

















# Coding with Scratch: Learning Loops: Repetition Loops (Count-Controlled)

<p><b>National Curriculum</b> Use sequence, selection and repetition in programs; work with variables and various forms of input and output.</p> <p><b>Aim</b> To use a loop to repeat an action or sequence multiple times.</p>	<p><b>Lesson Duration</b> This lesson will last approximately 60 minutes.</p> 
<p><b>Success Criteria</b></p> <ul style="list-style-type: none"> <li>I can explain what a loop is.</li> <li>I know that there are different types of loops.</li> <li>I know when to use a repeat loop.</li> <li>I can customise repeat blocks to repeat an action a specified number of times.</li> </ul>	<p><b>Key Vocabulary</b> Block code, repeat, repetition, loop, count-controlled.</p>

**Prior Learning:** After completing Lesson 1, children should be confident in changing backdrops and adding and controlling sprites within Scratch. They should know what block code is, be able to find blocks in different categories and use them to build algorithms in the Code Area. Children should also understand the need to test and debug algorithms to remove errors in code.

## Learning Sequence

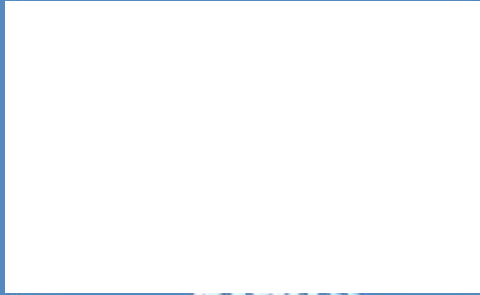
 	<p><b>Remember It:</b> Remind the children about the different categories of block code in Scratch using the <b>Block Code Sorting Activity</b>. Each pair or group will need a set of the cut-up cards. In this task, children are required to sort the cards to match a range of blocks to the category in which they are found. Check the answers with children using the <b>Lesson Presentation</b>. Recall prior knowledge by asking pupils to explain what action some of the blocks will produce when used in Scratch. This resource has been purposely produced in black and white so that children cannot simply match colours together. There is a coloured version of the activity available if required to support less-able pupils.</p>	
	<p><b>What is a Loop?:</b> Use the <b>Lesson Presentation</b> to introduce the concept of repetition in instructions. When discussing the glass of squash example, children may suggest answers such as writing 'x50' beside the instructions or adding the words 'repeat 50'.</p> <p>Children will learn that a loop is a way of repeating instructions or lines of code in an algorithm. Discuss the examples of loops in everyday life and how they can be utilised within computers. Encourage children to begin to think about why being able to use repetition might be useful when coding. <b>What are the advantages of repetition when writing instructions?</b></p>	
	<p><b>Loops in Scratch:</b> Use the <b>Lesson Presentation</b> to introduce children to the three different loop blocks available in Scratch. Ask children to look carefully at each block and discuss the things that are the same and the things that are different before providing them with further information about each type of loop. <b>Which block do you think would be most useful for repeating an action or a sequence of actions a specific number of times?</b></p>	
 	<p><b>Using a Repeat Loop:</b> Explore the repeat block. Ensure that children can recognise this is the correct loop to use to repeat an action or sequence a specific number of times. Children will need to know that the white area of the block can be customised by inputting a word or number. This is important for making code accurate and flexible in any given context. Use the examples in the <b>Lesson Presentation</b> to ensure that children can see that the number inputted into the loop block affects how often something is repeated. This is referred to as a 'count-controlled' loop.</p> <p>The <b>Lesson Presentation</b> provides examples of loops for children to think about and discuss. At this point you may wish to have children write the algorithms themselves in Scratch so that they can see how the loop works and how many times the actions are repeated. Alternatively, you may feel that your children do not need to complete this step and can move directly to the independent <b>Octopus Antics Scratch Task</b>.</p>	

	<p><b>Octopus Antics:</b> Ensure that children have access to Scratch and are logged in correctly if using a teacher account. Use the <b>Lesson Presentation</b> to introduce the task. Children can use their differentiated <b>Octopus Antics Scratch Task</b> sheets to investigate using a count-controlled loop to create repetition.</p>		
	<p>★ Use a count-controlled loop to make an octopus change colour.</p>	<p>★★ Use a count-controlled loop to make an octopus change colour and move randomly around the backdrop.</p>	<p>★★★ Use a count-controlled loop to make an octopus change colour and move around randomly with a repeated sound effect.</p>
	<p><b>Why Use Loops?:</b> Encourage the children to reflect on the importance of using loops for repetition. Take feedback from the class before revealing the advantages of using loops within code.</p>		

**Exploreit**  
**Choreographit:** Challenge children to plan a short dance sequence. They should plan between four and ten moves that will repeat a set number of times within their dance. Encourage the children to record their dance instruction as an algorithm, in the shortest possible way, making use of repetition and loops to help them.  
**Codeit:** Use the \_\_\_\_\_ to code a dance for the sprite using count-control loops to add repetition.

**Assessment Notes:**

**Disclaimers:**  
**External Links:**  
 We hope you find the information on our website and resources useful. This resource contains links to external websites and/or external apps. Please be aware that the inclusion of any link in this resource should not be taken as an endorsement of any kind by Twinkl of the linked website and/or app, or any association with its operators. You should also be aware that we have no control over the availability of the linked pages and/or apps. If the link is not working, please let us know by contacting TwinklCares and we will try to fix it although we can assume no responsibility if this is the case. We are not responsible for the content of external sites and/or external apps.  
**Scratch Safety:**  
 Showing or creating the flashing sprite effect could be problematic for children with conditions such as epilepsy. Discretion is advised.



# Computing

## Coding with Scratch: Learning Loops

Coding  
with Scratch

# Repetition Loops

(Count-Controlled)

repeat



# Question Marks

**This is Quizby.  
He is a question mark who  
loves to ask questions.**



When you see a question mark icon like this in the **Lesson Presentation**, it can be clicked on to reveal one of Quizby's questions.



