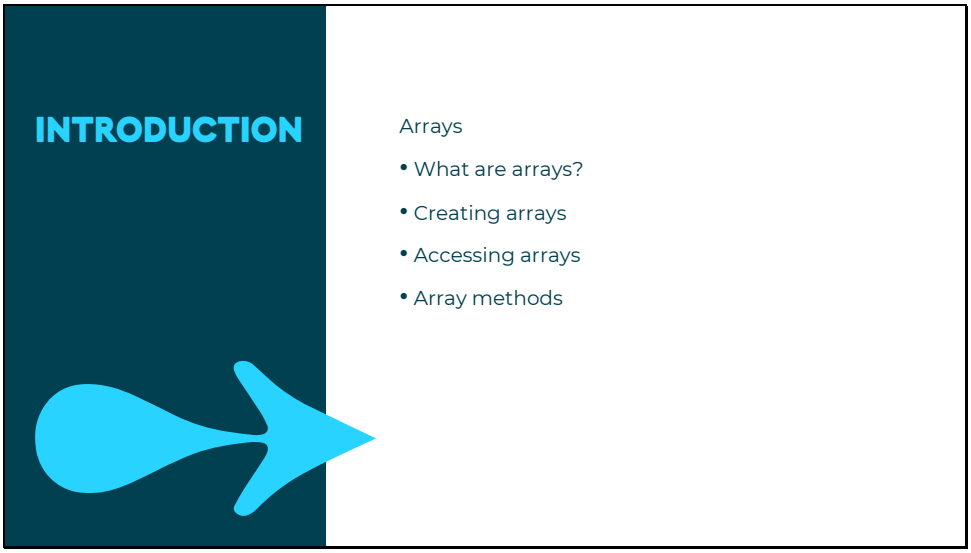
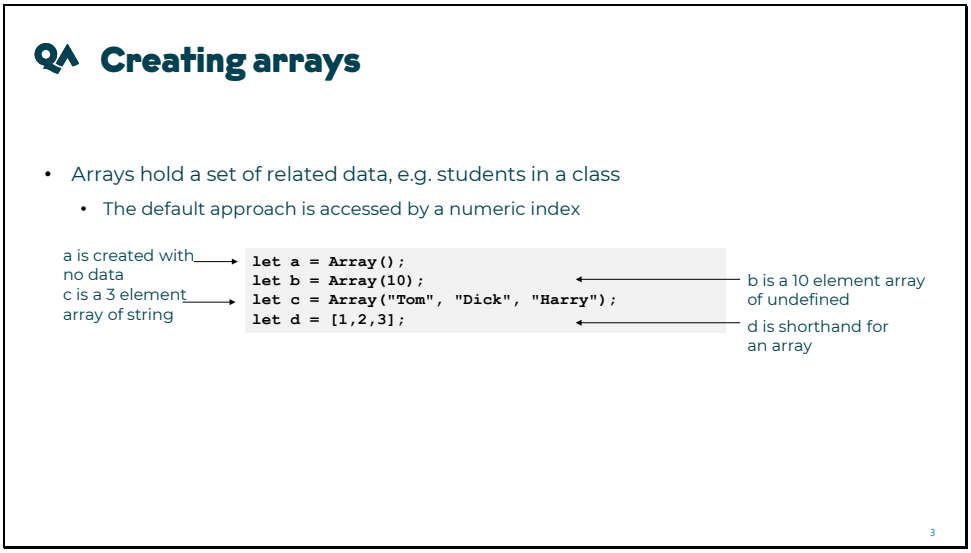
Slide 1

Slide 2


INTRODUCTION
Arrays
• What are arrays?
• Creating arrays
• Accessing arrays
• Array methods

Slide 3



As with the rest of JavaScript, the elements in arrays are loosely-typed. This means that each separate element of an array can contain a different type. This is useful and dangerous at once and brings us back to the consideration that type matters.

