Java Fundamentals
3-10: Loops, Variables, and Arrays
Practice Activities

Lesson Objectives:

- Create a while loop in a constructor to build a world
- Describe an infinite loop and how to prevent one from occurring
- Use an array to store multiple variables used to create a world
- Create an expression using logic operators
- Describe the scope of a local variable in a method
- Use string variables to store and concatenate strings

Vocabulary:

Identify the vocabulary word for each definition below.

	A type of item stored in an array, such as a string or integer, accessed using an index.
	A statement that can execute a section of code multiple times.
	Symbols that can be used to combine multiple boolean expressions into one boolean expression.
	A position number in the array object that specifies which array element to access.
	An object that holds multiple variables. An index can be used to access the variables.
	A variable declared inside the body of the method to temporarily store values, such as references to objects or integers.
	A loop that causes the code to keep executing. The code does not stop because the end to the code isn't established.

Try It/Solve It:

1. True or false: A loop is a statement that can execute a section of code once. It is an efficient way to pass information to a single instance.

2. Which of the following is not a required component of a while loop?

   Java keyword while

   Condition

   One or more statements

   Instance

3. In the following example while loop, describe what the loop body executes:

```
int i = 0;
while (i < 10,000)
{
   addObject (new Bee (), 110, 130);
   i = i + 1;
}
```

4. In the following example loop, describe why it is an infinite loop:

```
int i = 0;
while (i < 10,000)
{
       addObject (new Bee (), 180, 120);
}
```

5. How do you resolve an infinite loop?
6. True or false: Logic operators are used to connect one or more boolean expressions.
7. In the following example code, identify the logic operators by circling them, and define how they are used:

```
public void act()
{
       if (!isDown && Greenfoot.isKeyDown (“x”)) {
              setImage (“dog.png”);
              isDown = true;
       }
       if (isDown && !Greenfoot.isKeyDown(“y”)){
              setImage (“dog2.png”);
              isDown = false;
       }
}
```

8. Write the statement that accesses the “a” key in the following array:

```
private String[] keyboardNames = {“a”, “b”, “c”, “d”, “e”, “f”, “g”, “h”};
```

9. What is the local variable below initialized to?

```
int i = 5;
```

Note: The rest of the questions refer to the Barrel project.

10. Create a field variable in **Plane** called isGoingFast that will store a Boolean value.
11. Modify the handleMovement() method so that the isGoingFast variable is set to true when the up arrow is clicked and set to false if it isn't.
12. Add code to the handleMovement() method so that if the up arrow is pressed the image changes to airplaneFaster.png.
13. Modify the animate() method so that it will not animate if isGoingFast is true;
14. Modify the **BarrelWorld** constructor so that you will use a loop to add 3 Rockets to the world.
15. Modify the **BarrelWorld** constructor so that you will use a loop to add 3 Barrels to the world.
16. Optional Question – think of ways to expand your program with additional features. These may include:
    - Clouds that float around covering the plane, barrel and rockets if both occupy the same location.
    - Rockets that change direction
    - Rockets that come from different sides
    - Animate the barrel sinking and floating
    - Add sound effects to the barrel sinking and floating
    - Any of your own ideas