See the Shimmering

OCEAN OF OBJECTS

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐠, ⭐, 🏰, addCritter, takeOut};
```

✓

```
Nemo: { type  "fish", species: "clownfish", length: 3.7 }
```

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
Nemo: { type: "fish", species: "clownfish", length: 3.7 }
Dory: { type: "fish", species: "blue tang", length: 6.2 }
```

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

✓ ✓

✓

```
Nemo: { type: "fish", species: "clownfish", length: 3.7 }
Dory: { type: "fish", species: "blue tang", length: 6.2 }
Bubbles: { type: "fish", species: "yellow tang", length: 5.6 }
```

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
Nemo: { type: "fish", species: "clownfish", length: 3.7 }
Dory: { type: "fish", species: "blue tang", length: 6.2 }
Bubbles: { type: "fish", species: "yellow tang", length: 5.6 }
Peach: { type: "echinoderm", species: "starfish", length: 5.3 }
```

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐟, ⭐, 🏰, addCritter, takeOut};
```

✓ ✓ ✓ ✗

✗

```
Nemo: { type: "fish", species: "clownfish", length: 3.7 }
Dory: { type: "fish", species: "blue tang", length: 6.2 }
Bubbles: { type: "fish", species: "yellow tang", length: 5.6 }
Peach: { type: "echinoderm", species: "starfish", length: 5.3 }
"Coral Castle": { type: "environment", material: "coquina", moves: false }
```

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
                ✓   ✓   ✓   ✗   ✗       ↑
                                        ✗
```

```
addCritter: function ( name, type, species, length ){
   this[name] = {type: type, species: species, length: length};
}
```

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
               ✓   ✓   ✓   ✗   ✗       ✗
                                                ↑
                                                ✗
```

```
addCritter: function ( name, type, species, length ){
    this[name] = {type: type, species: species, length: length};
}
takeOut: function ( name ){
    this[name].name = name;
    var temp = this[name];
    delete this[name];
    return temp;
}
```

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐠, ⭐, 🏰, addCritter, takeOut};
```

✓ ✓ ✓ ✗ ✗ ✗ ✗

= 3 fish total

COUNTING FISH IN OUR TANK

What if we wanted to know how many fish our tank has at any given time?

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

✓ ✓ ✓ ✗ ✗ ✗ ✗

= 3 fish total

```
aquarium.length;
```

→ undefined

Hmm, uh oh. Generic Objects don't have a native `length` like Arrays and Strings do, so we can't use that in a loop format in order to get to each property.

ENUMERATION WITH THE FOR-IN LOOP

The for-in loop allows us to access each enumerable property in turn.

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
for ( var key in aquarium ) {

}
```

The in keyword looks "in" the Object to its right and finds each enumerable property in turn. Think of it like accessing each index of an Array.

ENUMERATION WITH THE FOR-IN LOOP

The for-in loop allows us to access each enumerable property in turn.

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
for ( var key in aquarium ) {
    console.log(key);
}
```

```
→ Nemo
→ Dory
→ Bubbles
→ Peach
→ Coral Castle
→ addCritter
→ takeOut
```

Logging out each property produces only their names as strings.

`key in aquarium`

ENUMERATION WITH THE FOR-IN LOOP

The for-in loop allows us to access each enumerable property in turn.

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
for ( var key in aquarium ) {
    console.log(key);
}
```

```
→ Nemo
→ Dory
→ Bubbles
→ Peach
→ Coral Castle
→ addCritter
→ takeOut
```

Logging out each property produces only their names as strings.

```
item key in aquarium
```

ENUMERATION WITH THE FOR-IN LOOP

Now we need a way to determine which properties in ‘aquarium’ are fish!

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
for ( var key in aquarium ) {

}
```

ENUMERATION WITH THE FOR-IN LOOP

Now we need a way to determine which properties in 'aquarium' are fish!

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
var numFish = 0;
for ( var key in aquarium ) {
      if ( aquarium[key].type == "fish" ) {

      }
}
```

Since key contains the string name of a property, we can use it in a set of brackets as an expression.

ENUMERATION WITH THE FOR-IN LOOP

Now we need a way to determine which properties in 'aquarium' are fish!

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
var numFish = 0;
for ( var key in aquarium ) {
      if ( aquarium[key].type == "fish" ) {

      }
}
```

Once we've accessed the Object that key refers to, we can seek its own type property, and check to see if the current Object is a fish.

ENUMERATION WITH THE FOR-IN LOOP

Now we need a way to determine which properties in 'aquarium' are fish!

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

?

