



## Unit 4: JavaScript

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### 4.1 Introduction to JavaScript

### 4.2 Programming Fundamentals

Turning in Console content:

There are many ways to get the content of the console for review. Here are two possible ways.

#### **Method 1: Screen Shots**

1. Create a Word or Google doc.
2. Take a screenshot of the console. With the console in full screen mode, press the Print Screen key. This copies an image of the screen to the clipboard.
3. Click inside the document and use Ctrl-V (or right click > paste) to paste in the image.
4. Have students paste screenshots of each section in their document, then share their document for assessment.

#### **Method 2: Console Log File**

The console can create a log file. Open the log file in Visual Studio Code (in Notepad the log shows up as one long line). The output is a complete record of the console history.

1. Have students right click inside their console and save console log file.
2. Have students share the output file, typically ``console.log`` or similar name.
3. Open `console.log` file with Visual Studio Code

Variables

#### **Learning Objectives**

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Students will learn how to **declare** and **assign** variables. Here we are going to store different kinds of things in variables and then print them out. We can use a button webpage -- maybe an input to a variable to modify the output.

### Declare Variables

```
var myVariable;
```

### Assign Variables

```
myVariable = 10;
```

### Data Types

```
// Numeric Data type
myNumericVariable = 0.75;

// String Data type
myStringVariable = 'This is some text';

// boolean Data type
myBooleanVariable = true;
```

### Store a Number in a variable

```
var area;
var width;
var height;

width = 6;
height = 3;
area = width * height;

// print to some html
var el = document.getElementById('area');
el.textContent = area + ' square inches';
```

## Declare and Assign Variables in One Line

```
var days = 365;
```

## Store a String in a variable

```
// Enclose string in single quotes
var animal = 'Mantis Shrimp';

// Enclose string in double quotes
var song = "Rocket Man"

// Put quotes in a string by escaping with backslash
var sentence = "JFK said \"Ask not what your country can do for you . . . \""
```

## Store a Boolean value in a variable

```
var isInClass = true;

// change a variable later in the code
isInClass = false;
```

## Arrays

- Store an array in a variable

```
var colors;
colors = ['red', 'green', 'blue'];

// Colors array declared another way
var colors = new Array('red', 'green', 'blue');

// Arrays can be numbers
var numbers;
numbers = [1, 2, 5, 12, 19];
```

- Read from an Array

## Documentation

1. Try all the code introduced in this lesson.
2. Save your console by right clicking on the console and selecting "Save As".

## Operators and Expressions

### Learning Objectives

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### Arithmetic

In this section students will learn how to use JavaScript as a calculator. A good way to motivate using computers to help with calculations is this [TED Talk from Conrad Wolfram](#). Watch the video beforehand to make sure it is appropriate for your students.

Operator	Description	Example
+	Addition	3 + 4 = 7
-	Subtraction	9 - 5 = 4
*	Multiplication	8 * 3 = 24
/	Division	12 / 3 = 4
%	Modulus (remainder)	7 % 3 = 1
++	Increment	4++ = 5
--	Decrement	3-- = 2
**	Exponent	3 ** 2 = 9

For more information see [W3Schools Operator Reference](#).

### Expressions

Expressions evaluate into values An expression is a statement that puts some information into a variable. Simple expressions assign a value to a variable. More complicated expressions can use two or more values to decide what to put in a variable.

```
// This expression assigns a value to a variable
var name = 'Hodor';

// This expression uses 2 values to determine the value of a variable
var hoursPerWeek = 24 * 7;
```

## Other Operators

Operator	Description	Example	Result
=	Assignment	x = 13	sets x to 13
<b>Comparisons</b>	Tests return true or false		
==	Equal to	x == 13	true
		1 == 2	false
!=	Not equal to	x != 13	false
		1 != 2	true
>	Greater than	x > 12	true
		10 > 12	false
		1 > 1	false
>=	Greater than or equal to	x >= 13	true
		13 >= 22	false
<	Less than	x < 13	false
		1 < 2	true
<=	Less than or equal to	x <= 13	true
		12 <= 2	false

## Documentation

1. Come up with a sample calculation using each operator. Confirm it does what you expect using the dev console.
2. Use variable named x, y and z to store different values. Create the values from expressions that have two or more values combined with operators.
3. Use each comparison operator with your x, y and z variables to create at least one true and one false outcome for each comparison operator.

## Conditionals

## Learning Objectives

## If Statements

```
if (userGuess == randomNumber) {  
    // put all the right guess code in here  
    lastResult.textContent = 'You are right! You read my mind!';  
    lastResult.style.backgroundColor = 'green';  
    gameOver();  
}
```

```
if (userGuess == randomNumber) {  
    // put all the right guess code in here  
    lastResult.textContent = 'You are right! You read my mind!';  
    lastResult.style.backgroundColor = 'green';  
    gameOver();  
} else {  
    // put all the wrong guess code in here  
    lastResult.textContent = 'Wrong!';  
    lastResult.style.backgroundColor = 'red';  
    if (userGuess > randomNumber) {  
        lowOrHi.textContent = 'Your guess was too high';  
    } else if (userGuess < randomNumber) {  
        lowOrHi.textContent = 'Your guess was too low';  
    }  
}
```

## Documentation

Loops

### 4.3 Snake Game

### 4.4 Working with the DOM