Review

- **Objects**
  - data fields
  - constructors
  - Methods
- **Classes**

Arrays

- A special kind of variable that holds not one, by many data items of a given type.
- Declared like variables, only type is followed by a pair of brackets.
  
  ```java
  float[] xs;
  
  Can be initialized using a special syntax involving the `new` keyword, the type, and a `size` in brackets.
  ```

  ```java
  int[] diameters = new int[10]; // Ten diameters
  ```

Arrays

- Individual data items are accessed with an index and square brackets.
  - `diameters[0], diameters[1], etc`
  - Indexes start at `0`!
- The length of an array can be determined using its `length` property.
  - `diameters.length`
  - The length of an array is one greater than the last valid index.
- Arrays can be passed to, and returned from functions.

```java
int[] diameters = new int[10];

void setup() {
    size(500, 500);
    background(200);
    for (int i = 0; i < diameters.length; i++) {
        diameters[i] = int(random(0, width/2));
    }
    fill(255, 0, 0);
    for (int i = 0; i < diameters.length; i++) {
        ellipse(random(width), random(height), diameters[i], diameters[i]);
    }
}

void draw() {
}
```

Use the Ball class

Treat in a manner very similar to a primitive data type.

```java
Ball[] balls = new Ball[20];

void setup() {
    size(500, 500);
    fill(255, 0, 0);
    smooth();
    ellipseMode(CENTER);
    // Create all new Ball objects
    for (int i = 0; i < balls.length; i++) {
        balls[i] = new Ball();
    }
}

void draw() {
    background(255);
    for (int i = 0; i < balls.length; i++) {
        balls[i].update();
        balls[i].draw();
    }
}
```

Built-in Array Functions

- `append(array, item)` — returns a new array expanded by one and add item to end
- `expand(array, newSize)` — returns a new array with size increased to newSize
- `shorten(array)` — returns a new array shortened by one
- `concat(array1, array2)` — returns a new array that is the concatenation of array1 and array2
- `subset(array, offset[, length])` — returns a subset of array starting at offset and proceeding for length (or end)
- `splice(array, value|array2, index)` or `splice(array, offset[, length])` — returns a new array with value or array2 inserted at index
- `sort(array)` — returns a new array sorted numerically or alphabetically
- `reverse(array)` — returns a new array with all elements reversed in order
Pop

- A game that measures your balloon-popping skill.
- How it should work...
  - As game runs, randomly placed balloons inflate
  - When the player pops (clicks on) a balloon, 1 point is earned
  - Points are added up throughout the game duration
  - If one click is over top multiple balloons, all balloons pop and multiple points are earned
  - The game runs for 30 seconds, and then ends