OZOBLOCKLY SKILLS 1
SHAPE TRACER 1

PREPARED FOR OZOBOT
BY LINDA MCCLURE, M. ED.

ESSENTIAL QUESTION
How can we make Ozobot move using programming?

OVERVIEW
The OzoBlockly Shape Tracer games (games.ozoblockly.com) will teach how to use the OzoBlockly language and the drag-and-drop code editor. Students who have had experience with Blockly or Scratch, and those who have not, will enjoy all levels of the tutorials. The practice will prepare students to create their own programs, load the program onto Ozobot and run the program.

Students learn how the movement and LED blocks tell the robot what to do. They also learn "Flash Loading", which is a special way to upload a program to an Ozobot, and an important Ozobot skill, calibration, but this time to a digital screen. Finally, students will switch to the OzoBlockly editor (ozoblockly.com/editor) to create their own game level. Groups can optionally play the unlocked Shape Tracer game (attached).

You and your students may notice bit, and to a lesser extent evo, veer off a straight line while running Free Movement programs. Students learn to make the bots more accurate in OzoBlockly Skills 4 and 5.

LESSON OUTLINE

1. In Shape Tracer 1, students learn OzoBlockly concepts by playing levels 1-10.
   Concepts:
   - Visual programming basics
   - Movement forward
   - Turn or rotate
   - Setting LED colors
   - Loading Ozobot and running the program
2. Students will write their own tutorial level 11 in the OzoBlockly Editor.
3. (Optional) Play the unlocked Shape Tracer board game (attached).

PREREQUISITES
Students should be familiar with care and calibration of the Ozobot Bit and Evo, but no prior knowledge of coding is required.

GRADE LEVEL
Grade 2 and up. Older students may move more independently through the levels of the tutorials. The tutorials are appropriate for all levels to learn the OzoBlockly programming language.

GROUPING
Individuals or groups of two or three students

MATERIALS
- Tablet or computer to access Ozobot Games http://games.ozoblockly.com and the OzoBlockly editor http://ozoblockly.com/editor
- Ozobot **Bit** or **Evo**, 1 per group or individual
- Student Handout, 1 per student or group
- Optional: printout of the unlocked Shape Tracer 1 Game, one per group

OZOBLOCKLY PROGRAMMING TOPICS
Free Movement, Light Effects

OZOBLOCKLY MODE
Mode 2 or higher

DURATION
45 - 55 minutes

VOCABULARY
- *Ozobot Bit or Evo* - Little robot that can follow drawn lines or be programmed using visual codes or through the OzoBlockly programming language
- *OzoBlockly* - A visual editor which allows to create programs by plugging blocks together. The blocks can be used to control Ozobot's behavior like movement, LED lights, etc.
- *Rotate Right or Left* – Approximate 90° turn
- *Rotate Slightly Right or Left* – Approximate 45° turn
- *Steps* – a unit of movement forward
- *Line Following* – Ozobot's default capability of sensing and following lines on paper or digital screens

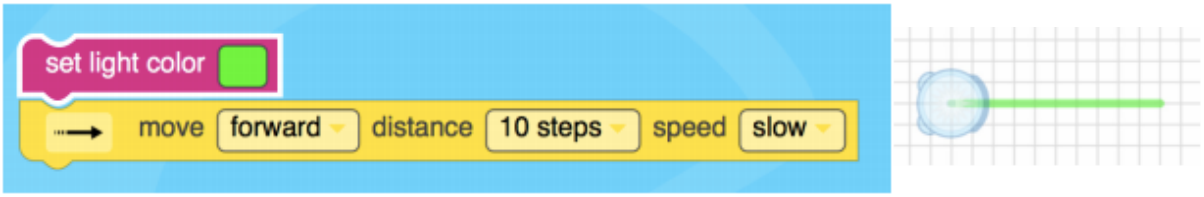
QUESTIONS ABOUT THIS LESSON?
Please contact us at ozoEdu@ozobot.com

LESSON

1. GUIDED CLASS ACTIVITY

LEVEL 1

With all students on Level 1, guide them through the interface. First, the Goal pop-up tells students what they have to do. The image on the right is the simulator, and the simulated Ozobot must trace the line exactly. To build the program, click the left category menu, then the block you want. The blocks must click together to create a program. Students can click the drop-down menus or color squares in the blocks to change the settings of each block. To run the program in the simulator, click "Run" under the simulator window.



