


















# Coding with Scratch: Learning Loops: Forever Loops

<b>National Curriculum</b> Use sequence, selection and repetition in programs; work with variables and various forms of input and output.		<b>Lesson Duration</b> This lesson will last approximately 60 minutes.
<b>Aim</b> To use a forever loop to repeat instructions continuously.		
<b>Success Criteria</b> I know the difference between a repeat loop and a forever loop. I know when to use a forever loop. I can use forever loops in algorithms for a particular purpose. I can explain why loops are useful.	<b>Key Vocabulary</b> Forever loop, infinity, repetition, algorithm, continuous.	
<b>Resources</b> <a href="#">Lesson Pack</a> PC devices, such as laptops, Chromebooks and/or tablets Scratch Online version accessed via _____	<b>Preparation</b> Differentiated <a href="#">Disco Dancers Activity Sheet</a> - one per child as required. Please access Lesson 4 (Crab Teacher Example), Lesson 4 (Cat2 Teacher Example), Lesson 4 (Beetle Teacher Example) and Lesson 4 (Let's Dance Teacher Example) Scratch files within the _____	
<b>Prior Learning:</b> From previous lessons, children should be familiar with the three types of loops available in Scratch. They will have explored the count-controlled loop for repetition and used this within algorithms		

## Learning Sequence

	<b>Remember It:</b> Use the <a href="#">Lesson Presentation</a> to remind children about the repeat block and its function. Please access <a href="#">Lesson 4 (Crab Teacher Example)</a> , <a href="#">Lesson 4 (Cat2 Teacher Example)</a> and <a href="#">Lesson 4 (Beetle Teacher Example)</a> Scratch files. Run each one in turn and challenge the children to identify which algorithm was used to code the sprites. Draw children's attention to how the use of a loop helps to simplify code.	
  	<b>The Forever Loop:</b> Use the <a href="#">Lesson Presentation</a> to introduce children to the forever loop. Ask them to think about the differences between the repetition block and the forever block. Children should understand that there is no option to customise the forever block because the actions inside the forever loop will always run continuously unless stopped. Look at the dance moves Cat wants to teach them. Children can practise the dance moves together to become familiar with them. They should recognise that a loop could be used to create repetition. Encourage children to think about the two different loops and to realise that in a real-life setting a forever loop may be challenging as humans cannot repeat actions without an end but computer programs can repeat actions endlessly without tiring. <b>Why is a loop useful in coding?</b> Use the examples on the <a href="#">Lesson Presentation</a> to think about when children may use a forever loop in their own coding. Challenge children to create an algorithm in Scratch to make a frog jump up and down forever. Introduce children to the blocks they need to use and give them time to create and test their algorithm. Remind children about the importance of running their program and debugging it if they find something that does not work. Click the frog to show children a possible solution.	
	<b>Let's Dance:</b> Introduce children to the Costumes available for some sprites within Scratch and ensure that they know where to locate these using the tabs above the Block Palette. Show children the algorithm for the Cassy Dancer sprite and view the <a href="#">Lesson 4 (Let's Dance Teacher Example)</a> Scratch project. Ask children to identify the different dance moves they can see happening in the dance. Ensure children can see that a wait instruction is important to separate each of the movements. Reducing the wait time between moves makes Cassy dance faster. <b>What would happen if wait blocks were not included in the forever loop?</b> Children should understand that the dance moves would all happen too fast for us to be able to see them clearly.	

 	<p><b>Disco Dancers:</b> Use the <a href="#">Lesson Presentation</a> to introduce the children to their task. Provide children with the appropriate differentiated <a href="#">Disco Dancer Activity Sheets</a>.</p> <div style="display: flex; justify-content: space-around;"> <div>  <p>Children use three to four costume changes to create a simple dance routine for a single dancer.</p> </div> <div>  <p>Children use a range of costume changes and movements to create a longer dance routine with an added soundtrack.</p> </div> <div>  <p>Children use a range of costume changes, movements, music and light effects to create a dance performance with more than one dancer.</p> </div> </div>	
	<p><b>Dance Off:</b> Make sure that children have saved their work with an appropriate filename. Invite children to present their dance creations to the class, group or partner and evaluate each other's work. The <a href="#">Lesson Presentation</a> provides key points for children to think about when evaluating. Encourage children to reflect on whether this task would have been easy to complete without using a forever loop. Children should understand that the forever loop allows something to happen continuously without having to write huge amounts of code.</p>	

**Exploreit**

**Researchit:** Children may like to find out more about the concept of infinity? Can they find out what symbol is used for infinity? Are there any examples of infinity?

**Codeit:** Provide children with the . Can they use forever loops to help solve the challenges?

**Assessment Notes:**

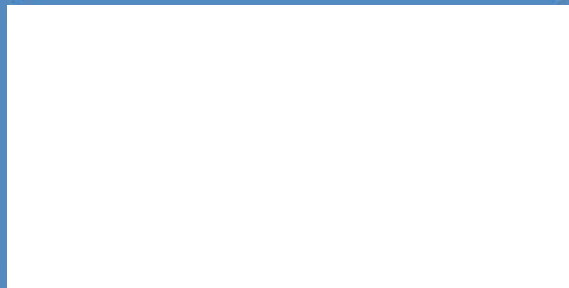
**Disclaimers:**

**External Links:**

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

# Forever Loops



# 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**

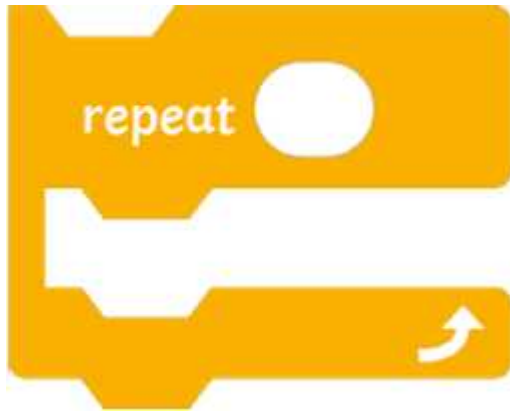
To use a forever loop to repeat instructions continuously.

