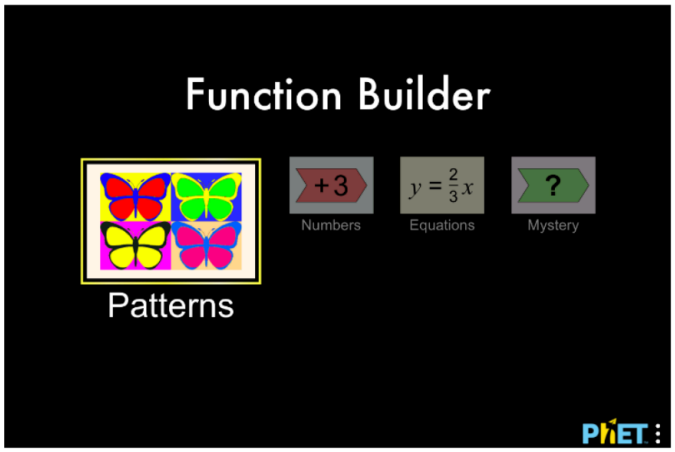
Unit 4 Inquiry Project: Defining Functions Activity Sheet

Part 1: Simulating Relationships

Today you are going to investigate something called an interactive simulation. It is a tool that will help you visualize how functions work.

To begin, open the Function Builder activity in your web browser. You will use it to complete the rest of this activity sheet. It will look like this:



Play with any of the screens on the Function Builder for 5 minutes.

As you discover how the tool works, share your thinking with your group members. You may want to use the following question and sentence stem to guide your discussions:

- *What did you try? What happened?*
- *I tried ... and it caused ... to happen.*

Write down two things you notice or have questions about, and one thing a neighbor noticed that is interesting to you.

1.

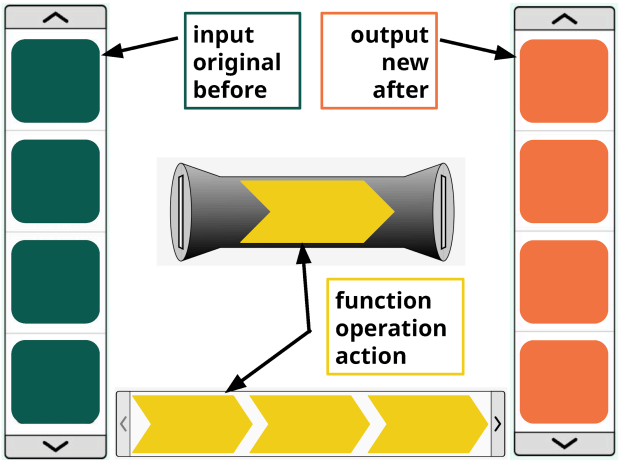
2.

3.

Part 2: What is a function?

In this activity, whenever you see 💬, stop and share your responses with your partner. If you have different responses, try to come to a consensus.

You may have noticed that all of the simulation screens share a three-part structure. These three parts can be described in a variety of ways, such as the ones listed in the image below.



1. Come up with your own names for the three parts of a function.

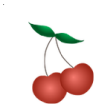
2. Share your labels with your group. Write down any similarities. 💬

For questions 3-4, use the simulation screen labeled “Patterns”.

3. The blue “builder” in the middle of the screen is a function. Describe what a function is using the labels you've agreed on as a class.

4. Suppose you build this function:

a. Complete the following table, sketching what happens to the input after going through the function.

Input	Output
	
	
	
	
	
	

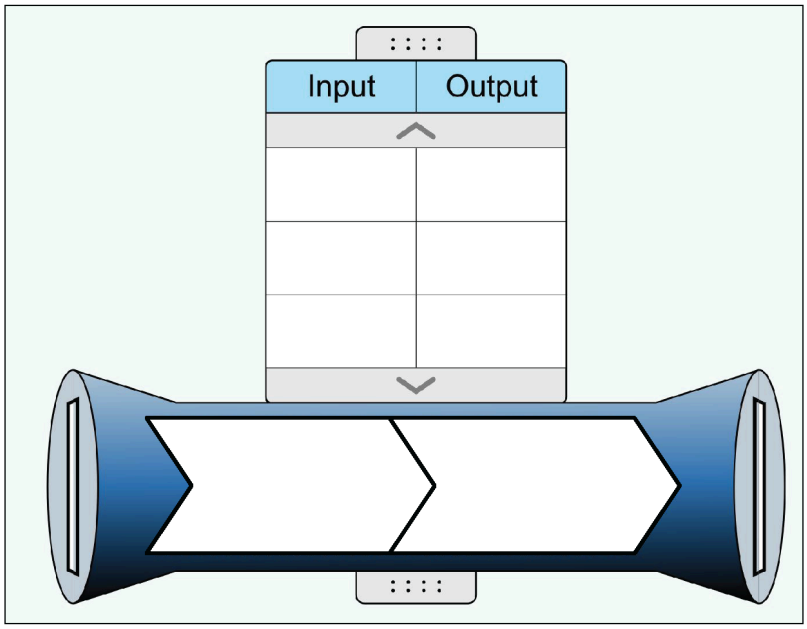
b. Write a rule that describes what the function does. Compare with your group. 💬