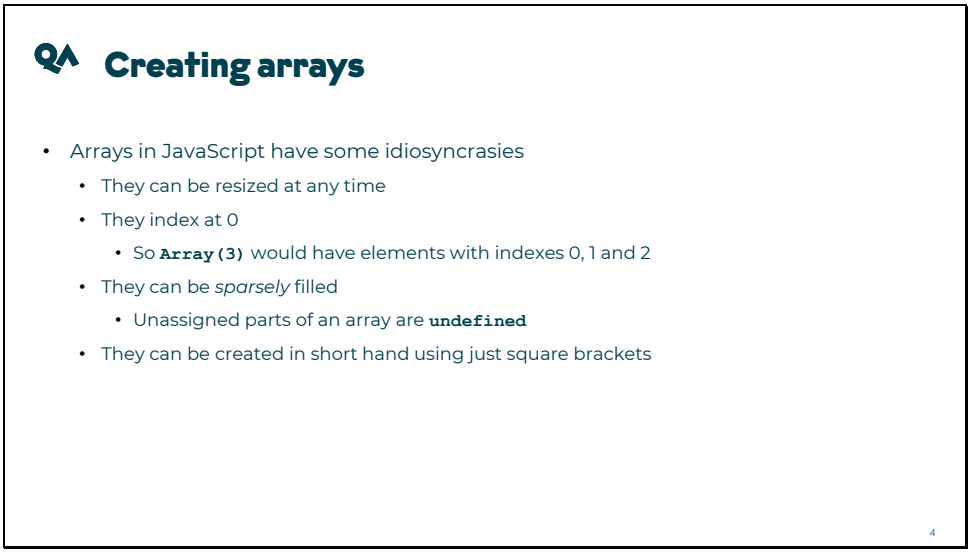
Array indices in JavaScript start at 0. Arrays have a `length` property equal to the length of the array; note that an array of length of 6 will have elements 0 to 5.

JavaScript arrays are *sparse* – this means that there can be holes in an array. The example above shows an array that initially has values assigned to elements number 0 and 5. This results in an array that contains only two elements. Elements numbered 1 to 4 exist but, if referenced, will yield the special value `undefined`.

Note that once a value has been assigned to an element of an array, that array element is now defined, and cannot be removed. Assigning `null` to it changes the value but does not remove the array element. In fact, simply *referring* to the element is enough to create it.

Arrays in JavaScript will grow dynamically from its initial size. It is also possible to shrink an array by assigning a smaller value to the `length` property than it currently holds. Do not assume that elements with indexes greater than or equal to the new value exist.

Slide 4



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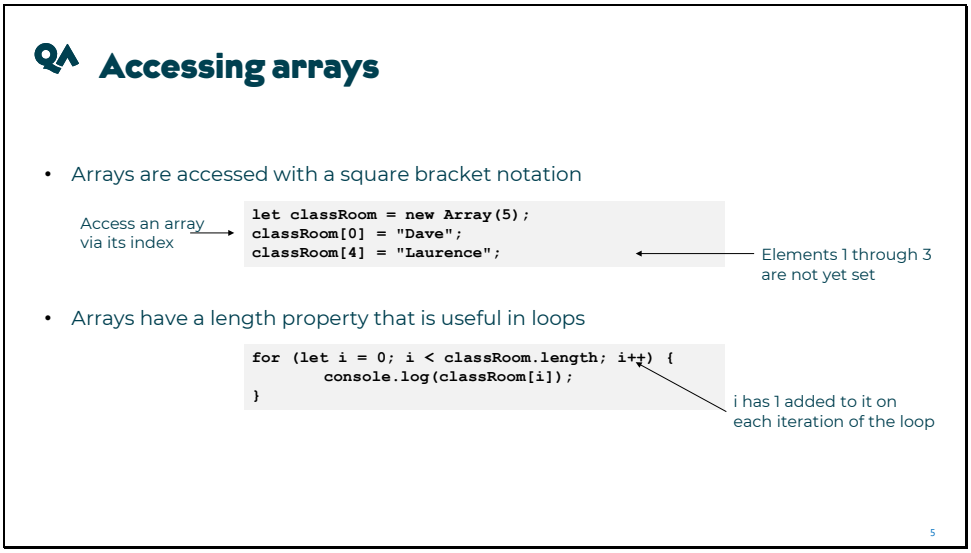


Arrays allow us to store a related set of data. Arrays store data in a list of elements; we access a particular elements by specifying the name of the array and the element index within square brackets, e.g.