## **Success Criteria**

I know the difference between a repeat loop and a forever loop.  
I know when to use a forever loop.  
I can use forever loops in algorithms for a particular purpose.  
I can explain why loops are useful.

## Remember It

Do you remember this Scratch block from last lesson?

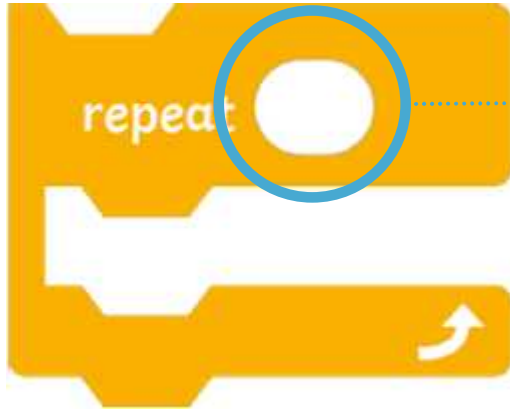


**Talk About It:** Talk to your partner. Can you remember what this block is called? What does it do? Why is it useful?



## Remember It

Do you remember this Scratch block from last lesson?



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

Being able to customise coding blocks is very important. It helps to keep code short and simple. Using repetition in coding saves computer programmers a lot of time.



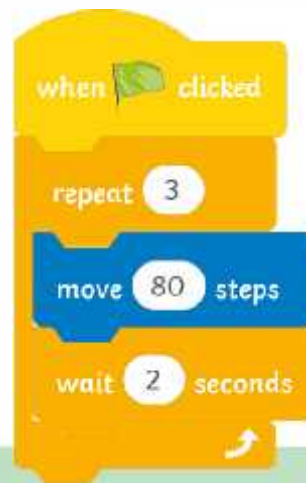
## Remember It

The sprites in Scratch are all in a dancing mood today. Just look at them go!

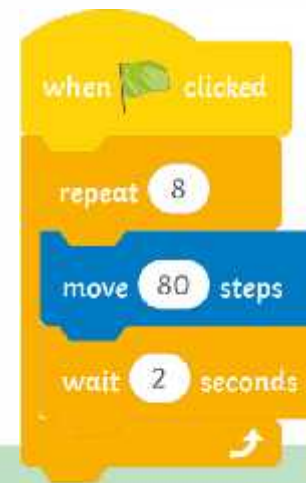
Open [Lesson 4 \(Beetle Teacher Example\)](#) to see **Beetle** dance. Can you spot the correct algorithm that has been used?



Not this one. There is no loop block to repeat the actions.



Well done. **Beetle** repeats the dance moves 3 times.



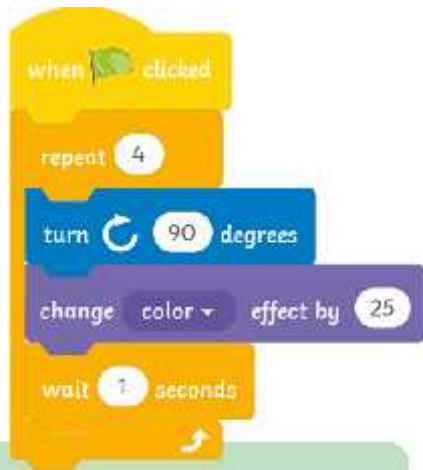
Not this one. **Beetle** does not repeat the dance moves 8 times.

## Remember It

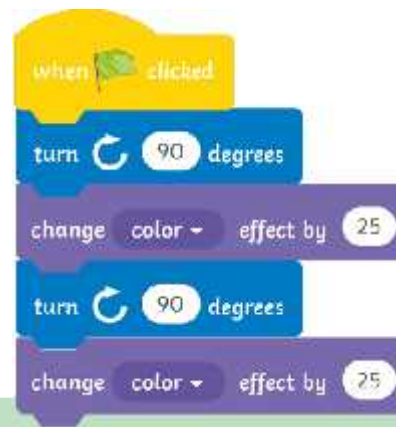


## Remember It

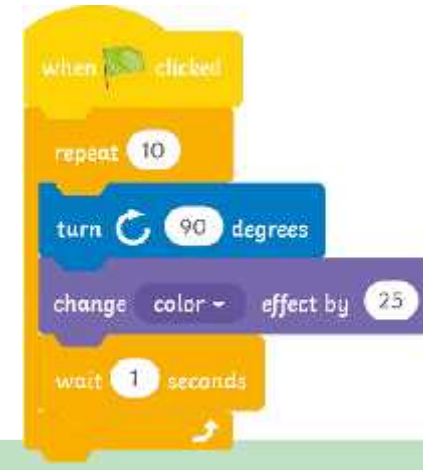
Open  to watch **Cat2** dance.  
Can you spot which algorithm has been used?



Spot on!  
**Cat2** repeats her  
crazy dance moves  
4 times.



Not this one. There  
is no loop block to  
repeat the actions.