Part 3: Different Kinds of Functions

In this activity, whenever you see 💬, stop and share your responses with your partner. If you have different responses, try to come to a consensus.

For questions 1-3, use the simulation screen labeled “Numbers”. Note the tabs located above and below the blue function builder.

1. Build a function. Fill in the function builder and table.

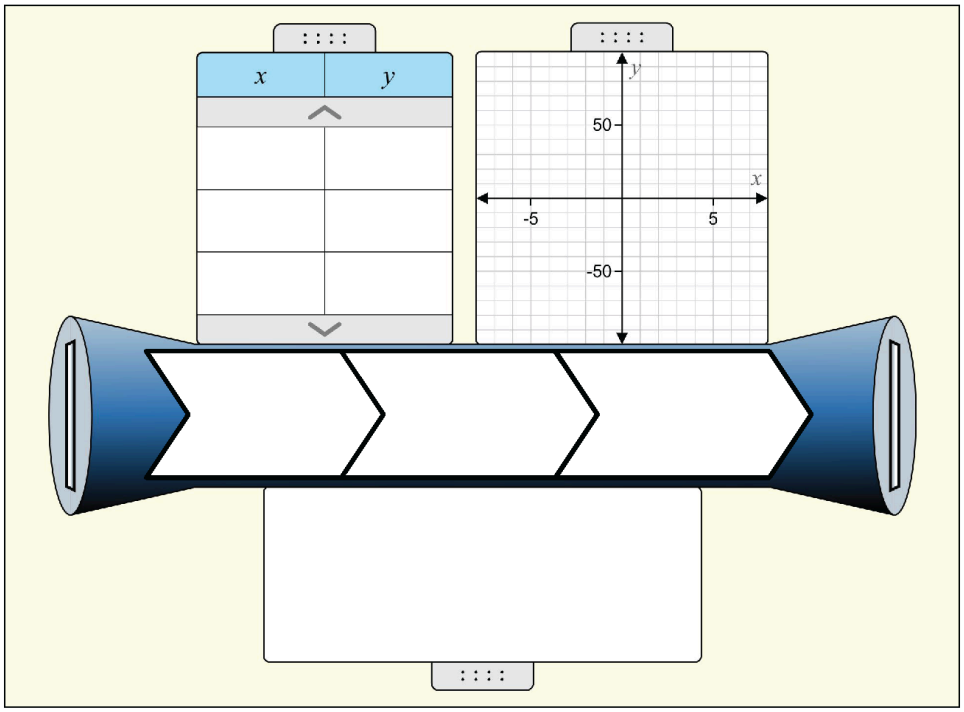


2. What is the output when the input is 10? Switch papers with a teammate and check that you found the correct output. 💬

3. Describe how to find the output for your function if given any input. **Challenge yourself to describe it in multiple ways.**

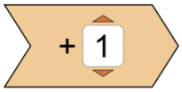
For questions 4-8, use the simulation screen labeled “Equations”. Note the tabs located above and below the function builder.

4. Build a custom function. Fill in the function builder and representations.



5. What is y when x is 100?

6. Manipulate your function in different ways. Use the table to describe the effects on the table, graph, and equation that each of your actions has.

Action	Effect on table	Effect on graph	Effect on equation
Click the up arrow on the addition operation 			

7. What does your graph look like? What other graphs can you make?

8. Briefly describe how different operations impact the graph of your function.
    a. Addition

    b. Subtraction

    c. Multiplication

    d. Division

Extension

Play with the game! Challenge yourself to figure out the mystery functions. They get tricky when you have two or three operations. Does your rule match the simulation's rule? Can there be more than one answer?

Link to game