The questions that appear next to these question marks will help you to think about the key learning throughout the lesson.

## **Aim**

To use a loop to repeat an action or sequence multiple times.

## **Success Criteria**

I can explain what a loop is.

I know that there are different types of loops.

I know when to use a repeat loop.

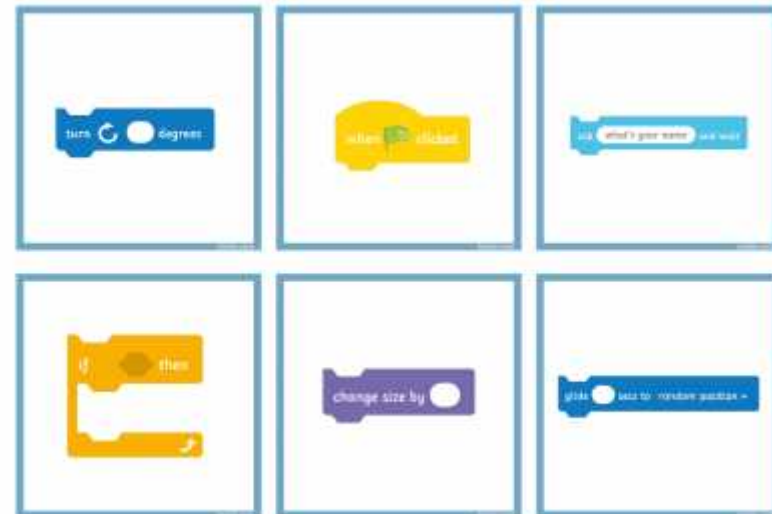
I can customise repeat blocks to repeat an action a specified number of times.

## Remember It

Scratch uses blocks of code to create algorithms.  
The blocks are separated into different types or categories.  
Can you remember where to find some of the different blocks?



Put on your sorting hat.  
Use the **Block Code**  
**Sorting Activity** and sort  
the cards into groups.  
Which blocks come from  
the same category?



When you have finished, check your answers on the next slide.

# Remember It

How well did you do? Click below to see the answers.