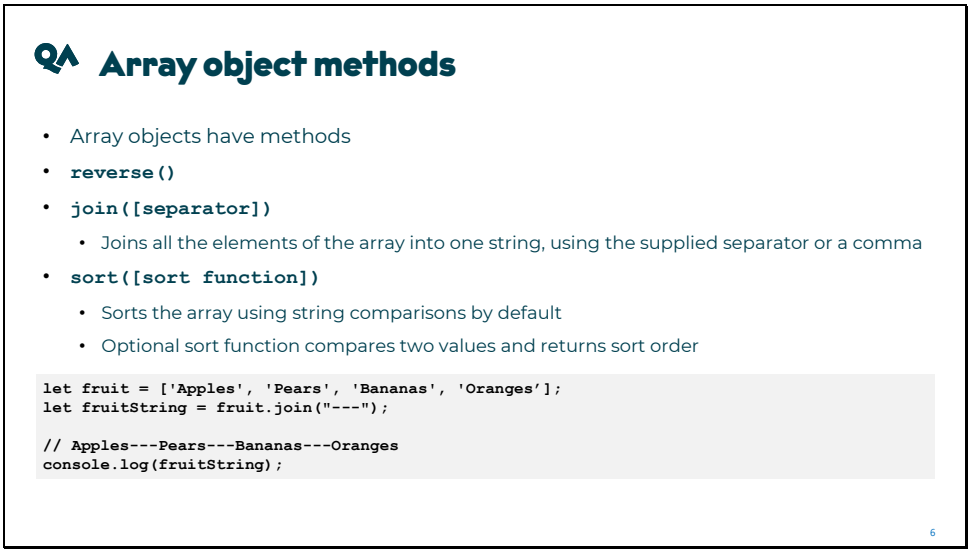
```
myArray[0];
```

The first element of the array is always accessed through [0].

In the above example, a 5 element array is created and elements 1 through 3 are not set. In this situation, they will have a value of **`undefined.`** If you remember what we have learnt from the module on types, this makes perfect sense. They have been created but not initialised.

Arrays also have a length property. This will always reflect the exact number of elements an array contains. As you can see, this is immensely useful as it allows us to create loops that will always run as many times as is needed.