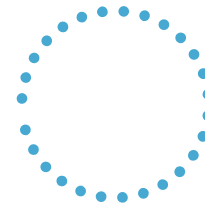
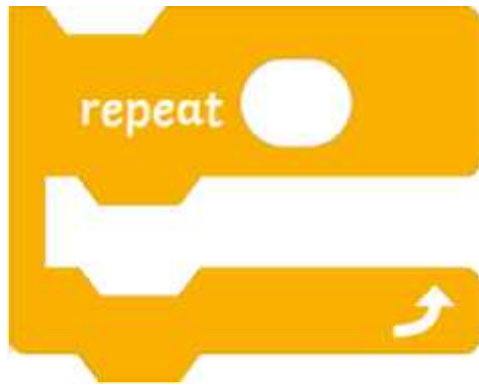


Not this one.  
There are too many  
repeats.



## The Forever Loop

In this lesson, you will learn about another type of loop in Scratch called a **forever** loop.



**Talk About It:** Look carefully at the two blocks. What do you notice is different between them?

Did you notice that the **forever** block does not include a white area where you can customise how many times to repeat the code within it? Why do you think that is?

# The Forever Loop

A **forever** loop is sometimes called an infinite loop.

Do you know what the word 'infinite' means?



Infinite means  
endless or limitless.



A **forever** loop repeats the instructions inside the loop over and over again with no end point.

## The Forever Loop

Now that we know about different types of loops, we have to think carefully about which loop to choose when tackling a specific problem or task.

**Cat** wants to teach you some dance moves. Time to get up on your feet. Can you follow the steps and do the dance?

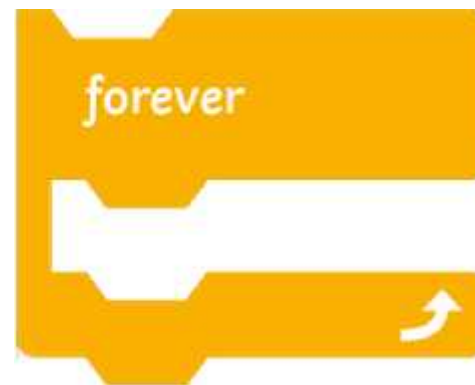
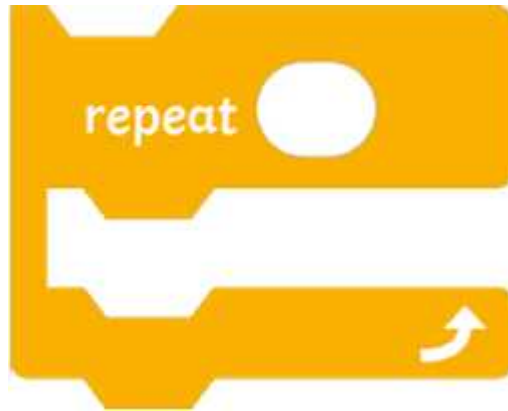
One step right.  
Hands up.  
Spin around once.  
Hands down.  
One step left.





## The Forever Loop

**Cat** thinks that the dance would be better if we repeated these steps more than once. What could **Cat** include to help write the dance instructions?



Did you think of a loop? What a good idea! A loop is a great way to repeat the same actions continuously.

X

Why is a loop useful in coding?



## The Forever Loop

**Cat** is still busy planning a dance routine for you.



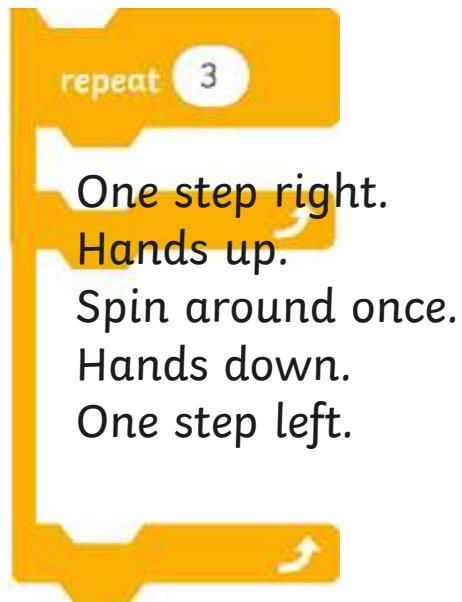
**Cat** is thinking about the different loop instructions. Which loop do you think would be best to help **Cat** plan a dance routine for you? Why? Click on each loop to find out.





## The Forever Loop

If **Cat** chooses the **repeat** block, he can customise the number in the block to tell you how many times to repeat the dance moves



How many times will you have to repeat the actions?

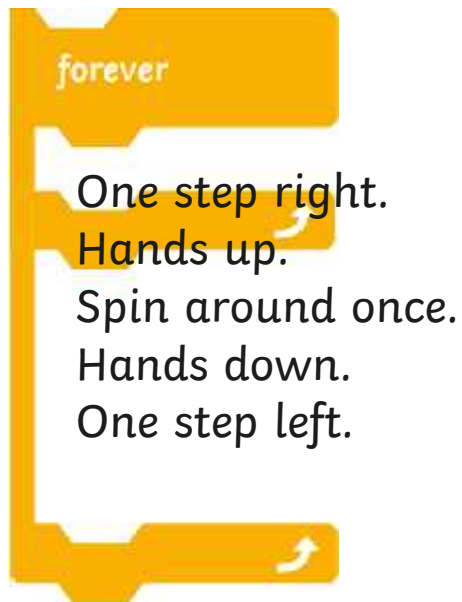
Can you follow the instructions and do the dance?

Well done **Cat**!  
This is a great loop to use.



# The Forever Loop

If **Cat** chooses the **forever** block the instructions will repeat endlessly.