**Motion** blocks



**Looks** blocks



**Sound** blocks



**Events** blocks



**Control** blocks



**Sensing** blocks

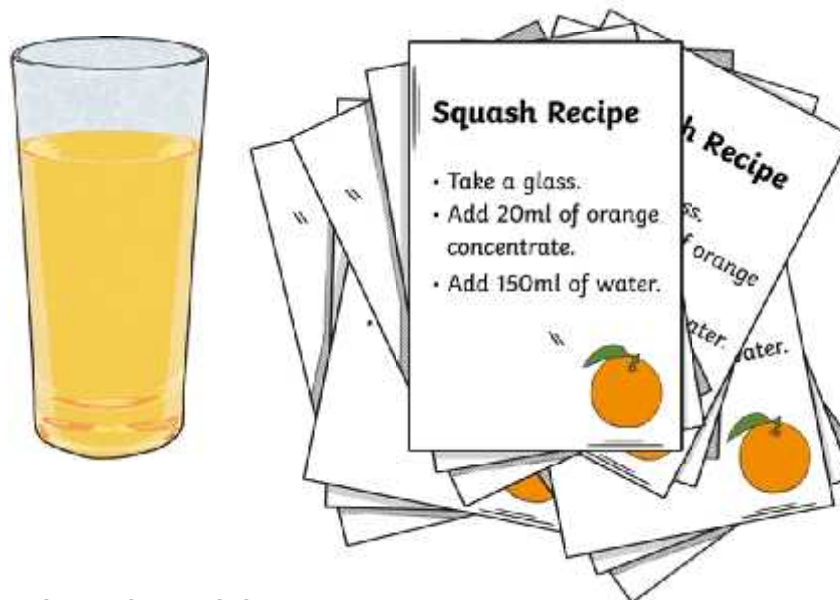




## What Is a Loop?

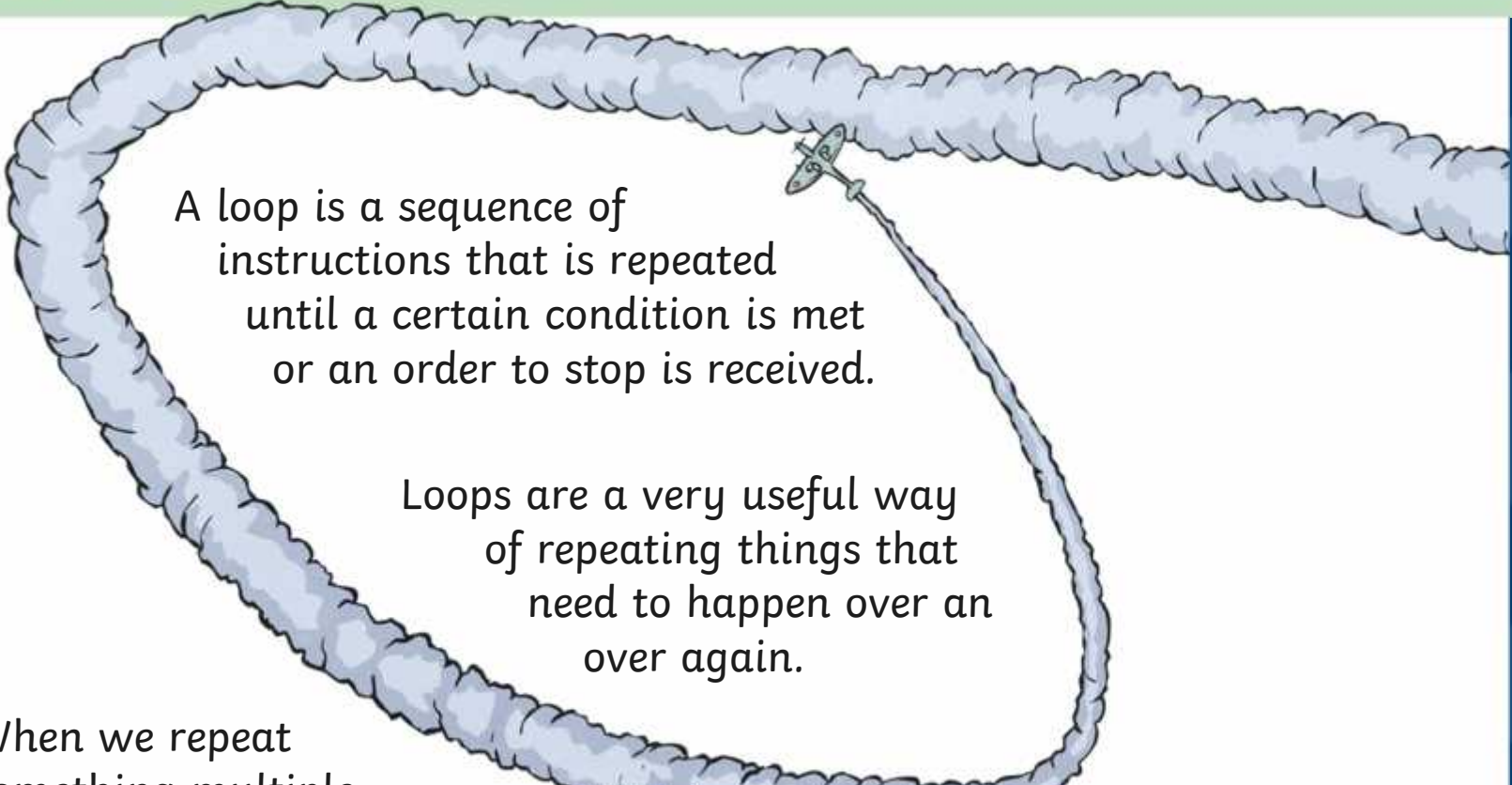
Look at the instructions for making a glass of squash.

They are fine for one glass of squash but imagine if you had to write the same instructions each time to make 50 glasses of squash!



Sometimes we need to be able to repeat instructions easily and quickly.  
Can you think of a way to tell someone to repeat this instruction 50 times?

## What Is a Loop?



A loop is a sequence of instructions that is repeated until a certain condition is met or an order to stop is received.

Loops are a very useful way of repeating things that need to happen over and over again.

When we repeat something multiple times we call it repetition.

X What are the advantages of repetition when writing instructions?



# What Is a Loop?

Loops can be found in lots of different places. We use them in everyday life to repeat actions, such as singing certain parts of a song or playing clapping games.

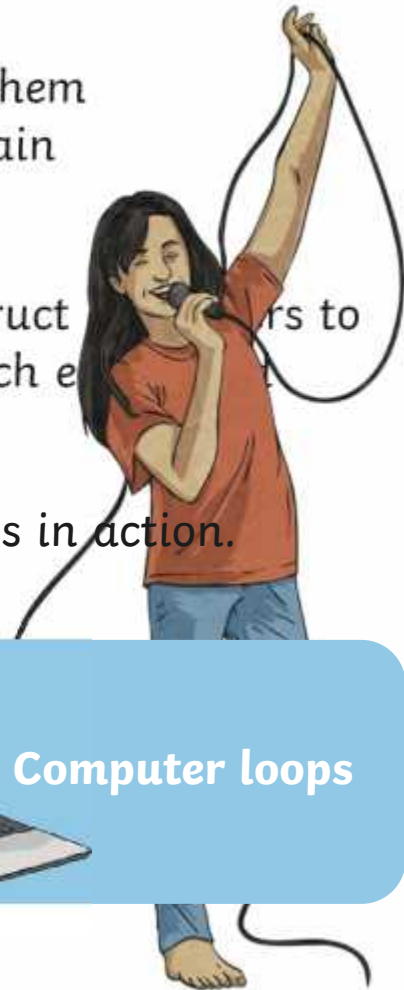
Loops are very important in computing. They can instruct computers to carry out repetitive tasks. They make writing code much easier and quicker.

Click on the options below to find out more about loops in action.

Real-world loops

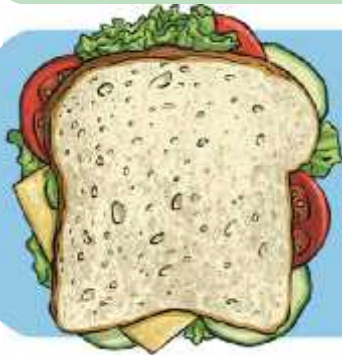


Computer loops



# What Is a Loop?

When you go swimming your arms and legs move in a loop. They repeat the same actions again and again until you reach the end of the swimming pool.



When the dinner staff make cheese and salad sandwiches for the school picnic they follow the same instructions to make each sandwich. The instructions do not change, they are just repeated.

When you lay the table for dinner time, you repeat the same arrangement of plates and cutlery for each person. This is a loop.



**BACK**

Can you think of any more examples of real-world loops?

## What Is a Loop?

To log into some apps and software you have to enter a password. If you enter an incorrect password, the password box and instructions may reappear three times giving you three chances to enter a correct password. This is an example of a computing loop.



A computer game that counts a score is an example of a computer loop. Each time the goal is achieved the computer program adds a specific number of points to the score. This action is repeated throughout the game.

**BACK**

## Loops in Scratch

There are three different loop blocks in Scratch and they all do a slightly different job.

You can find the loop blocks in the **Control** category at the left-hand side of the **Code Area**.



**repeat**  
(a given number of times)  
block



**forever**  
block



**repeat until**  
block

**Talk to your partner:** What do you notice about the different loop blocks?

# Loops in Scratch

A loop is a sequence of instructions that is repeated until a certain condition is met.



This block repeats the instructions for a specified number of times.