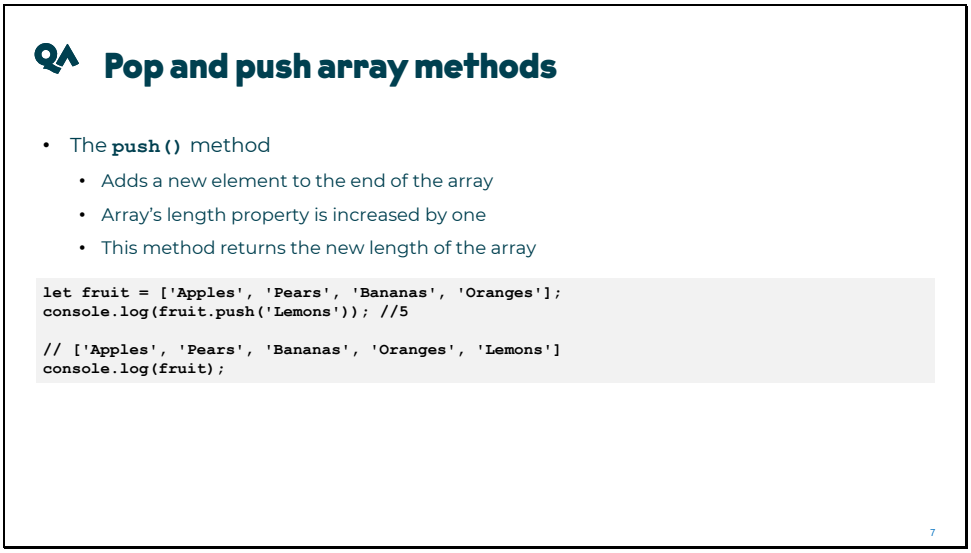
Slide 6



Array objects have various methods:

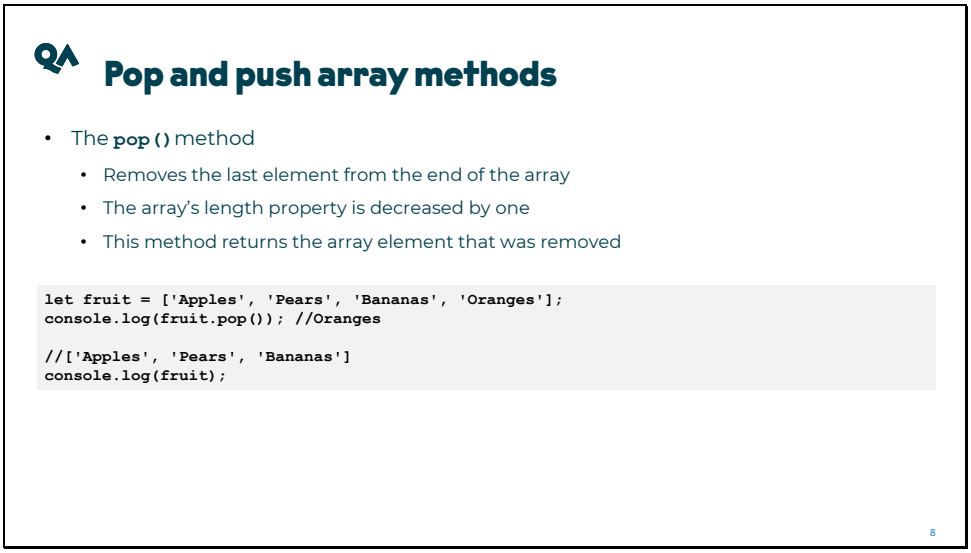
- **`reverse`** reverses the order of the elements in the array, so that the last element in the array becomes the first, and so on. This method operates directly on the array itself, rather than returning a new array
- **`join`** returns a string formed by joining together all the elements in the array using the supplied separator. If no separator is supplied, a comma is used. The separator may be any string (including an empty one). Undefined array elements are represented by a null string, meaning that two or more separators will appear next to each other
- **`Sort`** sorts the array. If no function argument is supplied, the array elements are temporarily converted to strings and sorted in standard dictionary order. To make the sort generic, it is possible to supply a function as an argument. This function will be called by the sort routine as necessary to compare two values in the array. The function should have the form: `compare(a, b)` and should return a value less than 0 if a should be sorted less than b, 0 if they are equal, and greater than 0 if a should be sorted greater than b

Slide 7



The JavaScript `Array.push()` method adds a new element to the end of the array. When doing so, the array's length property increases by one. After adding the new element to the end of the array, this method returns the new length of the array.
The JavaScript `Array.pop()` method removes the last element from the end of the array. When doing so, the array's length property decreases by one. After removing the last element from the end of the array, this method returns the array element that was removed.

