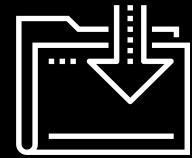
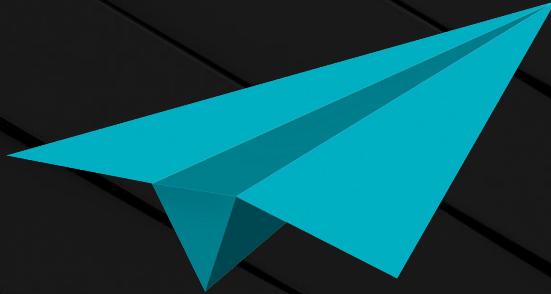


{ } Introduction to ES6

Skills Bootcamp in Front-End Web Development

Lesson 11.1





Office Hours

30 Minutes



WELCOME

Be sure to install Node.js it using the resources found on the
[Node.js installation guide on The Full-Stack Blog](#)



Learning Objectives

By the end of class, you will be able to:



Run very simple JavaScript files from the command line using Node.js.



Explain arrow functions and how they impact the `this` context.



Use template strings and use `const` and `let` in place of `var`.



Use functional loops like `map()` and `filter()`.





What is Node.js?



Is an open source, cross-platform JavaScript runtime environment designed to be run outside of the browser.



Is a general utility that can be used for a variety of other purposes, including asset compilation, scripting, monitoring, and as the basis for web servers.



Instructor Demonstration

Mini-Project



What are we learning?

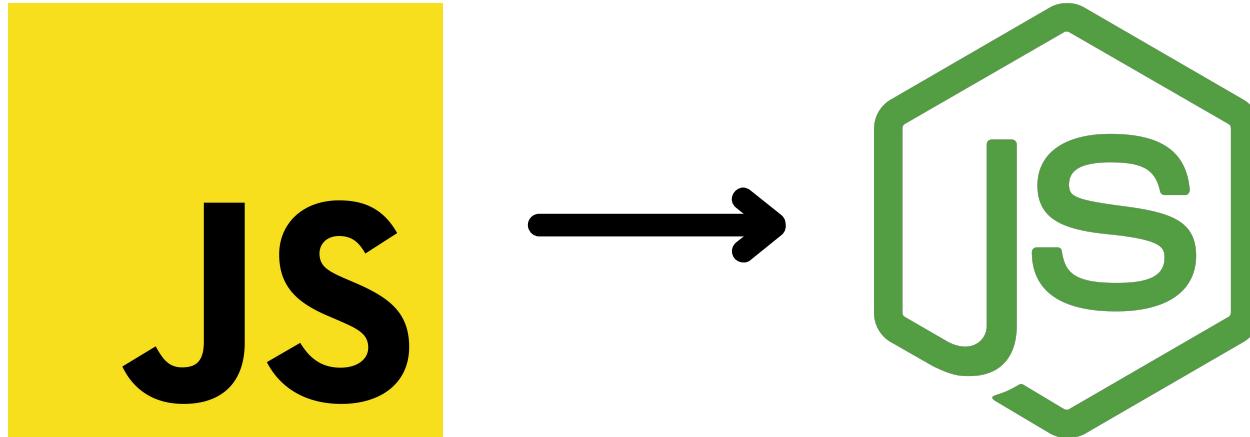
We are learning more about Node.js, third-party modules,
and Node's native `fs` module.

```
var fs = require('fs');
```



How does this project build off or
extend previously learned material?

We are continuing to expand our knowledge of using JavaScript to build programs, but this time we are working outside the browser.



Questions?





Instructor Demonstration

Node.js

Questions?