This block repeats the instructions until the loop is stopped.



This block repeats the instructions until a certain condition is met to stop the loop.

X

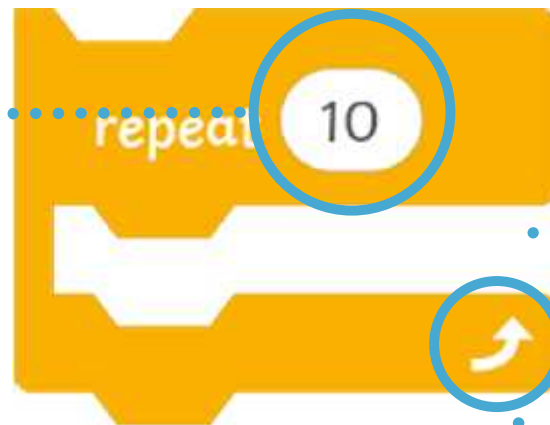
Which block do you think would be best for repeating an action a certain number of times?



## Using a Repeat Loop

In this lesson you will learn about the repeat (a given number of times) loop. Look carefully at this **repeat** (a given number of times) block.

This white area allows us to customise the repeat block. We can edit the number to change how many times something is repeated.



The actions that are to be repeated can be added inside the **repeat** block.

The arrow at the bottom shows that the code inside the block will be repeated.

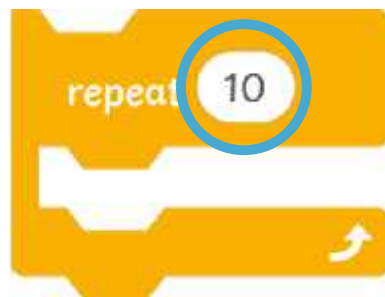


## Using a Repeat Loop

When the **repeat** (a given number of times) loop is used we say that the code is 'count-controlled'. We can call it a count-controlled loop.

The number added into the white area in the loop counts and controls how many times the actions must be repeated.

A



B



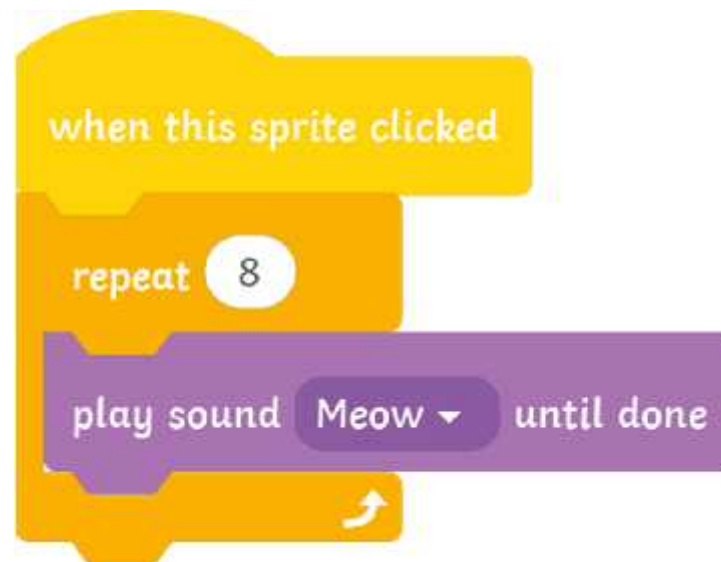
C



How many times will the actions be repeated in these algorithms?  
Which loop will repeat the actions the greatest number of times?

## Using a Repeat Loop

How many times will the actions be repeated in this algorithm?  
What will the sprite do?



That's right! The sprite will say Meow **8** times.

## Using a Repeat Loop

How many times will the actions be repeated in this algorithm?  
What will the sprite do?



The sprite will grow bigger **3** times. Did you guess correctly?

## Using a Repeat Loop

How many times will the actions be repeated in this algorithm?  
What will the sprite do?



A tricky one this time. The sprite will move 50 steps and then wait for 2 seconds. It will repeat this **5** times. How many steps will the sprite move altogether?

## Using a Repeat Loop



Why not try writing these algorithms in Scratch yourself and see how they work?

You could always try customising the blocks to make the algorithm different.



# Octopus Antics



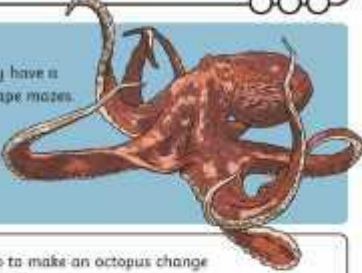
Now it is your turn!  
Look at the **Octopus Antics Scratch Task**.

Can you use the count-controlled repeat block in your code and use repetition to complete the task?

## Octopus Antics

To use a loop to repeat an action or sequence multiple times.


**Did You Know?**  
Octopuses are very intelligent animals. They have a large brain and can solve problems and escape mazes. They are also able to change the colour of their skin. They do this to camouflage themselves from predators and to communicate with other octopuses.



**Task:** Can you use a count-controlled loop to make an octopus change colour and move to random positions 10 times?

**Getting Started**  
Select one of the **Underwater** backdrops.  
Choose **Octopus** from the sprite library.  
Move the **Octopus** to a good position on your backdrop.

**Useful blocks**



**Extension:** Can you add a second sprite to your backdrop and use a count-controlled loop to make it change colour too? How can you make the Octopus change colour more quickly or more slowly?

## Why Use Loops?

Loops are very useful when writing computer code.  
Can you think why?  
Talk to your partner and share your ideas.

- Loops keep code clear and simple.
- Loops reduce the number of lines of code that have to be written which saves computer programmers lots of time.
- Loops reduce errors because the code only has to be written once.
- Loops make code shorter and this makes it easier to debug.

## **Aim**

To use a loop to repeat an action or sequence multiple times.

## **Success Criteria**

I can explain what a loop is.

I know that there are different types of loops.

I know when to use a repeat loop.