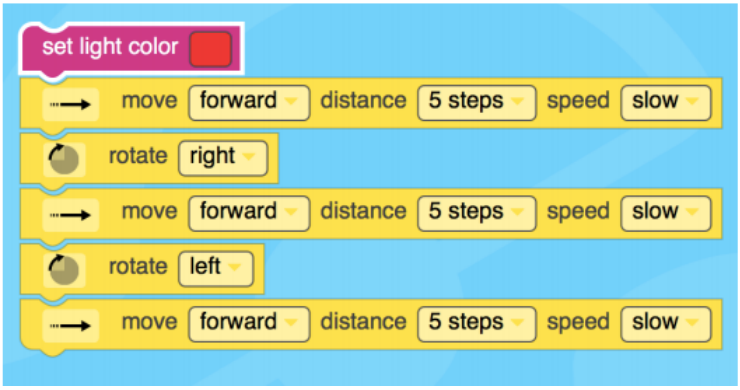
LEVEL 2

Explain that Ozobot can make turns. For this we use the "Rotate" block found in "Movement".

Have the students experiment with movement and rotation. Question the students, "how far does the Ozobot move when programed to turn a "slight left" versus a "left" turn?"

Discuss 45° rotation versus 90° rotation. Challenge the students to find how many degrees are in a U-Turn.

Students solve level 2:



LEVELS 3-10

You can choose to introduce how to load these programs onto students' bots.

Once students have found the solution, walk through calibration to the screen, Flash loading, and running the loaded program:

- **Calibration**: hold Ozobot's power button for 2 seconds (until it blinks), then set the bottom onto the white bot outline on the screen where Flash Loading takes place. If it's successful, Ozobot blinks green. Try again if it was red.
- **Flash Loading:** Turn your bot back on and place it on the white outline. Click "Load Ozobot". When it's working, the bot flashes green while loading. If it flashes red, start over.
- **Run Program:** Double-click the power button while the bot is on to run the program on the bot.

You won't need to calibrate to the screen once you've done it once. It's best to do it when you begin a session, or if you also have to calibrate to paper during your session (if you're line following or detecting surface colors).

Refer to the OzoBlockly Getting Started Guide (http://files.ozobot.com/stem-education/ozoblockly-getting-started.pdf) for all of the information on calibration and troubleshooting. Click the "Help" button under the simulator for more information on how to flash load a bot. **Students can complete the rest of the levels on their own.** Solutions are attached to this lesson.

2. INDEPENDENT ACTIVITY

OBJECTIVE

Students will write their own Level 11.

PROCEDURE

Students now have a chance to create a new level with ozoblockly.com/editor. Give students a copy of the attached student handout.

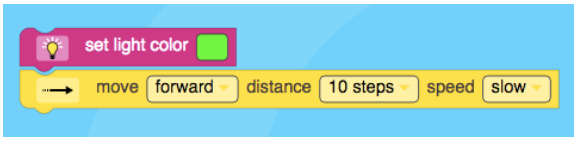
3. OPTIONAL - SHAPE TRACER GAME

PROCEDURE

Give each group of students a copy of the Shape Tracer game attached to this lesson. Students can read the rules and cut out the game cards and pieces. This activity could also be another class session.