```
var numFish = 0;
for ( var key in aquarium ) {
      if ( aquarium[key].type == "fish" ) {
            numFish++;
      }

}
```

```
aquarium["addCritter"].type;
```

→ undefined

```
undefined == "fish";
```

→ false

ENUMERATION WITH THE FOR-IN LOOP

Now we need a way to determine which properties in ‘aquarium’ are fish!

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
var numFish = 0;
for ( var key in aquarium ) {
      if ( aquarium[key].type == "fish" ) {
            numFish++;
      }
}
```

```
console.log(numFish);
```

→ 3

Current Property	aquarium[property]	has .type?	aquarium[property].type	type == fish?	numFish
Nemo	aquarium[“Nemo”]	YES	“fish”	TRUE	1
Dory	aquarium[“Dory”]	YES	“fish”	TRUE	2
Bubbles	aquarium[“Bubbles”]	YES	“fish”	TRUE	3
Peach	aquarium[“Peach”]	YES	“echinoderm”	FALSE	3
Coral	aquarium[“Coral Castle”]	YES	“environment”	FALSE	3
addCritter	aquarium[“addCritter”]	no	undefined	FALSE	3
takeOut	aquarium[“takeOut”]	no	undefined	FALSE	3

ADDING OUR FISH COUNTER TO THE AQUARIUM

We'll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, 🐠, ⭐, 🏰, addCritter, takeOut};
```

```
var numFish = 0;
for ( var key in aquarium ) {
      if ( aquarium[key].type == "fish" ) {
            numFish++;
      }

}
```

ADDING OUR FISH COUNTER TO THE AQUARIUM

We’ll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, 🐠, ⭐, 🏰, addCritter, takeOut};
```

```
aquarium.countFish = function ( ) {
        var numFish = 0;
        for ( var key in aquarium ) {
              if ( aquarium[key].type == "fish" ) {
                    numFish++;
              }
        }

}
```

ADDING OUR FISH COUNTER TO THE AQUARIUM

We'll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, 🐟, ⭐, 🏰, addCritter, takeOut};
```

```
aquarium.countFish = function ( ) {
       var numFish = 0;
       for ( var key in          ) {
             if (        [key].type == "fish" ) {
                  numFish++;
             }
       }

}
```

ADDING OUR FISH COUNTER TO THE AQUARIUM

We'll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
aquarium.countFish = function ( ) {
       var numFish = 0;
       for ( var key in this ) {
             if ( this[key].type == "fish" ) {
                  numFish++;
             }
       }
}
```

Remember, since countFish will be "owned" by aquarium, it will use the this keyword to refer to it as an owner Object.

ADDING OUR FISH COUNTER TO THE AQUARIUM

We’ll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut};
```

```
aquarium.countFish = function ( ) {
        var numFish = 0;
        for ( var key in this) {
              if ( this[key].type == "fish" ) {
                    numFish++;
              }
        }
        return numFish;
}
```

ADDING OUR FISH COUNTER TO THE AQUARIUM

We’ll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut, countFish};
```

```
aquarium.countFish = function ( ) {
        var numFish = 0;
        for ( var key in this ) {
              if ( this[key].type == "fish" ) {
                    numFish++;
              }
        }
        return numFish;
}
```

```
aquarium.countFish();
```

→ 3

ADDING OUR FISH COUNTER TO THE AQUARIUM

We’ll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, 🐡, ⭐, 🏰, addCritter, takeOut, countFish};
```

```
aquarium.countFish = function ( ) {
        var numFish = 0;
        for ( var key in this ) {
              if ( this[key].type == "fish" ) {
                   numFish++;
              }
        }
        return numFish;
}
```

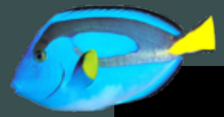
```
var poorDory = aquarium.takeOut("Dory");
```

ADDING OUR FISH COUNTER TO THE AQUARIUM

We'll need to build a function property using our loop

```
var aquarium = {🐠,     🐟, ⭐, 🏰, addCritter, takeOut, countFish};
```

```
aquarium.countFish = function ( ) {
        var numFish = 0;
        for ( var key in this ) {
              if ( this[key].type == "fish" ) {
                    numFish++;
              }
        }
        return numFish;
}
```



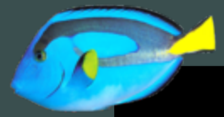
```
var poorDory = aquarium.takeOut("Dory");
```

ADDING OUR FISH COUNTER TO THE AQUARIUM

We'll need to build a function property using our loop