I can customise repeat blocks to repeat an action a specified number of times.



The Scratch logo is a yellow speech bubble with a white arrow pointing to the right. It is centered on a dark blue background with a pattern of lighter blue, semi-transparent Scratch code blocks.

**Coding  
with Scratch**

**Motion**  
Blocks

**Looks**  
Blocks

**Events**  
Blocks

**Control**  
Blocks


**Sound**  
Blocks

**Sensing**  
Blocks

turn   degrees

when  clicked

ask  and wait

if  then

change size by

glide  secs to

change volume by

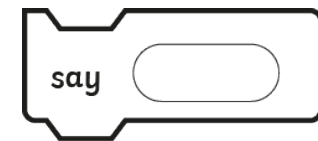
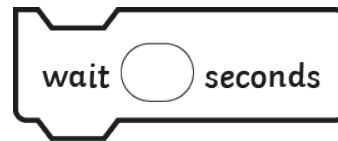
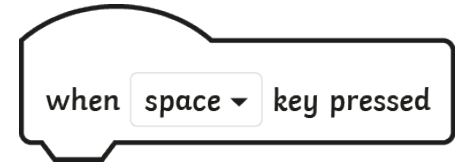
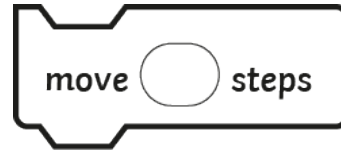
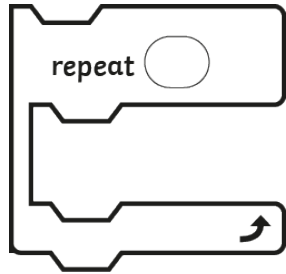
when this sprite clicked

point in direction

touching  ?

switch costume to

when I receive



**Motion**  
Blocks

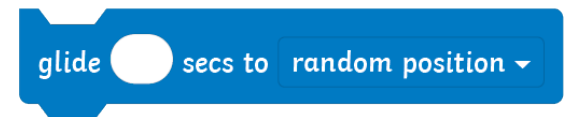
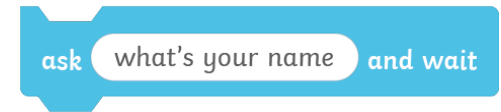
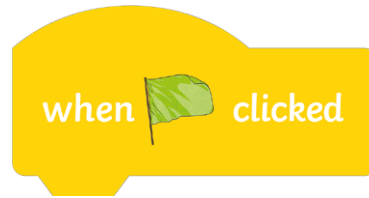
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**Sound**  
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**Sensing**  
Blocks



change volume by

when this sprite clicked

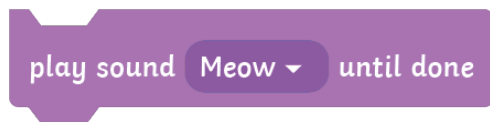
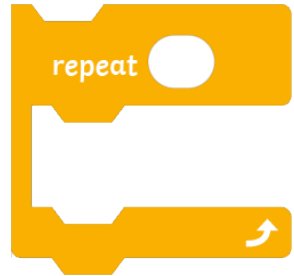
point in direction

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# Octopus Antics

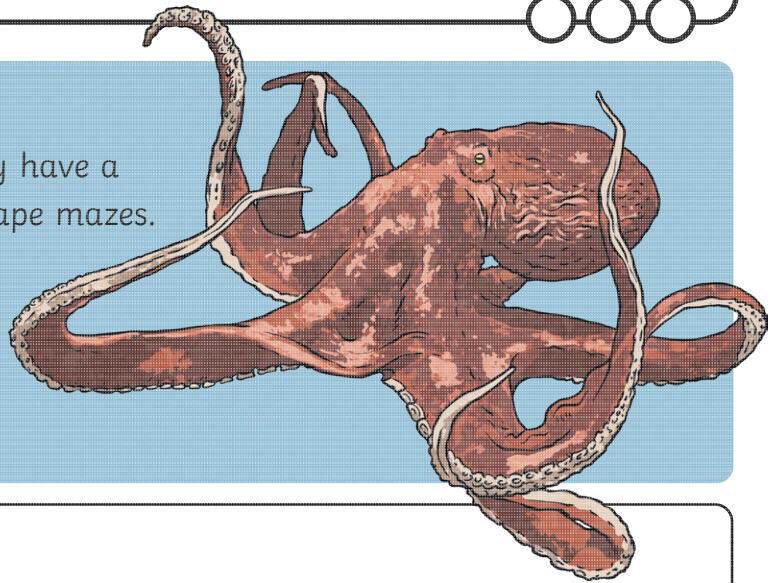
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## Did You Know?

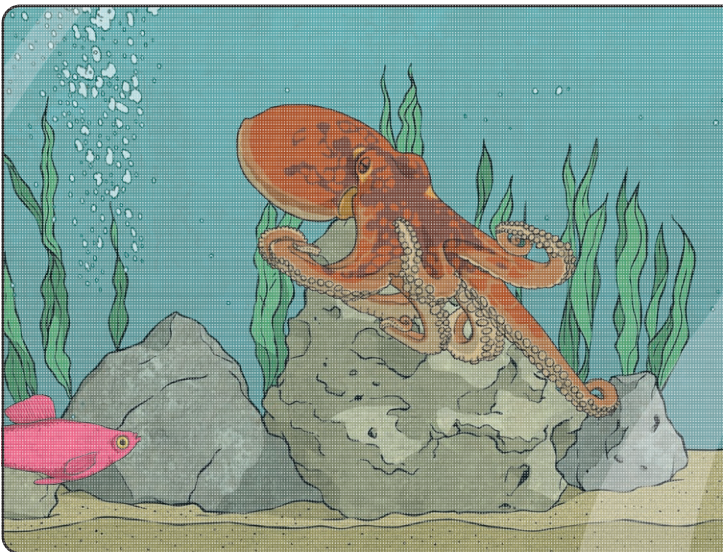
Octopuses are very intelligent animals. They have a large brain and can solve problems and escape mazes.