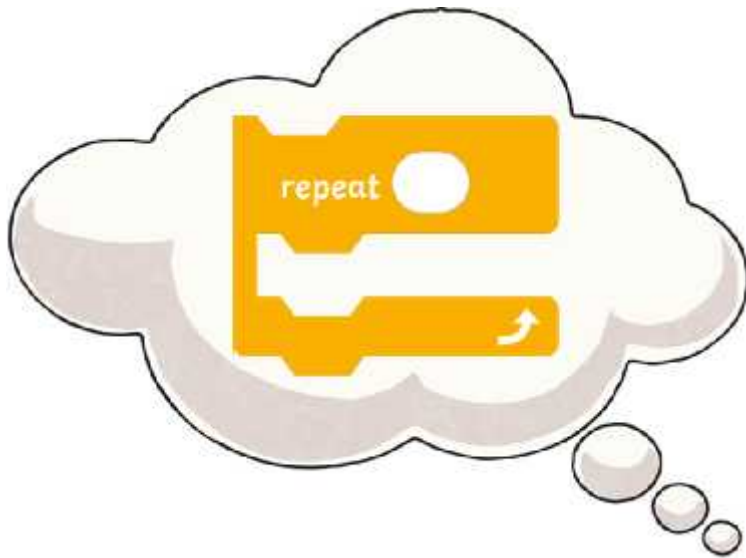
Stop!  
What will happen  
if **Cat** uses this block?

You would soon get very tired  
indeed. You would have to repeat  
these dance moves forever!

**BACK**

## The Forever Loop

**Cat** is still busy planning a dance routine for you.

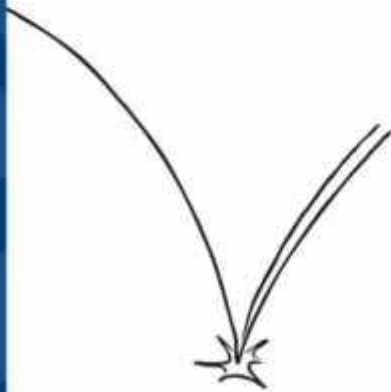


**Cat** is thinking about the different loops to use. Which loop do you think would be best to help **Cat** write the dance instructions for you? Why? Click on each loop to find out more.

## The Forever Loop

The **forever** loop is good to use for sprites because they never get tired. Computer programs can repeat endlessly without needing to rest or sleep.

Only use the **forever** loop if you want an action or sequence of actions to be repeated continuously without ending.



You could use a **forever** loop to make a ball bounce endlessly



The **forever** loop is a great way to make a sprite walk.

# The Forever Loop



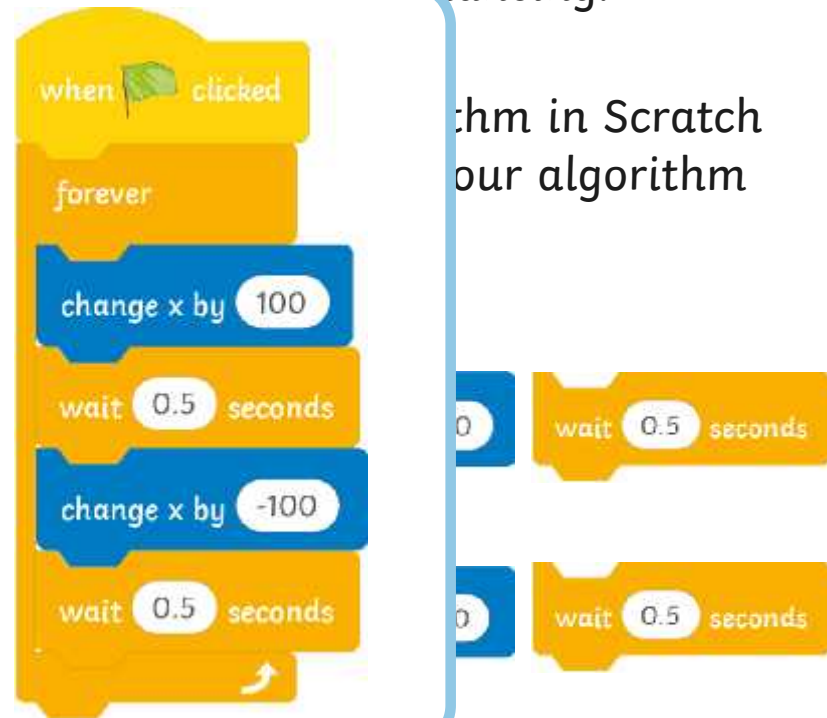
A **forever** loop is a good way to animate a sprite. Using a **forever** loop can make a sprite look like it is walking or jumping or dancing.

Can you use the blocks shown to make **Frog 2** jump up and down to see if **Frog 2** does keep jump

**Top Tip:** Remember that Scratch uses an **x,y** coordinate grid. Changing the **y** position moves a sprite up and down.



Click on the frog to see one possible solution.



Algorithm in Scratch  
our algorithm

## Let's Dance

When you hover the cursor over some of the sprites in the sprite library you may notice that some of them look like they are moving. These sprites have different **Costumes**. A **Costume** shows the sprite in a slightly different position or colour.

Click on the **Costumes** tab above the **Block Palette** to see the different **Costumes** for the sprite you have chosen.

Using **Costumes** and **forever** loops together is a fun way to create some crazy dance moves.

 Code

 Costumes

 Sounds

## Let's Dance


The **Cassy Dancer** sprite has four **Costumes**.