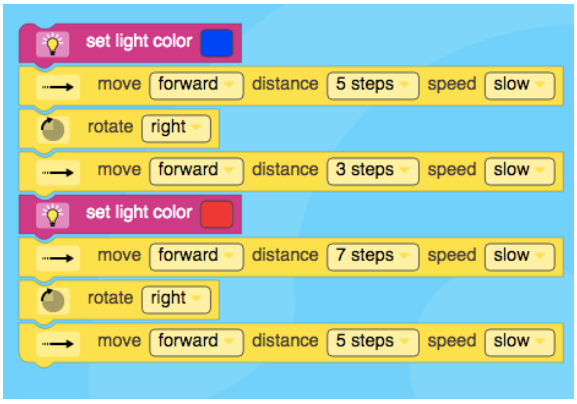
ANSWER KEY

Level 1

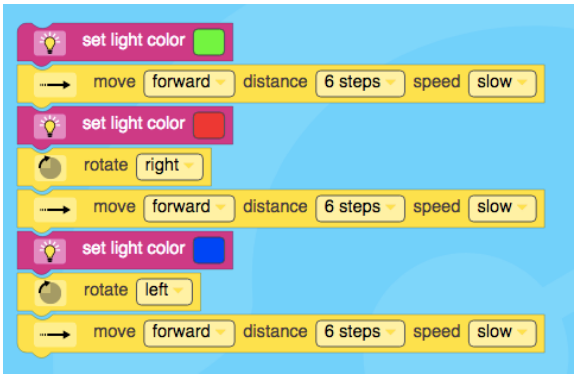


Level 2

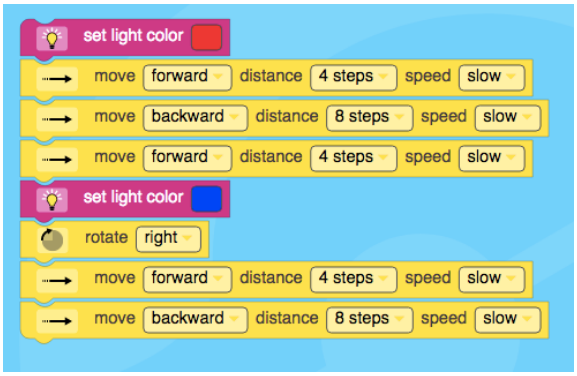
Level 3



Level 4

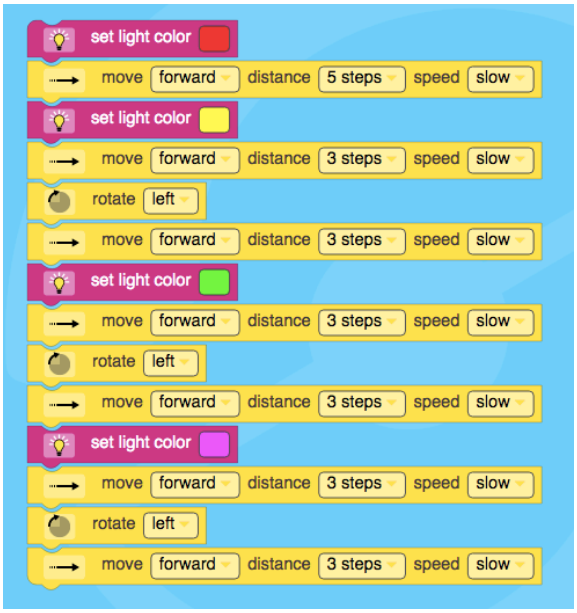


Level 5

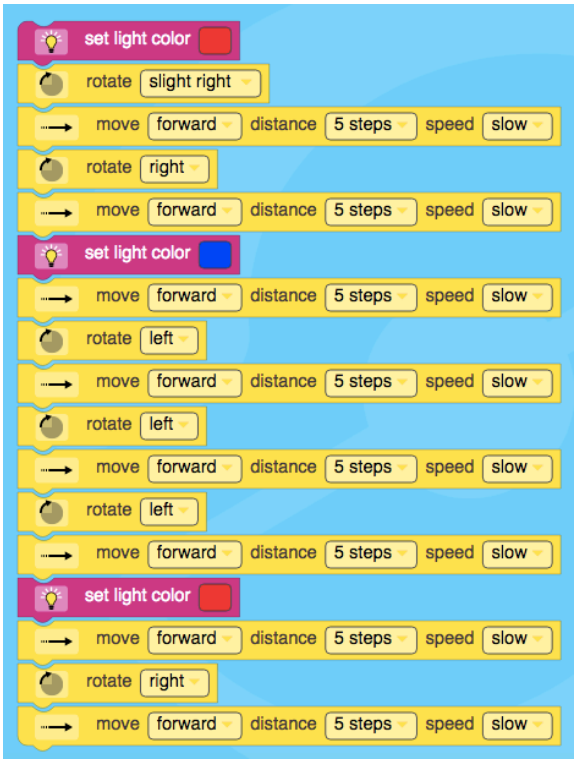


Level 6

Level 7



Level 8



Level 9

Level 10

STUDENT HANDOUT
CREATE A SHAPE TRACER 1 LEVEL

RULES

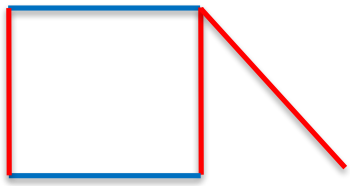
1. Sketch a path in the box below to be the basis of Level 11. The path should be slightly more difficult than levels 1-10. Check out the example for ideas.