They are also able to change the colour of their skin. They do this to camouflage themselves from predators and to communicate with other octopuses.



## Task:

Can you use a count-controlled loop to make an octopus change colour 20 times?



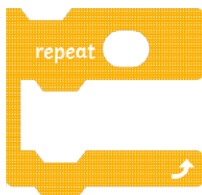
## Getting Started

Select one of the **Underwater** backdrops.

Choose **Octopus** from the sprite library.

Move the **Octopus** to a good position on your backdrop.

## Useful blocks



## Extension:

How can you make the **Octopus** change colour more quickly or more slowly?

# Octopus Antics

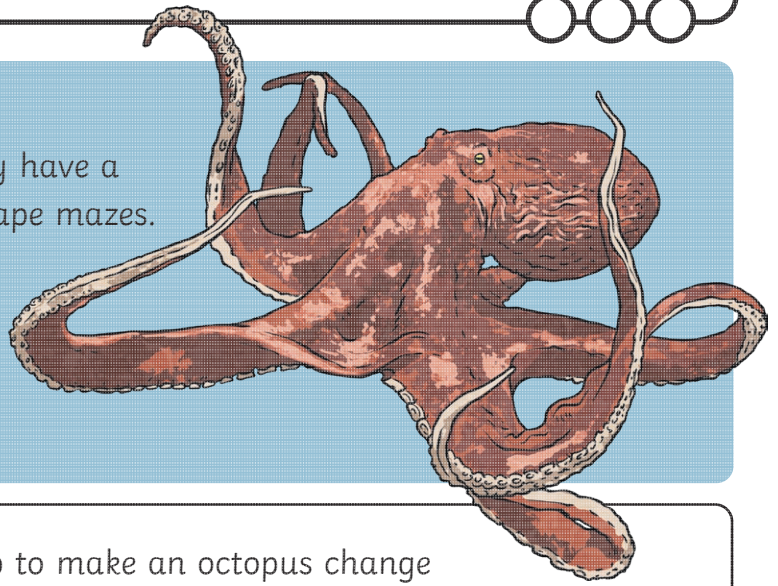
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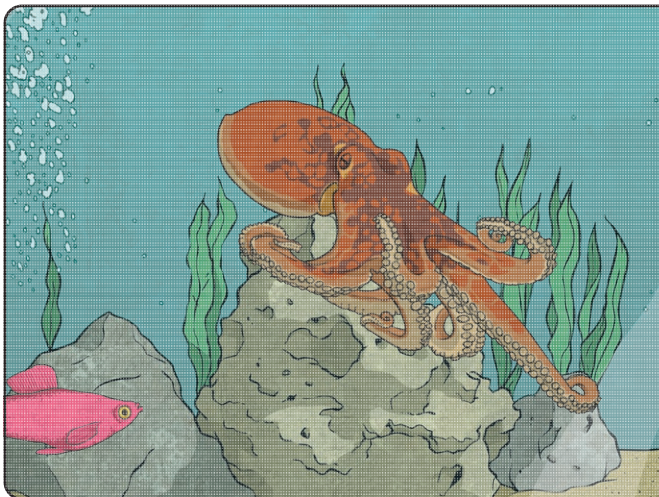
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**Task:** Can you use a count-controlled loop to make an octopus change colour and move to random positions 10 times?



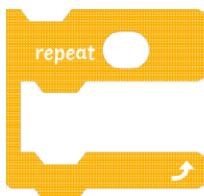
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**Extension:** Can you add a second sprite to your backdrop and use a count-controlled loop to make it change colour too?

How can you make the Octopus change colour more quickly or more slowly?

# Octopus Antics

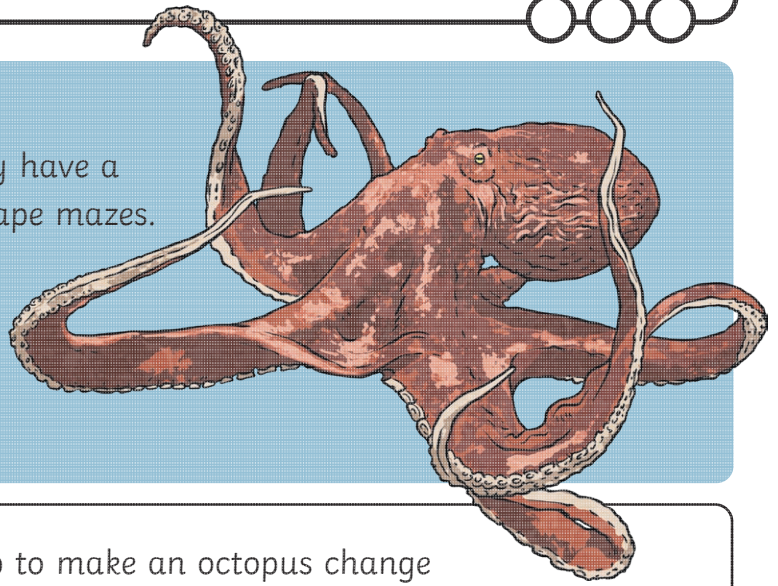
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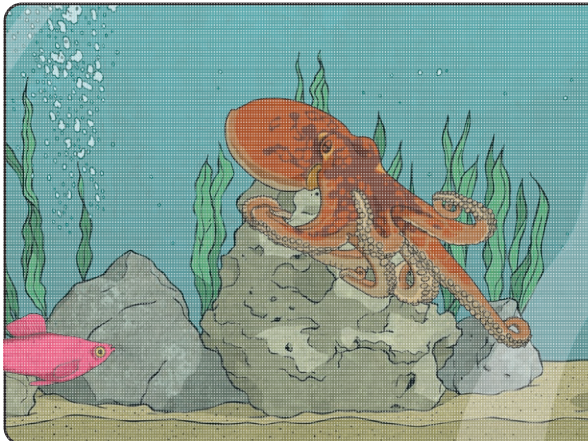
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**Task:** Can you use a count-controlled loop to make an octopus change colour and move to random positions 5 times with a repeated sound effect?



