

Lesson 3.3: Drawing Shapes

Objectives

In this lesson, students will:

- ❖ Learn to use the pen in Scratch to draw shapes
- ❖ Gain an understanding of the X / Y coordinate plane
- ❖ Be introduced to modularization and abstraction by incorporating small shapes to create new composite shapes.

Agenda

1. Drawing in Scratch	10 mins
2. The X/Y Coordinates	10 mins
3. Student Activity	20 mins
4. Wrap Up and Reflections	10 mins

Resources & Links

- ❑ Starter project:
<https://scratch.mit.edu/projects/259629539>

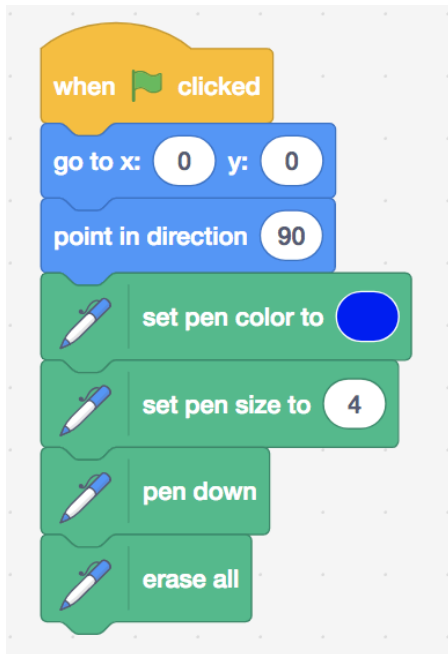
Preparation

- ❑ Computers connected to the internet
- ❑ Print student activity worksheet (one per student pair or one per student)

1. Drawing in Scratch

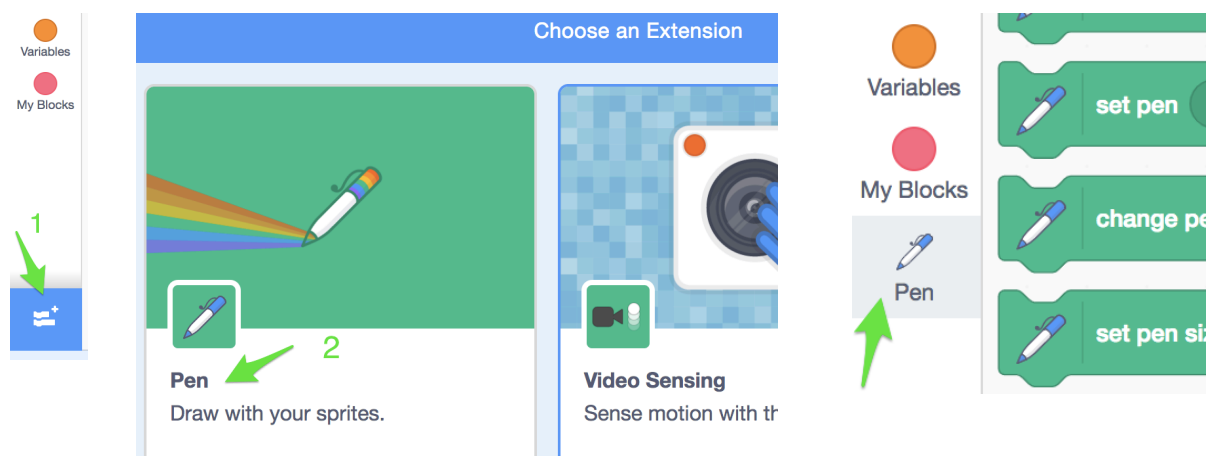


Display your screen and engage students in your demonstration and instruction of drawing in Scratch:

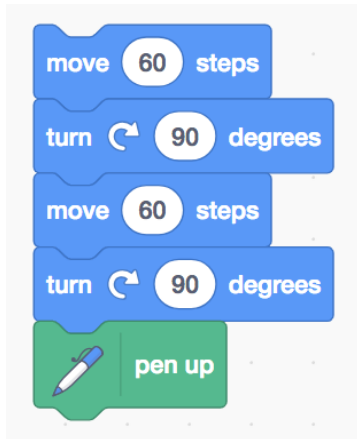


To explore the Pen in Scratch, display the following code and explain what it does line by line.

