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| **Topic:** | 4 Web Design and Development Fundamentals (Front-end) | |
| **Knowledge/Skill set:** | 4.6 JavaScript/JQuery | |
| **Task Item(s):** | 4.6.1 | Code in JavaScript, variables, functions |
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**Lecture Title:**  JavaScript

**Learning Objectives**:

1. Provision of a first look on JavaScript
2. Familiarization with the syntax of JavaScript
3. Understanding of the basic usage of JavaScript
4. Practice on the fundamental concepts and features of the language
5. Determination on when it is appropriate to use each of the features of the language
6. Inspiration in order to search on the more advanced concepts of JavaScript

**Additional Resources:**

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| **URL** | Refer to slide Online Resources |
| **Purpose** | Recourses for JavaScript Lecture |
| **Use:** | Suggest for student self-study |

More exercises at: https://www.w3resource.com/javascript-exercises

Activities:

1. *Show and discuss PowerPoint Presentation JavaScript*

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| --- | --- |
| **Title Slide** | **Points to be discussed** |
| What is JavaScript | Provide the basic idea behind JavaScript |
| JavaScript At First Glance | Mention usages of JavaScript with focus on the web, highlight its simplicity.  Example: Change the color of the page with the press of a button (click event) |
| How it works | Explain the process in the diagram analyzing how each step is executed and how JavaScript is executed in the browser altering the HTML code |
| Client-Side Scripting (1/2) | Provide the advantages of client-scripting |
| Client-Side Scripting (2/2) | Provide the disadvantages of client-side scripting |
| JavaScript features | Describe in which applications we can find JavaScript |
| How it can be used | Present the different ways it can be used |
| Inline JavaScript | Explain how JavaScript can be written inline |
| Embedded JavaScript | Show how JavaScript can be embedded in a webpage |
| External JavaScript | Show how an external JavaScript file can be loaded |
| No JavaScript | Explain what happens when JavaScript is not enabled and how noscript tag can be used to prompt the user to enable javascript |
| Variables | Focus on expressions, identifiers usage variable declarations. Mention functions, arrays, objects. |
| Variables example | Present the variable examples |
| Variables naming | Explain how variables should be named and used in JavaScript |
| JavaScript Types & Expressions | Mention how types and expressions are used in JavaScript |
| JavaScript Comments | Present how comments can be inserted in JavaScript |
| JavaScript Strings (1) & (2) | Mention the usage of both single and double quotes, with notes on its combinations and backslash usage (for instance: “it’s\”a new\” day!”) |
| Numbers | Mention there is one type of numbers for both integers and decimals. Explain the usage of ‘+’ between numbers and strings. |
| Booleans | Demonstrate the usage of Boolean operators, mention their usage in conditional and loop statements. |
| Comparison Operators | Present the comparison operators |
| Logical Operators | Describe the logical operators |
| Conditionals if else | Present the syntax of if else |
| Conditionals switch | Present how the switch is used |
| Conditional assignment | Explain how the conditional assignment is used and present the equivalent if else structure |
| Loops | Present the different types of loops JavaScript can support |
| While/do while | Present the while and do while blocks |
| For loop | Explain how the for loop works in JavaScript |
| Arrays | Present the arrays in JavaScript |
| Arrays literal notation | Present how the Arrays can be declared and initialized |
| Arrays common features | Present the different methods that the arrays support |
| JavaScript Objects (1) | Explain how JavaScript uses the objects |
| JavaScript Objects (2) | Present what the objects are in JavaScript |
| Object creation (1) | Present the alternative ways that an object can be defined |
| Object creation (2) |
| Constructors | Present how the constructors are used in JavaScript |
| Properties | Explain what the properties of an object are |
| For loop (2) | Present the alternative for loop |
| Objects Included in JavaScript | Present what are the basic objects that are used in JavaScript |
| Math | Present the math class |
| Date | Present how the Date class can be used JavaScript |
| Window | Present the basic idea behind the Window object |

*b. Ask if any questions/problems*

*c. Work with students Hands-On Exercises below*

*d. Ask students to solve Practice Exercises alone*

**Hands-On Exercises:**

1. **Exercise 1**

What will the following expressions execution (evaluation) print?  
2 + 3  
“Hello ” + “World!”  
“Hello ” + 1

“Hello”\*5

“Hello”/2

10/0

Exercise Solution: **EvaluationsExpression**

1. **Exercise 2**

Write a function that takes as argument two strings, concatenates them and returns the result.

Exercise Solution: **StringConcatenation**

1. **Exercise 3**

Create a car object of a Ferrari F430. This should contain the following properties: Brand, Model, Max Speed (330 km/h), Current Speed, Status of whether the car has started or not.. User should be able to start, stop and set its speed status. The car should also provide a way of exposing all the data described above, after each state change.

Advanced: Check corner cases – for instance, can the user set the speed while the car is turned off? Can the driver turn off the car while the speed is not set to 0? – Conditional statements are not yet taught, but this can be shown as introduction for the next section.

Exercise Solution: **Supercar**

**Practice Exercises:**

1. **Exercise 1**

Create a function that takes as argument the three constants (a, b, c) of a polynom and computes a second degree polynomial discriminant.

The type is (b\*b) – (4\*a\*c).

Exercise Solution: **Discriminant**

1. **Exercise 2**

Create a JavaScript Object that represents a score board of a football field.

It should have the following properties:

* Score of the home team (initial value: 0)
* Score of the away team (initial value: 0)
* Current minute playing

As methods, it should contain:

* A method that sets the home team score.
* A method that sets the away team score.
* A method that sets the current minute playing in the game.
* A method that prints its state, in the format:

*<minute>’: Home: <HomeScore> - Away: <AwayScore>*

Exercise Solution: **ScoreBoard**