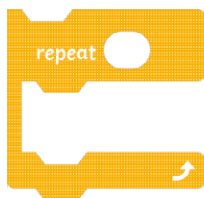
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**Extension:** Can you add a second sprite to your backdrop and use a count controlled loop to make it change colour too?

How can you make the octopus change colour more quickly or more slowly?

Can you make the octopus say something each time it moves?

# Octopus Antics Answers

The following examples show possible solutions to the tasks. Children may have completed the task in a different way, using different blocks, changing the order of the blocks or editing variables.

## Task ★ :

Can you use a count-controlled loop to make an octopus change colour 20 times?

```
when green flag clicked
repeat 20
  change color effect by 25
  wait 1 seconds
```

## Task ★★ :

Can you use a count-controlled loop to make an octopus change colour and move to random positions 10 times?

```
when green flag clicked
repeat 10
  change color effect by 25
  go to random position
  wait 1 seconds
```

## Task ★★★ :

Can you use a count-controlled loop to make an octopus change colour and move to random positions 5 times with a repeated sound effect?

```
when green flag clicked
repeat 5
  play sound Ocean Wave until done
  change color effect by 25
  go to random position
wait 1 seconds
```

# Octopus Antics

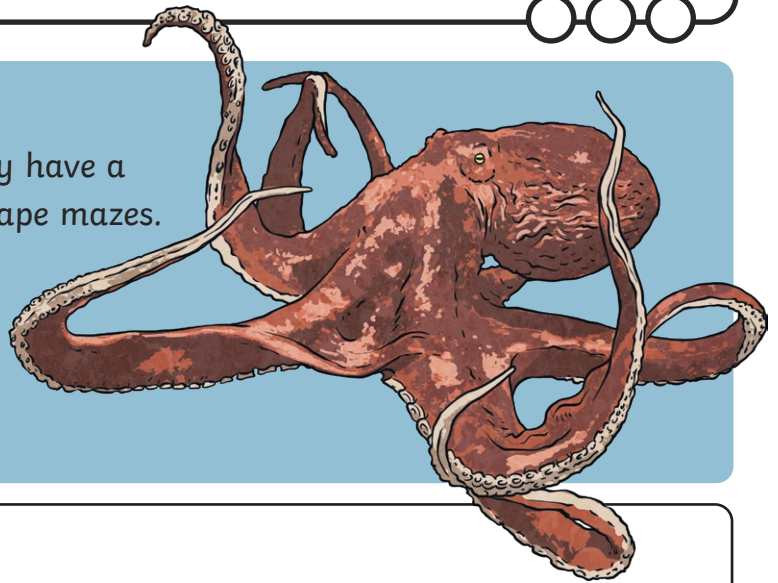
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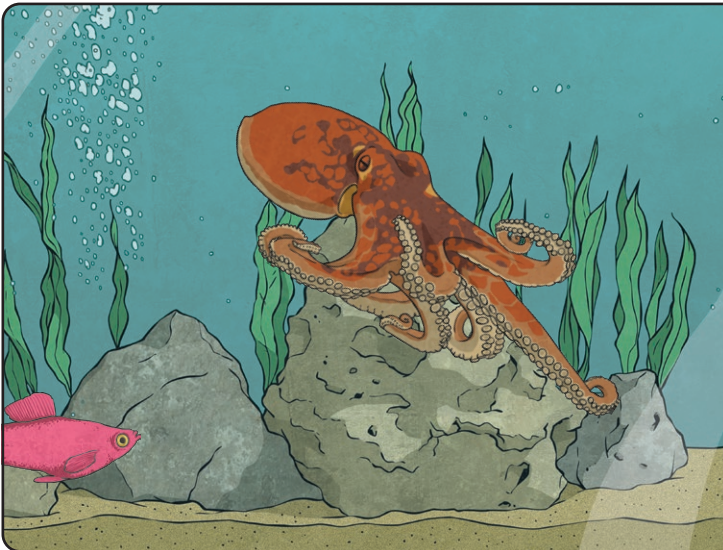
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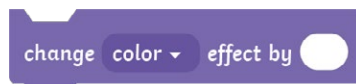
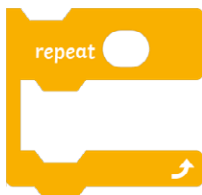
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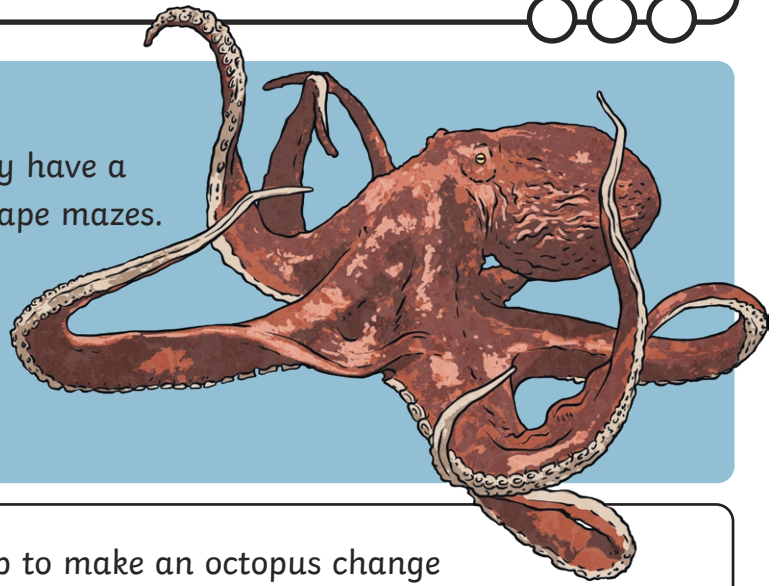
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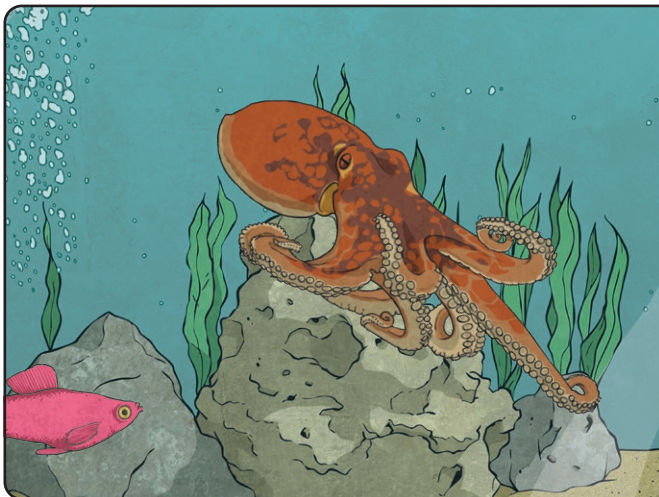
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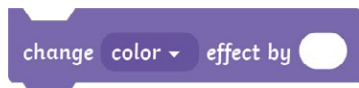
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How can you make the Octopus change colour more quickly or more slowly?

