Three.js Learning Roadmap

UI Basic (Compulsory for Three.js):

HTML basics, follow from W3Schools HTML Tutorial through to this section HTML Versus XHTML

CSS basics, follow from W3Schools CSS Tutorial through to w3schools.com: CSS Specificity also cover flexbox in advanced section (flex is now a standard, no more an advanced thing though) Introduction to CSS layout - Learn web development | MDN

Create a Complete Responsive Website Using Bootstrap

HTML5 and CSS3 Responsive design with media queries (basic understanding)

Difference in %, px, em, rem, vh, vw etc.

Git Training (Optional for Three.js):

Have a basic how know of GitHub and how to use git commands and GitHub desktop.
Below are two helping links in this regard:

https://gitexercises.fracz.com/exercise/master

https://learngitbranching.js.org/

JavaScript + ES6 Tutorials (Compulsory for Three.js):

https://www.freecodecamp.org/learn/javascript-algorithms-and-data-structures/es6/

Basic (Compulsory for Three.js)

Reference Book for JavaScript: Eloquent JavaScript

- Variables
- Data Types
- Conditional Statements
  - if else
  - switch
  - ternary
- Loops
  - While
  - for
  - for of
  - for in
- Comparison Operators

- Functions
- Functions with default parameters
- Callbacks
- Higher Order Functions
- Arrays
- Objects
- null vs undefined
- truthy / falsy concept
- Error Handling

Advanced (Optional for Three.js):

Reference video lectures for advanced concepts of JavaScript: Advance Concepts

- Hoisting in JavaScript
- Variable and Function Hoisting
- Scope Chain and Lexical Scoping
- IIFE
- “use strict” mode
- Closures in JavaScript
- Bind() method
- **this** keyword
- Iterators and Generators
- Classes, Objects, and Inheritance
- Callback Hell
- Promises
- Async / Await
- Event Loop

Arrays and Object Functions (Compulsory for Three.js):

Reference to learn and practice array functions: w3schools array functions. Practice all the given functions:

- find()
- findIndex()
- indexOf()
- filter()
- includes()
- push()

- pop()
- map()
- reduce()
- slice()
- splice()
- shift()
- unshift()
- valueOf()
- forEach()
- some()
- Object.keys()
- Object.values()
- Object.entries()

ES6 / ES7 and latest versions (Optional for Three.js):

ECMAScript is nothing but a collection of some new features added to JavaScript that obviously are designed to make our life easier. Have a look at the following points and see how it solves the problem in a friendly way.

- Object destructuring
- Object literal
- Spread operator
- Rest operator
- Arrow Functions
- Nullish coalescing operator
- Optional chaining operator
- var vs let vs const
- Trailing commas

Three.js Official Documentation:

Below is the link to official Three.js documentation:

https://threejs.org/docs/index.html

Three.js Basics

Basics of WebGL:

WebGL (short for Web Graphics Library) is a JavaScript API for rendering interactive 2D and 3D graphics within any compatible web browser without the use of plug-ins. Just learning the basics of WebGL would be enough but if you want to learn more here is helping link:

https://developer.mozilla.org/en-US/docs/Web/API/WebGL_API

Basic:

- Scene
- Webpack bundling
- Transforming Objects
- Animations
- Cameras (All types of cameras especially Orthographic and Perspective Camera)
- Fullscreen Responsiveness and Resizing
- Geometries (All types of Geometries)
- Debug UI (dat.gui)
- Controls (All types of Controls Orbit, Trackball, Drag etc.)
- LookAt method and it's usage
- Textures
- Materials
- Lights and Light Helpers
- Shadows
- Particles
- Raycaster
- Importing and using 3D Models
- Loaders

Mini Project:

Make a mini project that includes all the basics of Three.js and get your grip stronger on Three.js.

Shaders:

Helping link: https://www.shadertoy.com/

- Glsl Basics
- Shaders Basic
- Vertex Shader
- Fragment Shader
- Attributes
- Uniforms
- Built-in Functions
- Noises
- Texturing with Shaders
- Post Processing

Extra Techniques

- Galaxy Generator
- Physics
- Realistic Render
- Modified Materials
- Mixing Html and WebGL
- Importing and Optimizing Scene
- Baking and Importing scenes
- Performance Tips