Activity: Node.js

Suggested Time:

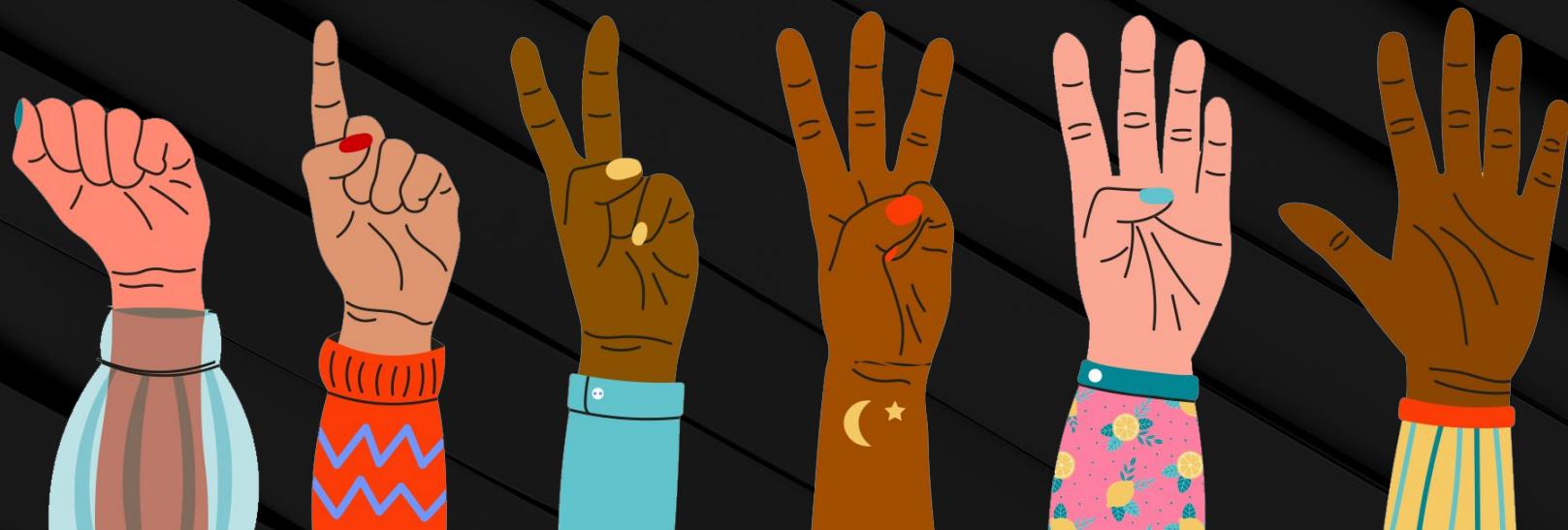
10 Minutes



Time's Up! Let's Review.

FIST TO FIVE:

How comfortable do you feel with the Node.js thus far?



Review: Node.js

01

What happens if we were to log `window` to the console?

02

What kinds of things do we think are possible in the browser, but not possible in Node.js?

03

What can we do if we don't completely understand this?

Review: Node.js

01

What happens if we were to log `window` to the console?

02

What kinds of things do we think are possible in the browser, but not possible in Node.js?

03

What can we do if we don't completely understand this?

We get an error—`window` is not defined in Node.js.

We can't use prompts, confirms, or alerts because of the `window` object.

We can refer to supplemental material, read the [Node.js documentation](#), and stick around for office hours to ask for help.

Questions?





Instructor Demonstration

Arrow Functions

Questions?





Pair Programming Activity:

Arrow Function Practice

Suggested Time:

15 Minutes



Time's Up! Let's Review.

Review: Arrow Function Practice

The following `funnyCase()` function is able to use arrow syntax, because there is no `this` context that needs to be preserved:

```
var funnyCase = string => {
  var newString = "";
  for (var i = 0; i < string.length; i++) {
    if (i % 2 === 0) newString += string[i].toLowerCase();
    else newString += string[i].toUpperCase();
  }
  return newString;
};
```

Review: Arrow Function Practice

When using arrow functions, we can use an implied return to reduce the code even further, as shown in the following example:

```
var numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];  
  
var doubled = map(numbers, element => element * 2);
```

Review: Arrow Function Practice

In the following example, we had to convert the arrow functions back to regular functions to preserve the context of this in the object:

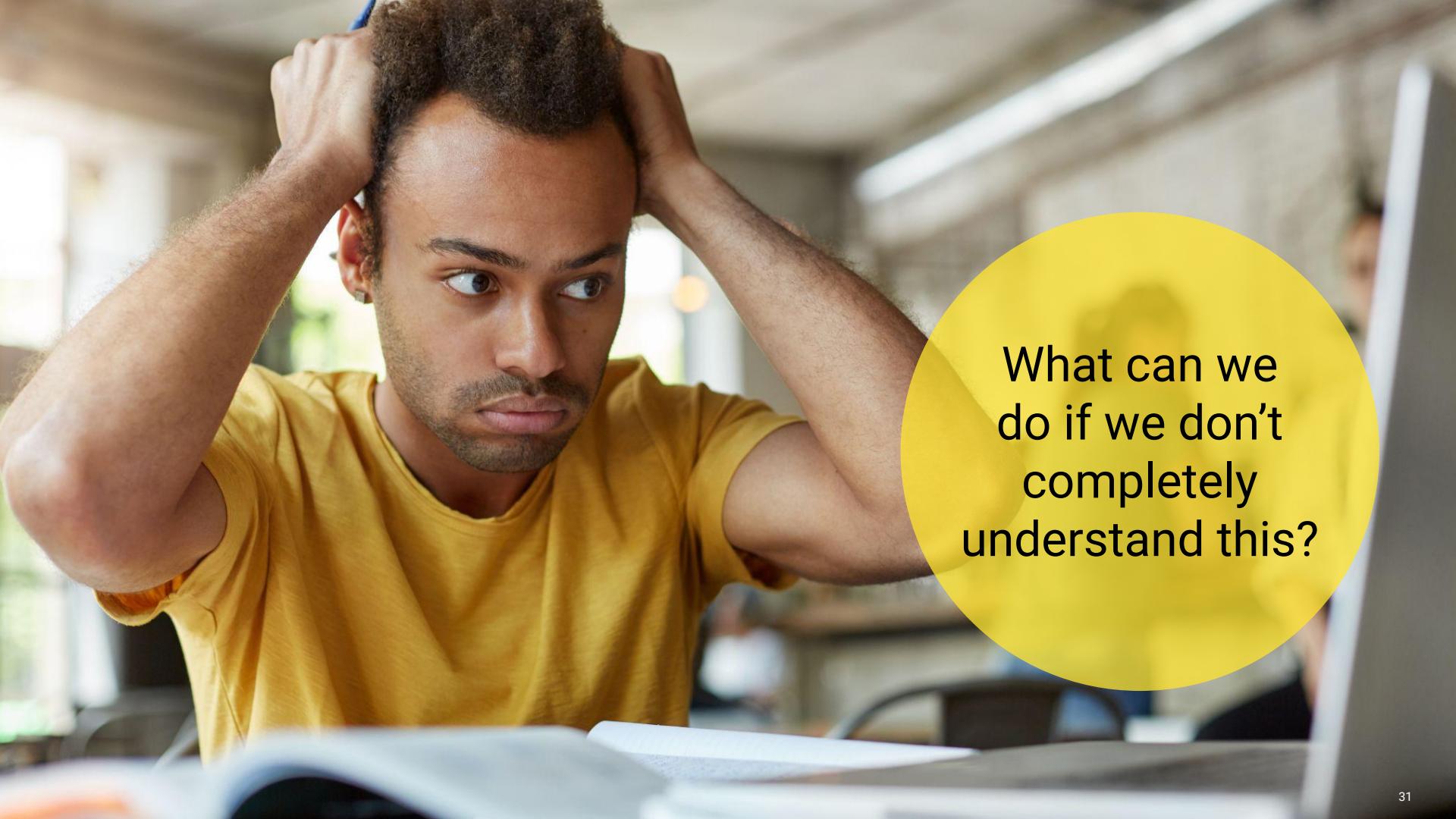
```
var netflixQueue = {
  queue: [
    "Mr. Nobody",
    "The Matrix",
    "Eternal Sunshine of the Spotless Mind",
    "Fight Club"
  ],
  watchMovie: function() {
    this.queue.pop();
  },
};
```



Why would you use arrow functions?



The syntax is easier to write and makes for cleaner-looking code.