```
var aquarium = {🐠, 🐟, ⭐, 🏰, addCritter, takeOut, countFish};
```

```
aquarium.countFish = function ( ) {
        var numFish = 0;
        for ( var key in this ) {
              if ( this[key].type == "fish" ) {
                   numFish++;
              }
        }
        return numFish;
}
```

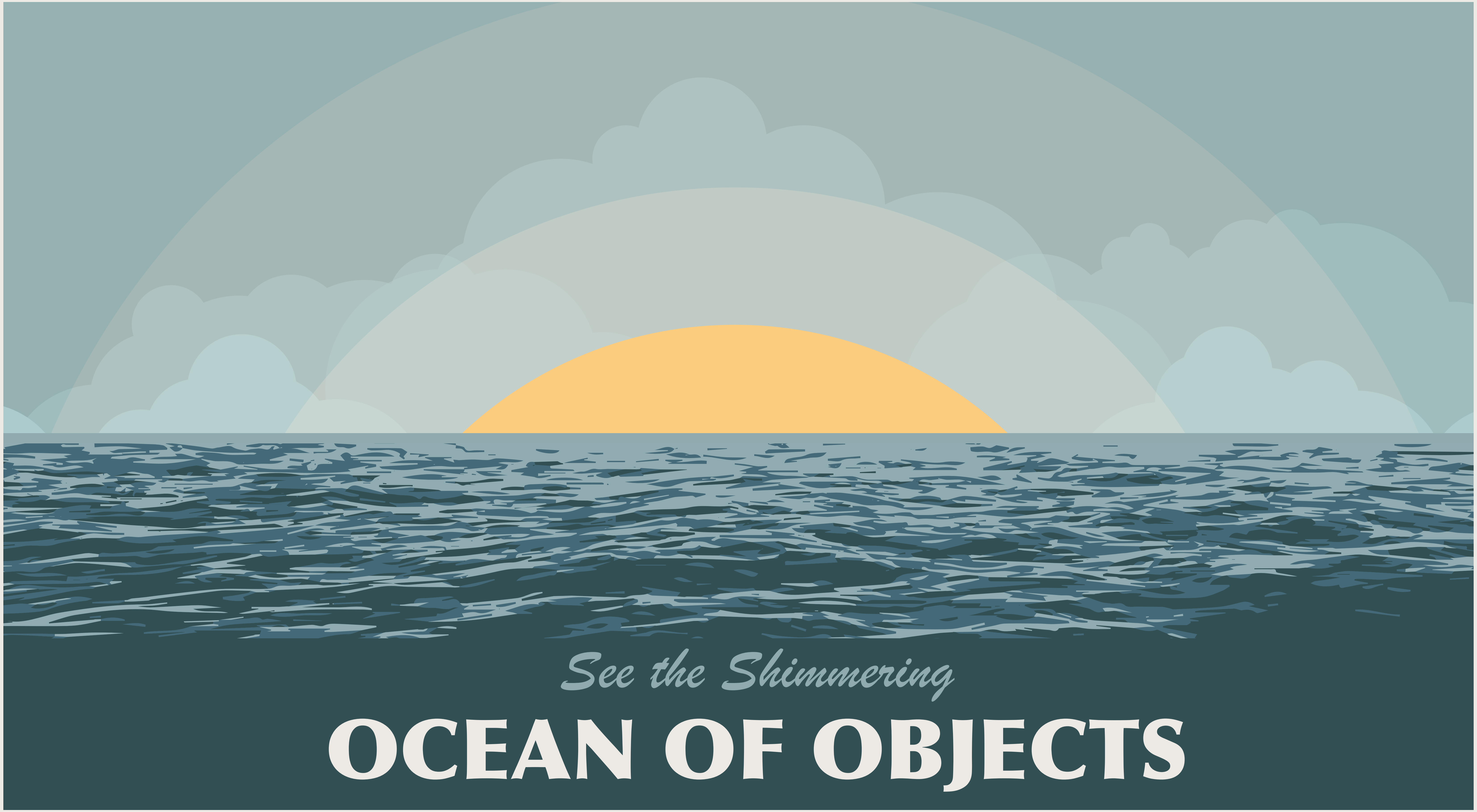


```
var poorDory = aquarium.takeOut("Dory");
```

→ true

```
aquarium.countFish();
```

→ 2


See the Shimmering
OCEAN OF OBJECTS