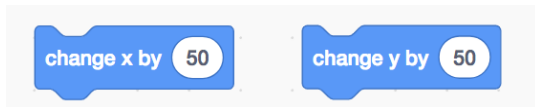
The Pen is an extension in Scratch that you add into your categories by clicking on the + icon at the bottom and then choosing the Pen extension.



Now add (snap to previous code) the following code and explain the additional instructions and run it to show what happens.



Ask students to explore drawing with the pen in their Scratch accounts. Prompt them to experiment with pen size, pen color and additional motion instructions, in particular:

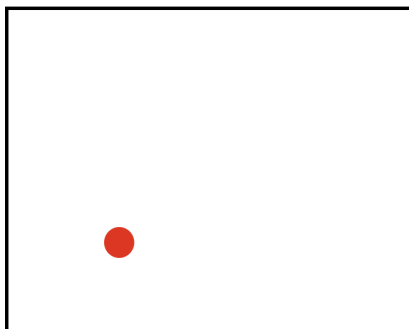


2. The X / Y coordinates



To help with understanding of the X/Y coordinate plane used extensively in Scratch, the following or similar role playing exercise is helpful.

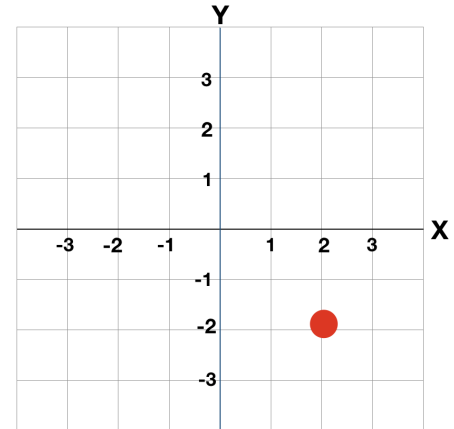
- Ask 2 student volunteers to come forward. Ask student A, the guesser, to turn away from the drawing board and close their eyes. Student B draws a large square on the board and a small circle or dot somewhere inside it, not the middle (see illustration).



Student A, the guesser, looks the other way.

Student B draws a circle inside a large rectangle on the board.

- Ask student B, the describer, to remember where the circle is located and erase the circle. Student B must now describe to student A where to draw the circle inside the large square without pointing at anything. Typically the location given is not very close to the original location.
- Next draw simple X and Y coordinate lines with marker numbers on both lines as shown and explain briefly what an (x,y) value is and where an example value pair would be located
- Ask 2 new students to repeat the exercise, but this time taking advantage of the help of our new x and y lines.



The (x, y) coordinates display a sprite's position on the stage. It could be helpful to change the backdrop to the X,Y grid (**All** categories at the very end when creating a new Stage).

Moving the cat around with the cursor, or simply moving the cursor around the stage shows how the X and Y values on the bottom right of the stage change depending on the cursor's location. The *goto* instruction under the motion category also displays the X / Y values of the sprites location.



The x-coordinate determines the sprite’s position on the horizontal axis (left or right position)

The y-coordinate determines the sprite's position on the vertical axis(up or down position).

3. Student Activity: Drawing Shapes

In this activity students explore and discover drawing new shapes using and navigating the X/Y coordinate plane. Have students work in pairs observing pair programming conduct.

Distribute the activity worksheet, one per student pair. Follow up with reflection questions.



Instructions to give to students:

1. In this activity, you will remix a starter project that draws a square when the **s** key is pressed and a triangle when the **t** key is pressed.
2. Explore and discover drawing new shapes in different locations using existing shapes.

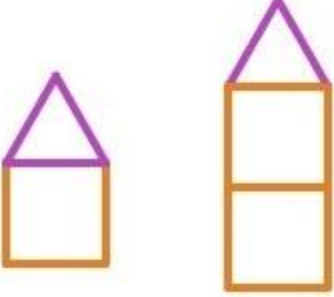
4. Wrap Up and Reflections



Reflection Points:

- What did you like about today’s activity?
- Did you reuse the existing shapes from the starter project?
- Did you write new code for each shape in the activity ?
- What did you like about this activity?

Student Activity: Drawing Shapes

What to do:	Using/Details:
<p>Remix and save using your project name</p>	<p>259629539</p>
<p>Run the project.</p> <p>Discuss with your partner what the code does. The go to determine where the shape is drawn.</p>	
<p>Draw each of these shapes.</p> <p>Remember reusing code is a good thing.</p>	
Extended Activity	
<p>Explore using different colors and pen sizes.</p> <p>Try drawing new shapes by re-using the square and triangle.</p>	