A close-up photograph of a young Black man with short, curly hair. He is wearing a bright yellow t-shirt and is sitting at a desk, looking down at an open book or document. His hands are clasped behind his head, and he has a serious, slightly worried expression. The background is blurred, showing what appears to be a classroom or library setting.

What can we
do if we don't
completely
understand this?

We can refer to supplemental material, read the [MDN Web Docs on arrow functions](#), and stick around for office hours to ask for help.

The screenshot shows the MDN Web Docs website. At the top, there's a navigation bar with the MDN logo, a search bar, and links for Technologies, References & Guides, Feedback, and Sign in. Below the header, a breadcrumb trail shows the page path: Web technology for developers > JavaScript > JavaScript reference > Functions > Arrow function expressions. To the right of the breadcrumb is a "Change language" button. The main content area has a title "Table of contents" on the left and "Arrow function expressions" in large bold letters. A sub-section "Differences & Limitations:" lists several bullet points about the limitations of arrow functions. At the bottom, there's a "JavaScript Demo: Functions =>" section with some sample code.

MDN Web Docs
moz://a

▶ Technologies ▶ References & Guides ▶ Feedback Search MDN Sign in

Web technology for developers > JavaScript > JavaScript reference > Functions > Arrow function expressions Change language

Table of contents

- Syntax
- Description
- Examples
- Specifications
- Browser compatibility
- See also

Related Topics

JavaScript

Tutorials:

- ▶ Complete beginners
- ▶ JavaScript Guide
- ▶ Intermediate

Arrow function expressions

An **arrow function expression** is a compact alternative to a traditional [function expression](#), but is limited and can't be used in all situations.

Differences & Limitations:

- Does not have its own bindings to `this` or `super`, and should not be used as `methods`.
- Does not have `arguments`, or `new.target` keywords.
- Not suitable for `call`, `apply` and `bind` methods, which generally rely on establishing a `scope`.
- Can not be used as `constructors`.
- Can not use `yield`, within its body.

JavaScript Demo: Functions =>

```
1 const materials = [
2   'Hydrogen',
3   'Helium',
4   'Lithium',
5   'Beryllium'
6 ];
```



Instructor Demonstration

let and const

Questions?





Pair Programming Activity:

Convert to ES6 Syntax

Suggested Time:

15 Minutes



Time's Up! Let's Review.

Review: Convert to ES6 Syntax

A good way to think about these variable names is to ask yourself “does this need to be changed in future?” If the answer is no, you should use **const**.

```
const $root = document.querySelector("#root");
```

Review: Convert to ES6 Syntax

Ask yourself if you need to take advantage of the `this` context inside your function. If not, convert it to an arrow function.

```
const makeGuess = () => {
  const $score = document.querySelector("#root p");
  $score.textContent = "Score: " + score + " | " + "Target: " + targetScore;

  if (score > targetScore) {
    alert("You lost this round!");
    playRound();
  } else if (score === targetScore) {
    alert("You won this round!");
    playRound();
  }
};
```

Review: Convert to ES6 Syntax

This kind of function is called a **constructor** function. Arrow functions can't be used in constructor functions.

```
const Crystal = function(color) {
    this.element = document.createElement("div");
    this.element.className = "crystal " + color;
    this.value = 0;

    this.element.addEventListener(
        "click",
        () => {
            score += this.value;
            makeGuess();
        },
        false
    );
};
```



What is a good use for `let`?



When we need to reassign a value.
An example of this would be a
counter variable like **i**.



What can we
do if we don't
completely
understand this?

We can refer to supplemental material and stick around for office hours to ask for help.

Read the [MDN Web Docs on let](#)

The screenshot shows the MDN Web Docs page for the `let` statement. The page has a header with the MDN logo, navigation links for Technologies, References & Guides, Feedback, and a search bar. Below the header is a breadcrumb trail: Web technology for developers > JavaScript > JavaScript reference > Statements and declarations > let. A "Change language" button is also present. The main content area starts with a "Table of contents" section. The main title is "let". A brief description follows: "The `let` statement declares a block-scoped local variable, optionally initializing it to a value." Below this is a "JavaScript Demo: Statement - Let" section containing a code editor with the following code:

```
1 let x = 1;
2
3 if (x === 1) {
4   let x = 2;
5
6   console.log(x);
7   // expected output: 2
8 }
9
10 console.log(x);
11 // expected output: 1
12
```

At the bottom of the demo section are "Run" and "Reset" buttons.