   Requirements:

   - The path should change colors at least twice.
   - Bit or Evo should have to double back on at least one path to win.
   - The turns must be 45°, 90°, 180° or a combination of these.

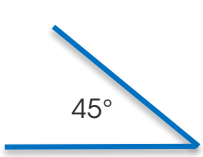
2. Go to ozoblockly.com/editor on a computer or tablet.
3. Choose "Bit" or "Evo" below the OzoBlockly logo (see right).
4. Choose "Beginner" (2) or "Intermediate (3)" modes
5. Write the program.
6. Test the program with your Bit or Evo and fix any problems (bugs).

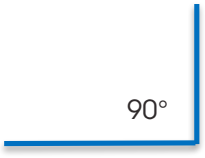
   Note: Your Bit or Evo may swerve a little bit off a straight line. Don't worry, that's normal. In future lessons you will learn how to help that.

Example	
	
Set LED blue	
Forward 5 steps	
Rotate Right 90°	
Set LED red	
etc…	

Some commands:

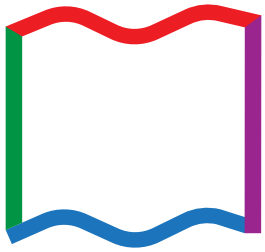
Forward ____steps
Rotate Left/Right (90°)
Rotate Slightly Left/Right (45°)
Rotate U-turn Left/Right (180°)
Change Color to _____





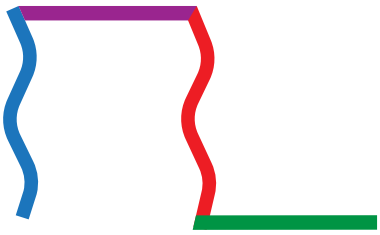
Shape Tracer Cards: Cut along dotted line

Shape Tracer B3 Ozobot.com



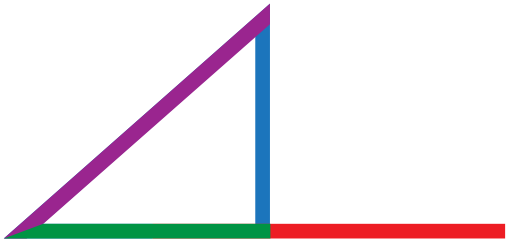
Ozobot.com B3 Shape Tracer

Shape Tracer B1 Ozobot.com



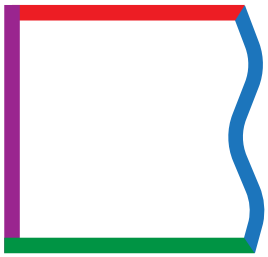
Ozobot.com B1 Shape Tracer

Shape Tracer B4 Ozobot.com



Ozobot.com B4 Shape Tracer

Shape Tracer C4 Ozobot.com



Ozobot.com C4 Shape Tracer

Shape Tracer

Ozobot.com

Be the fastest to identify the shapes and score the most points!

Instructions:

- First, choose one player to act as the programmer. This player will need to know and use OzoBlockly. (OzoBlockly.com)
- Everyone else chooses a player number.
- The programmer chooses a random Shape Tracer card without showing the group. They then recreate that shape using OzoBlockly, and load to Ozobot.
- Players gather around the Game Mat with their player number cards ready. When the programmer runs Ozobot, players will have to guess what shape Ozobot is creating by putting their player card on the correct shape.
- Watch Out! Once your card is placed, you can not change your answer!

Scoring:

- The first person to place their card on the correct answer wins 2 points, all other correct answers win 1 point.
- If no players get the correct answer, no points are given.
- The first player to reach 7 points, wins!

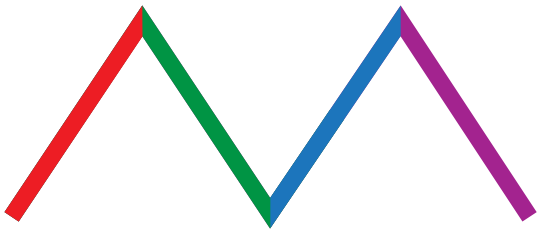
Optional Gameplay:

- Each player card has 2 colors on it. If the first color Ozobot uses for each shape matches a color on your player card, you get a point!

Play Shape Tracer 2 to unlock even more printable gameplay!