Open [Lesson 4 \(Let's Dance Teacher Example\)](#) to see how the different **Costumes** make **Cassy Dancer** look like she is dancing.



```
when green flag clicked
  forever loop
    switch costume to cassy-b
    wait 1 seconds
    switch costume to cassy-c
    wait 1 seconds
    switch costume to cassy-d
    wait 1 seconds
    switch costume to cassy-
    wait 1 seconds
```

What do you think would happen if you changed the white area of the **wait** block from 1 to 0.5?

X What would happen if wait blocks were not included in the forever loop? 



# Disco Dancers



Now it is your turn!

Use the **Disco Dancers Activity Sheet** to create some crazy Disco Dancers of your own. Choose the dancer you like most to show off their moves. Choose from **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.

## Disco Dancers

I can use a forever loop to repeat instructions continuously.

**Getting Started**  
Choose a suitable backdrop for your disco dancer.  
Choose a disco dancer with different Costumes. Try **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.  
Position the disco dancer in the middle of the **Stage**. Change the size of the disco dancer if you need to.

**Useful Blocks**

**Task 1:** Can you use a **forever** loop to write an algorithm that makes your dancer dance forever?

**Task 2:** Can you use another forever loop to play some music for your dancer?

**Challenge:** Try adding a star, balloon or heart sprite to the project. Can you use a forever loop to make it change colour or flash forever?



# Dance Off

Remember to save your work with a filename that will let you find it again.

Show your work in a big end of lesson dance off. Evaluate each other's work.

## Think About:

- What works well?
- What could be improved?
- How did the **forever** loop help with the code?

## **Aim**

To use a forever loop to repeat instructions continuously.

## **Success Criteria**

I know the difference between a repeat loop and a forever loop.  
I know when to use a forever loop.  
I can use forever loops in algorithms for a particular purpose.  
I can explain why loops are useful.

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**

# Disco Dancers

I can use a forever loop to repeat instructions continuously.



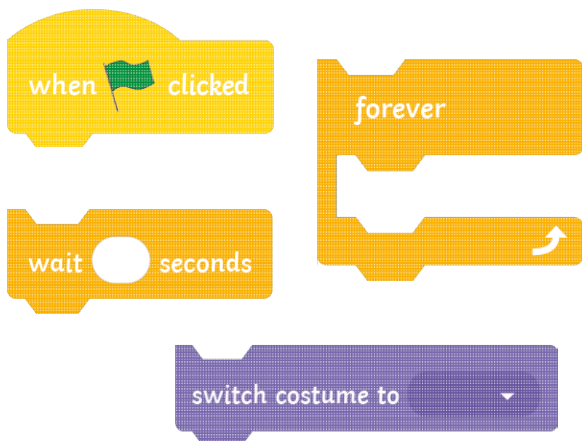
## Getting Started

Choose a suitable backdrop for your disco dancer.

Choose a disco dancer with different **Costumes**. Try **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.

Position the disco dancer in the middle of the **Stage**. Change the size of the disco dancer if you need to.

## Useful Blocks



## Top Tip:

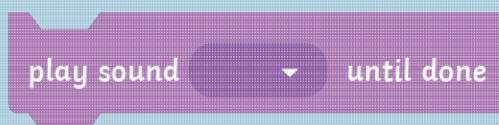
To resize a sprite, look for the **Size** option in the **Sprite Pane**. Decrease or increase the number that appears in the oval shape.

**Task:** Can you use a **forever** loop to write an algorithm that makes your dancer dance forever?

Use the useful blocks above and the different **Costumes** for your sprite.

**Challenge:** Can you create another **forever** loop to play some music for your dancer?

This block may be useful.





# Disco Dancers

I can use a forever loop to repeat instructions continuously.



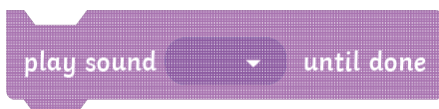
## Getting Started

Choose a suitable backdrop for your disco dancer.

Choose a disco dancer with different **Costumes**. Try **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.

Position the disco dancer in the middle of the **Stage**. Change the size of the disco dancer if you need to.

## Useful Blocks



**Task 1:** Can you use a **forever** loop to write an algorithm that makes your dancer dance forever?

**Task 2:** Can you use another forever loop to play some music for your dancer?

**Challenge:** Try adding a star, balloon or heart sprite to the project. Can you use a forever loop to make it change colour or flash forever?

# Disco Dancers

I can use a forever loop to repeat instructions continuously.



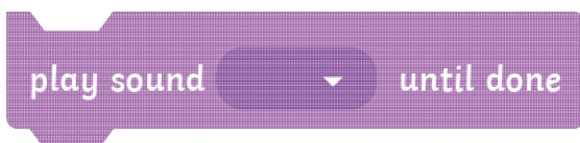
## Getting Started

Choose a suitable backdrop for your disco dancer.

Choose a disco dancer with different **Costumes**. Try **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.

Position the disco dancer in the middle of the **Stage**. Change the size of the disco dancer if you need to.

## Useful Blocks



**Task 1:** Can you use a **forever** loop to write an algorithm that makes your dancer dance forever?

**Task 2:** Can you use another **forever** loop to play some music for your dancer?

**Task 3:** Can you add a second dancer and make them dance forever too?

**Task 4:** Can you use a **forever** loop to add a star, balloon or heart sprite to your disco that changes colour or flashes forever?