Slide 8



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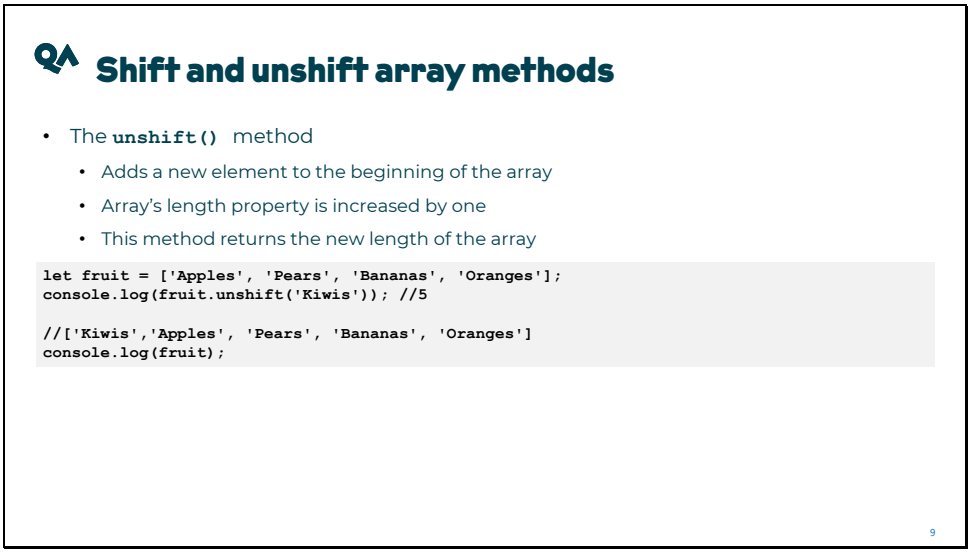
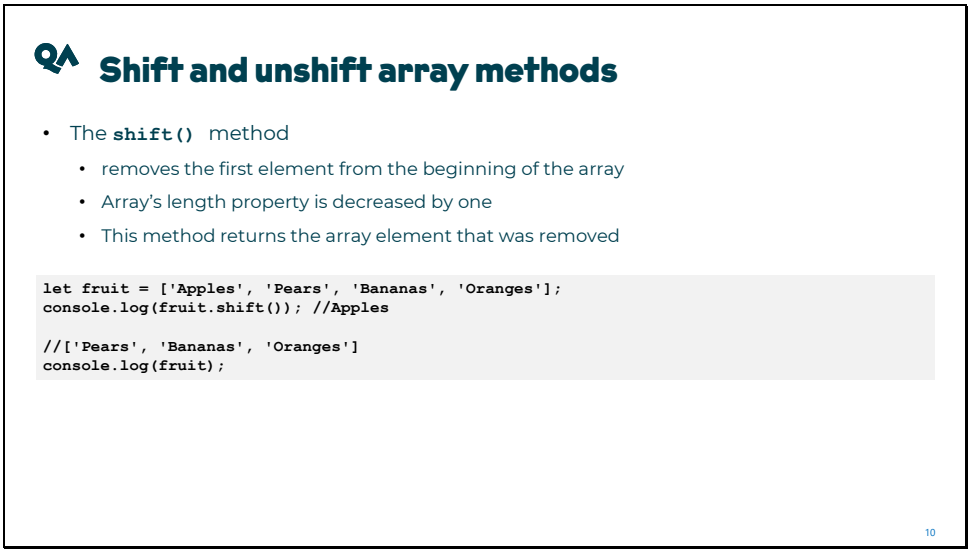
Slide 9



The JavaScript `Array.shift()` method removes the first element from the beginning of the array. When doing so, the array's length property decreases by one. After removing the first element from the beginning of the array, this method returns the array element that was removed.
The JavaScript `Array.unshift()` method adds a new element to the beginning of the array. When doing so, the array's length property increases by one. After adding the new element to the beginning of the array, this method returns the new length of the array.