Shape Tracer Cards: Cut along dotted line

Shape Tracer C2 Ozobot.com

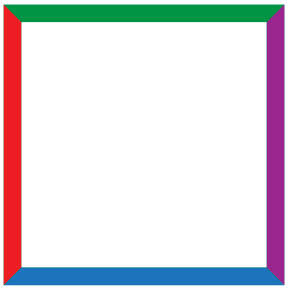


Ozobot.com C2 Shape Tracer

Shape Tracer A2 Ozobot.com

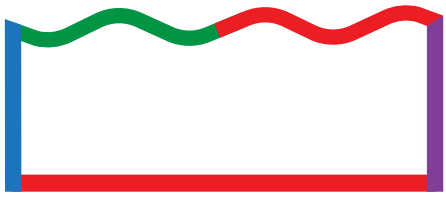
Ozobot.com A2 Shape Tracer

Shape Tracer A1 Ozobot.com



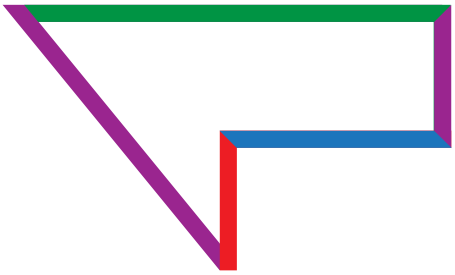
Ozobot.com A1 Shape Tracer

Shape Tracer A3 Ozobot.com



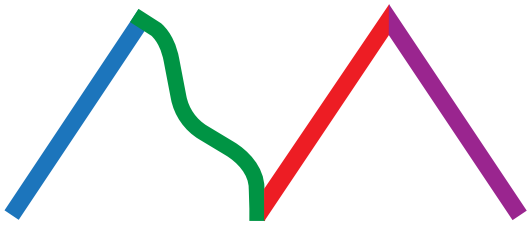
Ozobot.com A3 Shape Tracer

Shape Tracer B2 Ozobot.com



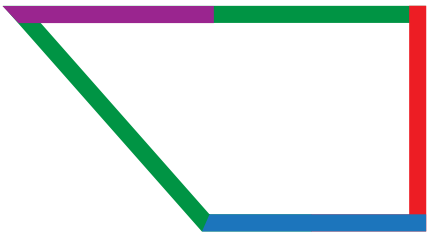
Ozobot.com B2 Shape Tracer

Shape Tracer A4 Ozobot.com



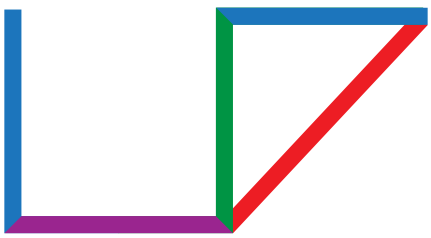
Ozobot.com A4 Shape Tracer

Shape Tracer C1 Ozobot.com