# Octopus Antics

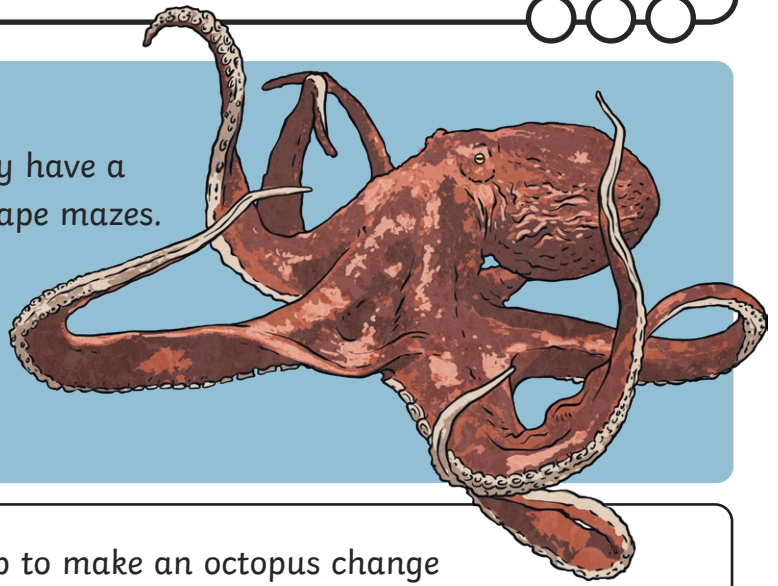
To use a loop to repeat an action or sequence multiple times.



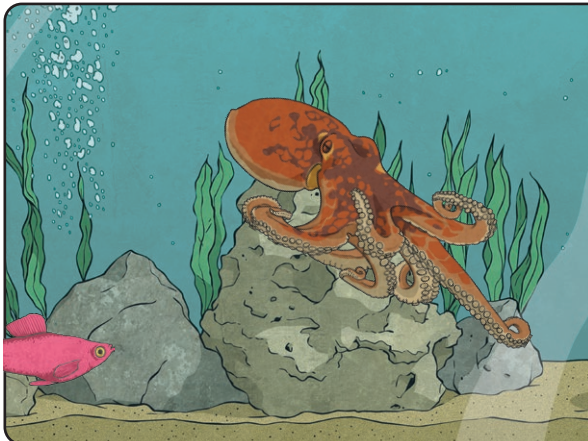
## Did You Know?

Octopuses are very intelligent animals. They have a large brain and can solve problems and escape mazes.

They are also able to change the colour of their skin. They do this to camouflage themselves from predators and to communicate with other octopuses.



**Task:** Can you use a count-controlled loop to make an octopus change colour and move to random positions 5 times with a repeated sound effect?



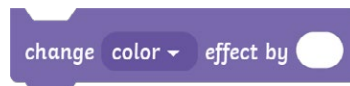
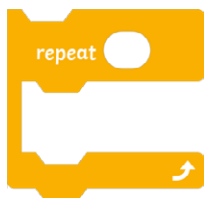
## Getting Started

Select one of the **Underwater** backdrops.

Choose **Octopus** from the sprite library.

Move the **Octopus** to a good position on your backdrop.

## Useful blocks



**Extension:** Can you add a second sprite to your backdrop and use a count controlled loop to make it change colour too?

How can you make the octopus change colour more quickly or more slowly?

Can you make the octopus say something each time it moves?



# Octopus Antics Answers

The following examples show possible solutions to the tasks. Children may have completed the task in a different way, using different blocks, changing the order of the blocks or editing variables.

## Task ★ :

Can you use a count-controlled loop to make an octopus change colour 20 times?

```
when clicked clicked
repeat 20
  change color effect by 25
  wait 1 seconds
```

## Task ★★ :

Can you use a count-controlled loop to make an octopus change colour and move to random positions 10 times?

```
when clicked clicked
repeat 10
  change color effect by 25
  go to random position
  wait 1 seconds
```

## Task ★★★ :

Can you use a count-controlled loop to make an octopus change colour and move to random positions 5 times with a repeated sound effect?

```
when clicked clicked
repeat 5
  play sound Ocean Wave until done
  change color effect by 25
  go to random position
  wait 1 seconds
```

Coding with Scratch: Learning Loops | Repetition With Loops  
(Count-Controlled)

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I can explain what a loop is.		
I know that there are different types of loops.		
I know when to use a repeat loop.		
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