Slide 10



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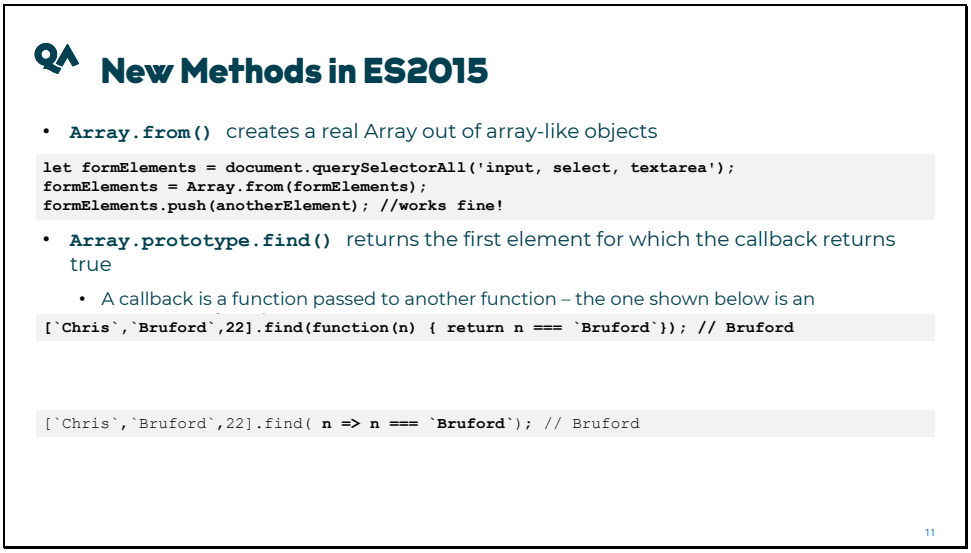
TRAINER NOTE: Functions up to and including Arrow Functions is relevant here before continuing

Slide 11


New Methods in ES2015
• Array.from() creates a real Array out of array-like objects
let formElements = document.querySelectorAll('input, select, textarea');
formElements = Array.from(formElements);
formElements.push(anotherElement); //works fine!
• Array.prototype.find() returns the first element for which the callback returns true
• A callback is a function passed to another function – the one shown below is an
[`Chris`,`Bruford`,22].find(function(n) { return n === `Bruford`}); // Bruford
[`Chris`,`Bruford`,22].find(n => n === `Bruford`); // Bruford
11

Slide 12

New Methods in ES2015

- Similarly **`findIndex()`** returns the index of the first matching element

```
[`Chris`,`Bruford`,22].findIndex( n => n === `Bruford`}); // 1
```

- **`fill()`** overrides the specified elements

```
[`Chris`,`Bruford`,22,true].fill(null);      // [null,null,null,null]
[`Chris`,`Bruford`,22,true].fill(null,1,2);  // [`Chris`,null,null,true]
```

Slide 13

New Methods in ES2015

- **`.entries()`**, **`.keys()`** & **`.values()`** each return a sequence of values via an iterator:

```
let arrayEntries = [`Chris`,`Bruford`,22,true].entries();
console.log(arrayEntries.next().value);      // [0,`Chris`]
console.log(arrayEntries.next().value);      // [1,`Bruford`]
console.log(arrayEntries.next().value);      // [2,22]
```

```
let arrayKeys = [`Chris`,`Bruford`,22,true].keys();
console.log(arrayKeys.next().value);         // 0
console.log(arrayKeys.next().value);         // 1
console.log(arrayKeys.next().value);         // 2
```

```
let arrayValues = [`Chris`,`Bruford`,22,true].values();
console.log(arrayValues.next().value);       // `Chris`
console.log(arrayValues.next().value);       // `Bruford`
console.log(arrayValues.next().value);       // 22
```

Slide 14

for...of loop

- The for-of loop is used for iterating over **iterable** objects (more on that later!)
- For an array if means we can loop through the array, returning each element in turn

```
//will print 1 then 2 then 3
let myArray = [1,2,3,4];
for (el of myArray) {
    if (el === 3) break;
    console.log(el);
}
```

- We could also loop through any of the iterables returned by the methods `.entries()`, `.values()` and `.keys()`

Slide 15