Read the [MDN Web Docs on const](#)

The screenshot shows the MDN Web Docs page for the `const` statement. The layout is identical to the `let` page, with the same header, breadcrumb trail, and "Change language" button. The main content area starts with a "Table of contents" section. The main title is "const". A brief description follows: "Constants are block-scoped, much like variables declared using the `let` keyword. The value of a constant can't be changed through reassignment, and it can't be redeclared." Below this is a "JavaScript Demo: Statement - Const" section containing a code editor with the following code:

```
1 const number = 42;
2
3 try {
4   number = 99;
5 } catch (err) {
6   console.log(err);
7   // expected output: TypeError: invalid assignment to const 'number'
8   // Note - error messages will vary depending on browser
9 }
10
11 console.log(number);
12 // expected output: 42
13
```

At the bottom of the demo section are "Run" and "Reset" buttons.

Questions?



Break





Instructor Demonstration

Functional Loops



What is the difference between
`filter()` and `forEach()`?

Functional Loops

filter()

returns a brand-new array

forEach()

mutates the existing array



How is `map()` different from
`filter()`?

Functional Loops

`map()` will return a brand-new array like `filter()` does; however, the length of the array that `map()` returns will be the exact same as the input array.

This isn't always the case for the `filter()` method.

Questions?





Instructor Demonstration

Template Literals

Template Literals

Using string interpolation, or template strings, we have a new way of concatenating variables to the rest of strings.

This is a new feature included in ES6.

Template strings are much more readable and easier to manage.

Consider the following example:

```
const arya = {  
    first: "Arya",  
    last: "Stark",  
    origin: "Winterfell",  
    allegiance: "House Stark"  
};  
  
const greeting = `My name is ${arya.first}!  
I am loyal to ${arya.allegiance}.`;
```



What are the main differences
that you notice in syntax between
regular string concatenation
and template literals?

Template Literals

Immediately we notice that template strings use backticks instead of quotes.

Additionally, instead of using plus signs, we can now reference variables explicitly using the `{}$` syntax.



Questions?





Activity: Template Literals

Suggested Time:

10 Minutes



Time's Up! Let's Review.

Review: Template Literals



Template strings are much easier to read than traditional string concatenation.



Dealing with spacing is a lot easier using template literals.



Don't forget to use backticks instead of quotes. This is a very easy mistake to make.

Review: Template Literals

In the following example, we create a template string that will eventually be injected into the DOM:

```
const music = {
  title: "The Less I Know The Better",
  artist: "Tame Impala",
  album: "Currents"
};

// write code between the <div> tags to output your objects data
const songSnippet = `
<div class="song">
  <h2>${music.title}</h2>
  <p class="artist">${music.artist}</p>
  <p class="album">${music.album}</p>
</div>
`;
const element = document.getElementById("music");
element.innerHTML = songSnippet;
```

We use the `{}$` syntax to reference the music object and the variables within it in the template string. That template string eventually gets added to the DOM as pure HTML.



What are the benefits of using template strings?