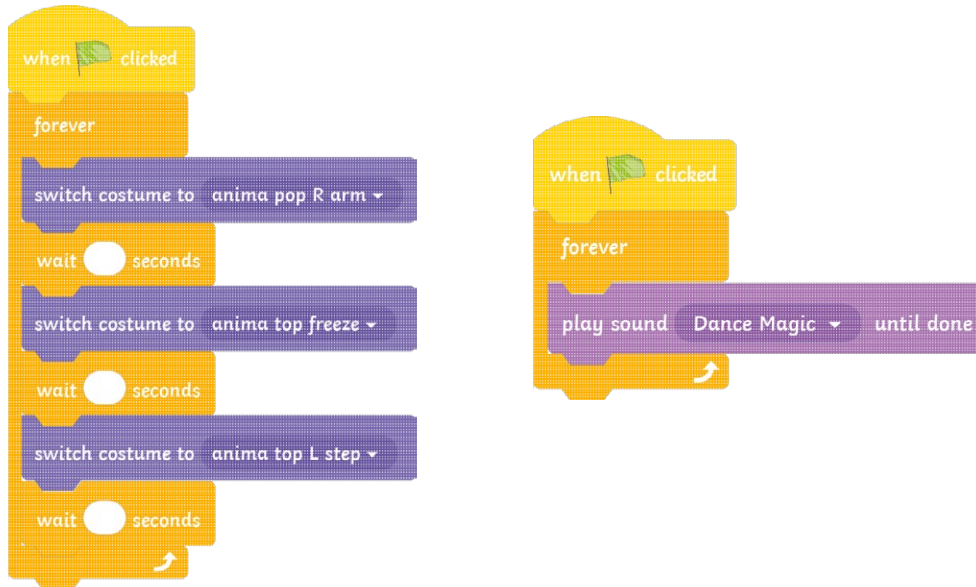
**Challenge:** Can you use a **Motion** block to make your dancers change position on the Stage?



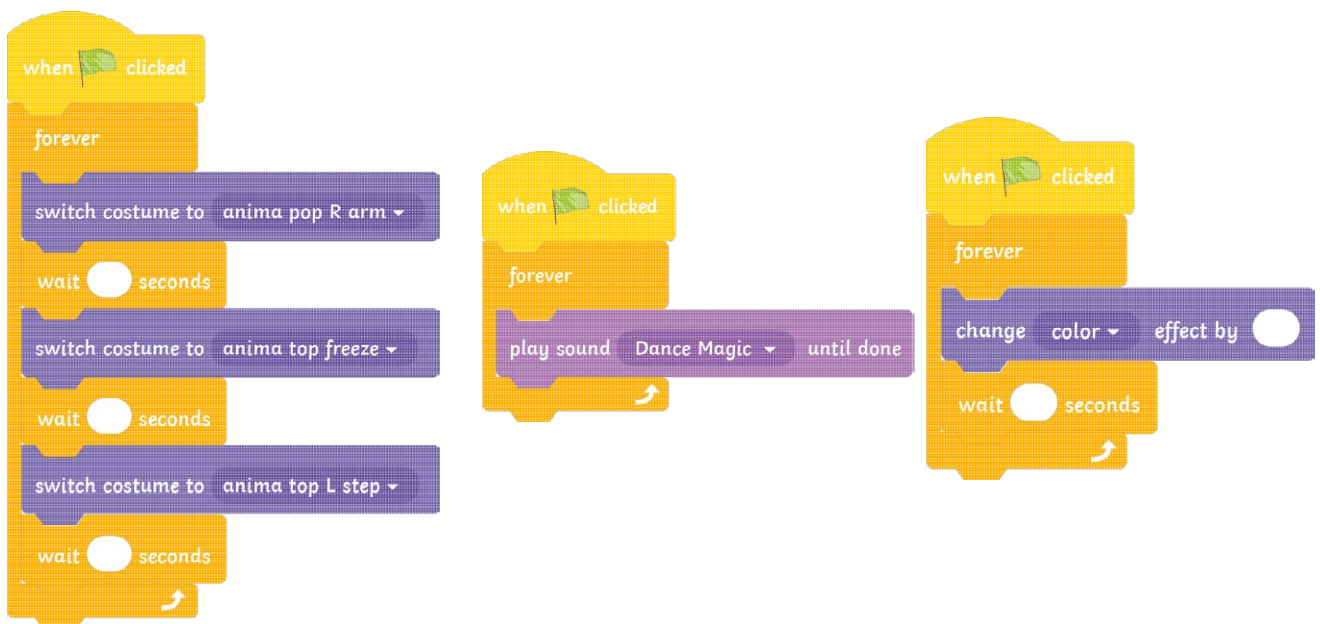
# Disco Dancers Possible Solutions

These tasks are very open ended and children will solve them in different ways. The following solutions provide children with example algorithms but some areas have been left blank as children will add their own wait time and positions.

## Disco Dancers ★



## Disco Dancers ★★



# Disco Dancers Possible Solutions

These tasks are very open ended and children will solve them in different ways. The following solutions provide children with example algorithms but some areas have been left blank as children will add their own wait time and positions.

## Disco Dancers ★★★

```
when clicked
  forever
    switch costume to anima pop R arm
    wait seconds
    switch costume to anima top freeze
    wait seconds
    switch costume to anima top L step
    wait seconds
```

```
when clicked
  forever
    play sound Dance Magic until done
```

```
when clicked
  forever
    change color effect by
    wait seconds
```

```
when clicked
  forever
    switch costume to cassy-d
    wait seconds
    switch costume to cassy-c
    wait seconds
    switch costume to cassy-b
    go to x: y:
    wait seconds
```



# Disco Dancers

I can use a forever loop to repeat instructions continuously.



