Note: This lesson uses the instruction and activities from Introduction to Computer Science using Java by Bradley Kjell
https://chortle.ccsu.edu/Java5/Notes/chap46/ch46_1.html and
https://curriculum.code.org/csp-18/unit5/13/ and it is modified for grade 7 students

1. **Standards**:
   - 7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program.
   - 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information.

2. **Lesson objective(s):**
   - Create arrays and access information stored within them using an index.

3. **Aim:** I can use arrays as a means of storing lists of information within a program

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4. **Warm up-time: 5 minutes** (think - pair - share)
   - What are some lists you have written over the years?
   - What lists do people in your family make?
   - Can you add something to these lists?
     i. List of food for next school event
     ii. List of songs for DJ for next school dance
   - Say that you are writing a program that reads in 100 numbers. Would you like to declare 100 variables and write 100 input statements?

5. **Lesson Content - 10 minutes**
   - Use content here - perhaps create guided notes
   - Videos to supplement content
     https://www.youtube.com/watch?v=seBDTeZmb-k

An _____ is an object that is used to store a list of values. It is made out of a contiguous block of memory that is divided into a number of _____. Each cell holds a value, and all the values are of the same type. Sometimes the cells of an array are called *slots*. In the example array pictured at right, each cell holds an `int`.

The name of this array is _____. The cells are indexed 0 through 9. Each cell can be accessed by using its _____. For example, `data[0]` is the cell which is indexed by zero (which contains the value 23). _____ is the cell which is indexed by 5 (which contains the value 14).

data	
0	23
1	38
2	14
3	-3
4	0
5	14
6	9
7	103
8	0
9	-56

Facts:

- The cells are numbered sequentially starting at

  _____.
- If there are N _____ in an array, the indexes will be 0 through N-1.

Sometimes the index is called a _____. The expression `data[5]` is usually pronounced "data-sub-five" as if it were an expression from mathematics: $data_5$.

The value stored in a cell of an array is sometimes called an _____ of the array. An array has a fixed number of cells. The values in the cells (the elements) can be changed.

- ○ Checks for understanding:
    - i. What value is in `data[7]` ?

6. **Lesson Activity 20 minutes**

- ○ Ss can follow the modules [here](#) to:
    - i. create an array which contains the even numbers from 0 to 10
    - ii. Use console.log to display the first item, the last item, the number 5 in your array.
    - iii. Use indexes and the assignment operator = to set all the 1's to be 0
    - iv. Use list.length and console.log to determine how many items are in each array.
- ○ What does the program below write?
    - i. stuff[0] has
    - ii. stuff[1] has
    - iii. stuff[2] has
    - iv. stuff[3] has
    - v. stuff[4] has

```
class ArrayEg1
{
  public static void main ( String[] args )
  {
    int[] stuff = new int[5];

    stuff[0] = 23;
    stuff[1] = 38;
    stuff[2] = 7*2;

    System.out.println("stuff[0] has " + stuff[0] );
    System.out.println("stuff[1] has " + stuff[1] );
    System.out.println("stuff[2] has " + stuff[2] );
    System.out.println("stuff[3] has " + stuff[3] );
    System.out.println("stuff[4] has " + stuff[4] );
  }

    }
```

7. Closing - 10 minutes

Your app needs to store the following information. Decide whether you would use an array or a variable to store it?

- ○ All the messages a user has sent
- ○ The highest score a user has ever reached on the app
- ○ A username and password to unlock the app

In general, when do you think you should store information in an array, and when should you use a variable?

Discuss:

- Variables store single pieces of information, while arrays store many.
- An array can grow in size to accommodate more information.
- Arrays are slightly more complex to use than variables. If you are only going to be storing a small and fixed amount of information, it is probably appropriate to use multiple variables.

8. Homework/Practice - Finish the modules in the intro to arrays lesson on code.org
https://curriculum.code.org/csp-18/unit5/13/