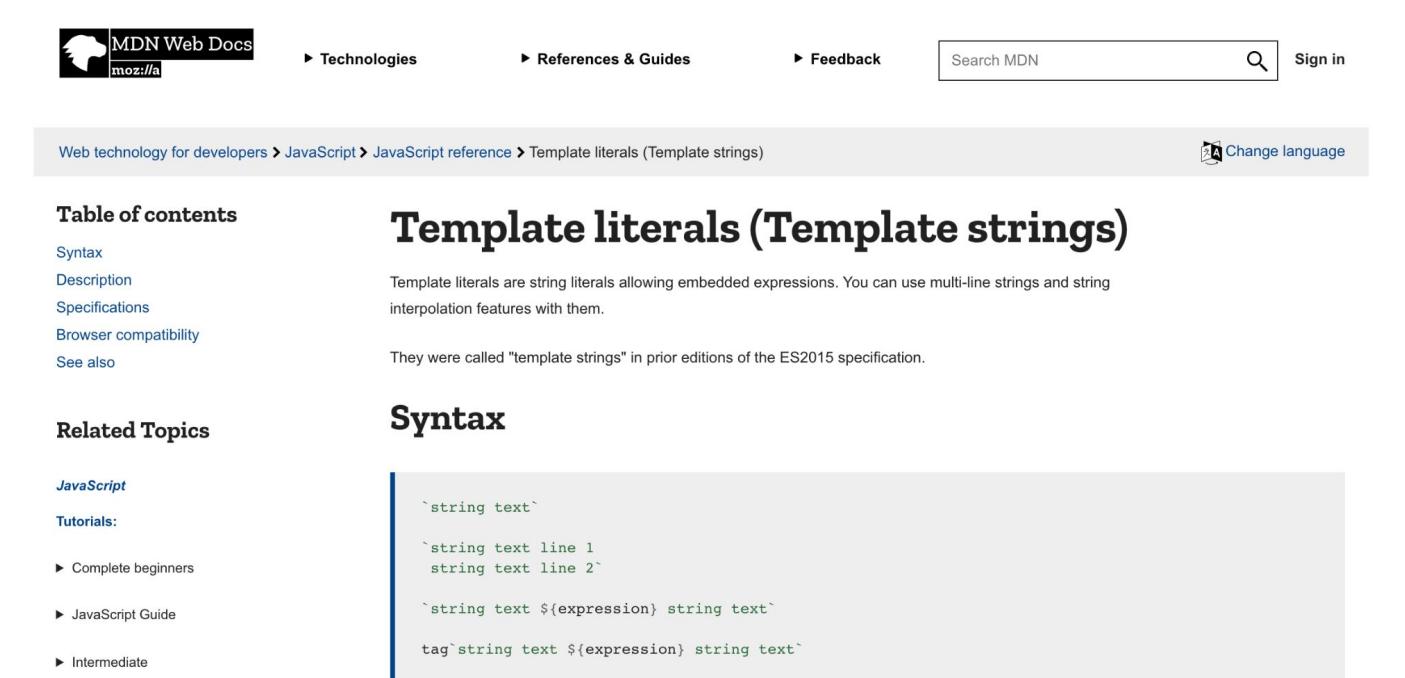


They are easier to read and easier to manage. They also allow us to maintain indentation and formatting of the content when inside the backticks.

A photograph of a young woman with dark hair pulled back, wearing a blue button-down shirt with white polka dots. She is sitting at a desk, looking intently at a laptop screen. Her right hand is resting against her chin, and she has a thoughtful, slightly furrowed brow expression. The background shows a bright room with a lamp and some foliage.

What can we
do if we don't
completely
understand this?

We can refer to supplemental material, read the [MDN Web Docs on template literals](#), and stick around for office hours to ask for help.



The screenshot shows the MDN Web Docs website. At the top, there's a navigation bar with the MDN logo, a search bar, and links for Technologies, References & Guides, Feedback, and Sign in. Below the header, a breadcrumb trail indicates the page path: Web technology for developers > JavaScript > JavaScript reference > Template literals (Template strings). To the right of the breadcrumb is a "Change language" button. The main content area has a title "Template literals (Template strings)" in large bold letters. A brief description follows: "Template literals are string literals allowing embedded expressions. You can use multi-line strings and string interpolation features with them." Below this, a note says, "They were called "template strings" in prior editions of the ES2015 specification." On the left side, there's a "Table of contents" sidebar with links to Syntax, Description, Specifications, Browser compatibility, and See also. Below that is a "Related Topics" sidebar with a "JavaScript" section and "Tutorials:" subsection containing links to Complete beginners, JavaScript Guide, Intermediate, and Advanced. The main content area also contains code snippets illustrating template literals:

```
`string text`  
`string text line 1  
    string text line 2`  
  
`string text ${expression} string text`  
  
tag`string text ${expression} string text`
```

Questions?



*The
End*