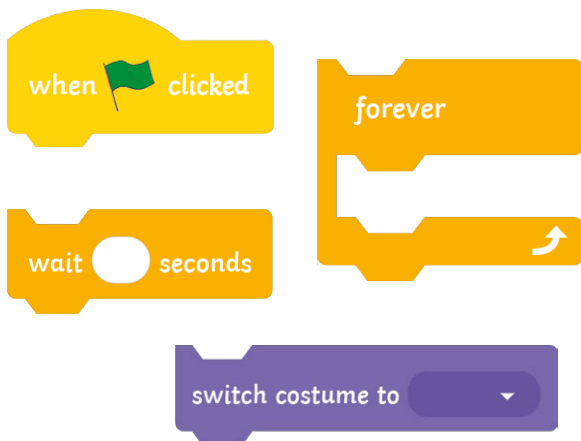
## Getting Started

Choose a suitable backdrop for your disco dancer.

Choose a disco dancer with different **Costumes**. Try **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.

Position the disco dancer in the middle of the **Stage**. Change the size of the disco dancer if you need to.

## Useful Blocks



## Top Tip:

To resize a sprite, look for the **Size** option in the **Sprite Pane**. Decrease or increase the number that appears in the oval shape.

**Task:** Can you use a **forever** loop to write an algorithm that makes your dancer dance forever?

Use the useful blocks above and the different **Costumes** for your sprite.

**Challenge:** Can you create another **forever** loop to play some music for your dancer?

This block may be useful.



# Disco Dancers

I can use a forever loop to repeat instructions continuously.



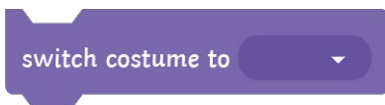
## Getting Started

Choose a suitable backdrop for your disco dancer.

Choose a disco dancer with different **Costumes**. Try **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.

Position the disco dancer in the middle of the **Stage**. Change the size of the disco dancer if you need to.

## Useful Blocks



**Task 1:** Can you use a **forever** loop to write an algorithm that makes your dancer dance forever?

**Task 2:** Can you use another forever loop to play some music for your dancer?

**Challenge:** Try adding a star, balloon or heart sprite to the project. Can you use a forever loop to make it change colour or flash forever?

# Disco Dancers

I can use a forever loop to repeat instructions continuously.



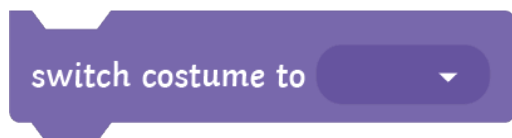
## Getting Started

Choose a suitable backdrop for your disco dancer.

Choose a disco dancer with different **Costumes**. Try **Champ99**, **Jouvi Dance**, **Ten80 Dance** or **Cassy Dancer**.

Position the disco dancer in the middle of the **Stage**. Change the size of the disco dancer if you need to.

## Useful Blocks



**Task 1:** Can you use a **forever** loop to write an algorithm that makes your dancer dance forever?

**Task 2:** Can you use another **forever** loop to play some music for your dancer?

**Task 3:** Can you add a second dancer and make them dance forever too?

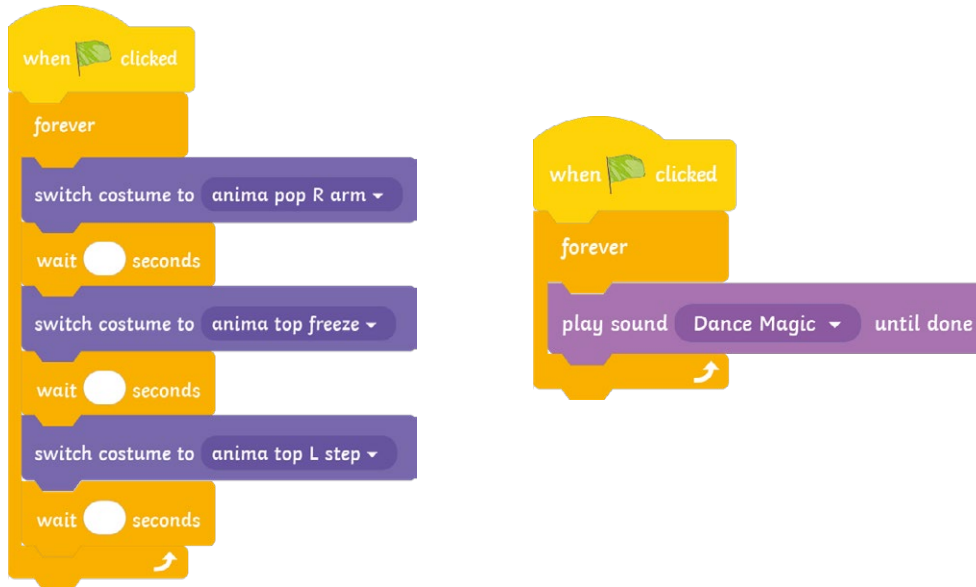
**Task 4:** Can you use a **forever** loop to add a star, balloon or heart sprite to your disco that changes colour or flashes forever?

