above) and stop on various colors on the mat. (EX: Start at line A. Stop at Red block on the mat.)

Bonus - Insert a Loop Block with a Wait Block, program the robot to look for multiple colors on the mat on one outing.

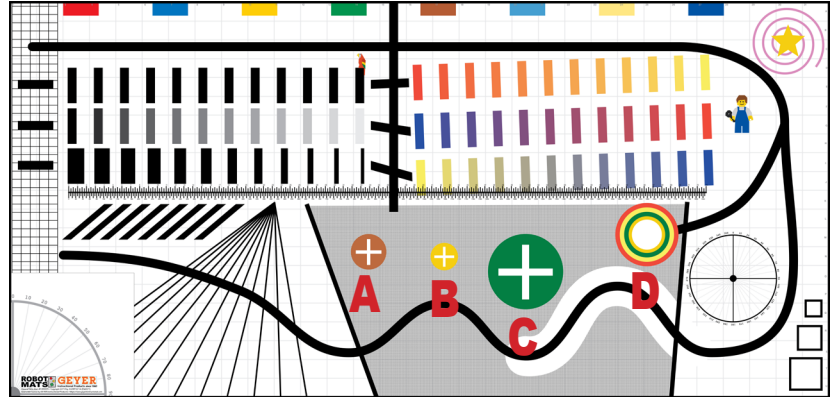
Draw your program block(s) here:

SKILL 5 - PROGRAMMING

In the directions for the challenges below, you will see markings added on the mats that are not on the actual mat. Please refer to the first image in this document for a true visual of the mat.

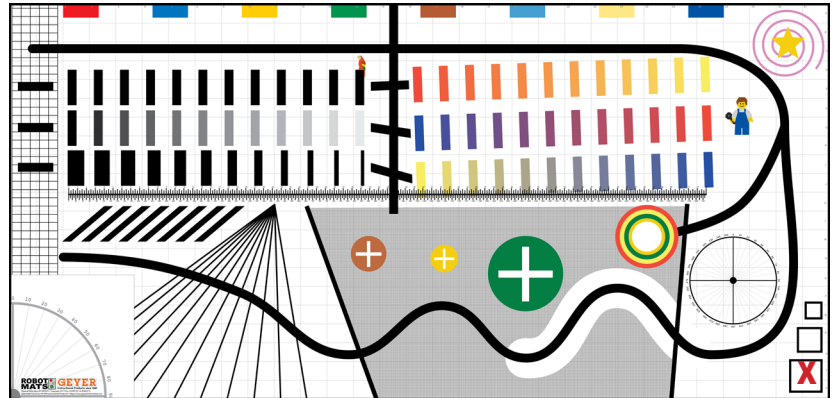
Planting Flowers

Using different colored blocks/builds to represent flowers and trees, program your robot to take those “flowers and trees” from Home Base out to circles A-D.



Bring It Back Home

Program your robot to retrieve an item placed in the bottom right hand corner of the mat (designated with an “X”.) The item can be a stack of blocks, a minifig, a build with a hoop at the top...the possibilities are up to you.



Clean Up the Debris

Place blocks (4 x 4 Lego® size, round or square) around the gray area of the mat. Build an attachment and program your robot to gather the debris and bring it back to HOME.