Ozobot.com C1 Shape Tracer

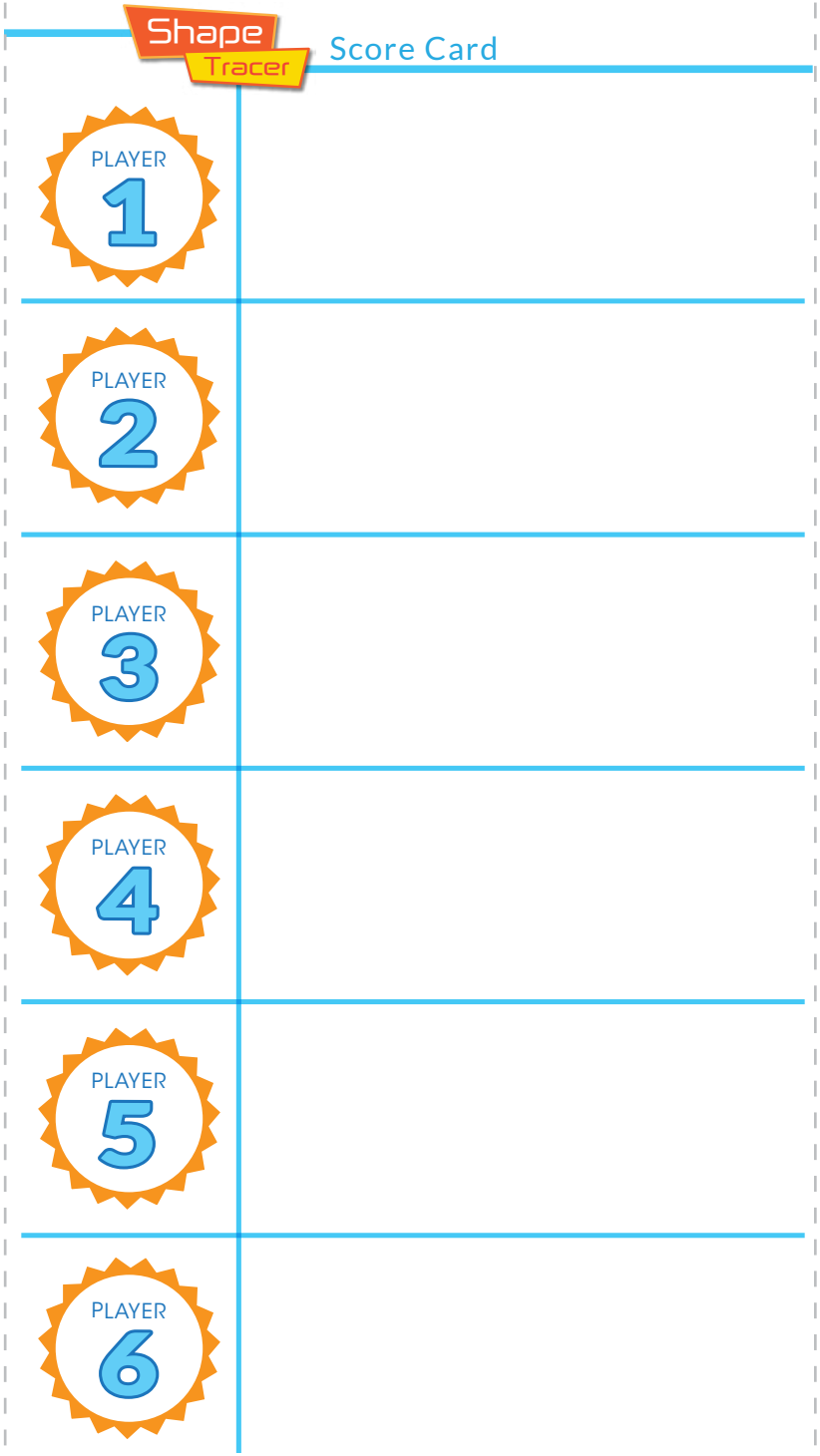
Shape Tracer C3 Ozobot.com



Ozobot.com C3 Shape Tracer

Player Cards: Cut along dotted line

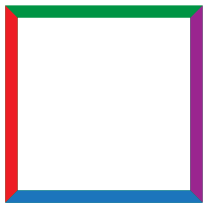
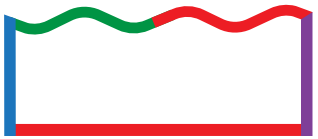
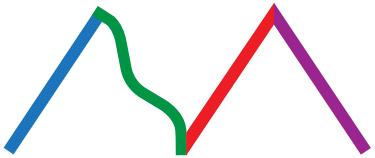
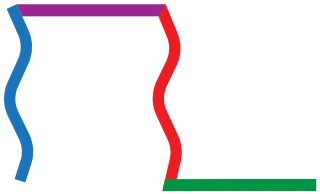
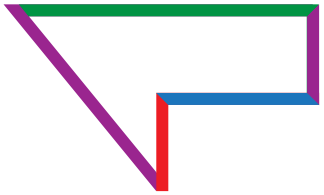
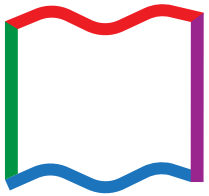
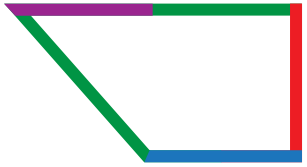
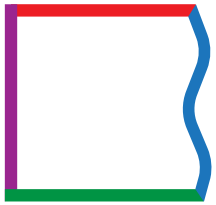
Score Card: Cut along dotted line



Shape Tracer

Game Mat

Ozobot.com

A1  A1	A2 A2	A3  A3	A4  A4
B1  B1	B2  B2	B3  B3	B4 B4
C1  C1	C2 C2	C3 C3	C4  C4

Ozobot.com

Game Mat

Shape Tracer