**Challenge:** Can you use a **Motion** block to make your dancers change position on the **Stage**?

# Disco Dancers Possible Solutions

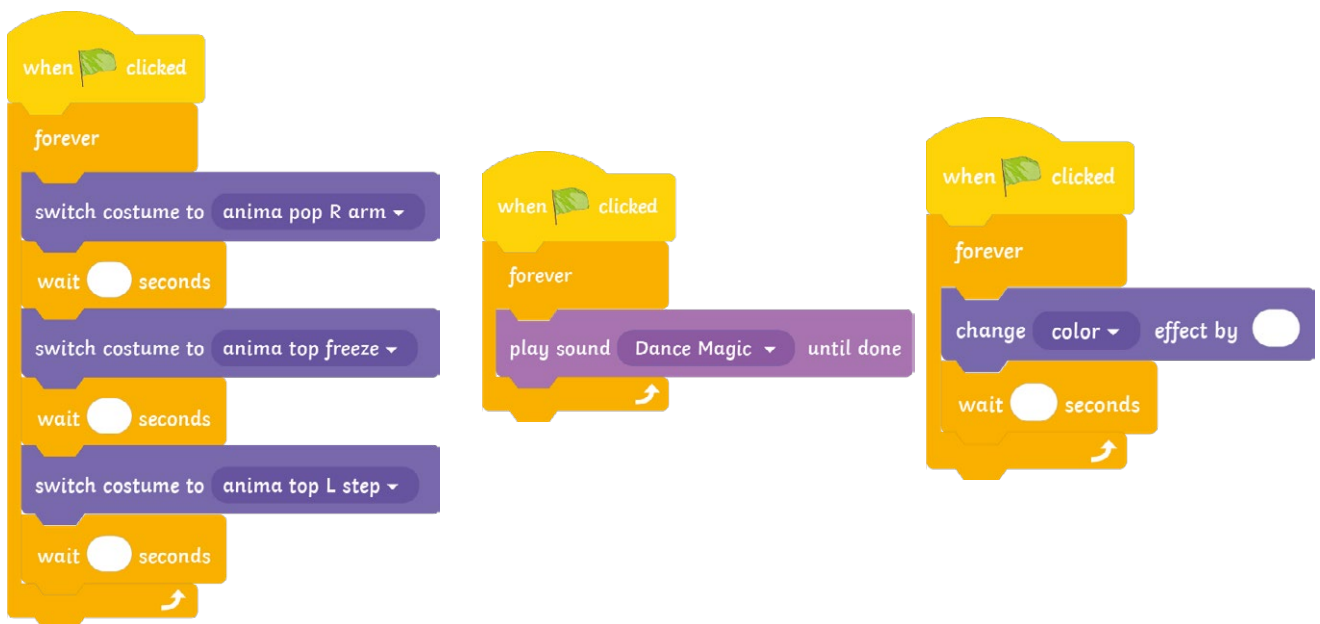
These tasks are very open ended and children will solve them in different ways. The following solutions provide children with example algorithms but some areas have been left blank as children will add their own wait time and positions.

## Disco Dancers ★



The image shows two Scratch code snippets. The first snippet is a 'when clicked' event block followed by a 'forever' loop containing three 'switch costume to' blocks (with dropdown menus for 'anima pop R arm', 'anima top freeze', and 'anima top L step') and three 'wait' blocks (each with a blank circle for seconds). The second snippet is a 'when clicked' event block followed by a 'forever' loop containing a 'play sound' block (with a dropdown menu for 'Dance Magic' and 'until done').

## Disco Dancers ★★

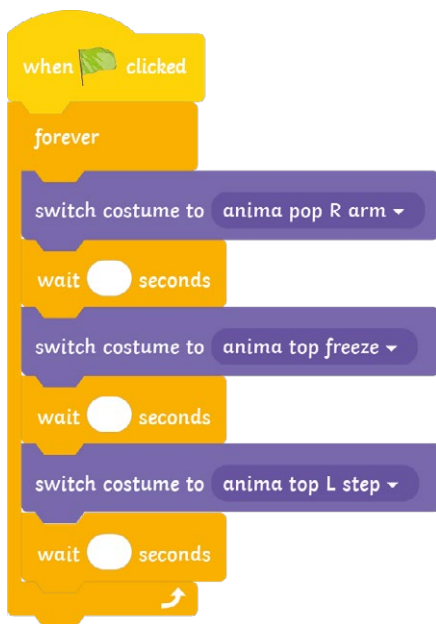


The image shows three Scratch code snippets. The first snippet is a 'when clicked' event block followed by a 'forever' loop containing three 'switch costume to' blocks (with dropdown menus for 'anima pop R arm', 'anima top freeze', and 'anima top L step') and three 'wait' blocks (each with a blank circle for seconds). The second snippet is a 'when clicked' event block followed by a 'forever' loop containing a 'play sound' block (with a dropdown menu for 'Dance Magic' and 'until done'). The third snippet is a 'when clicked' event block followed by a 'forever' loop containing a 'change color' block (with a dropdown menu for 'color' and 'effect by' followed by a blank circle) and a 'wait' block (with a blank circle for seconds).

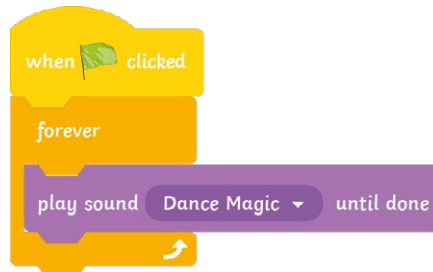
# Disco Dancers Possible Solutions

These tasks are very open ended and children will solve them in different ways. The following solutions provide children with example algorithms but some areas have been left blank as children will add their own wait time and positions.

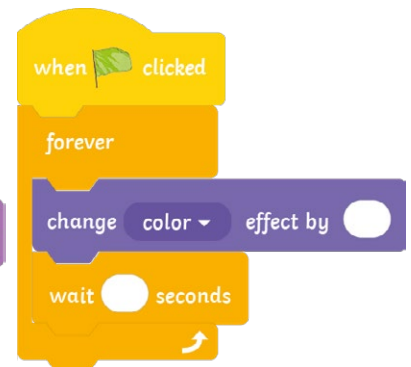
## Disco Dancers ★★★



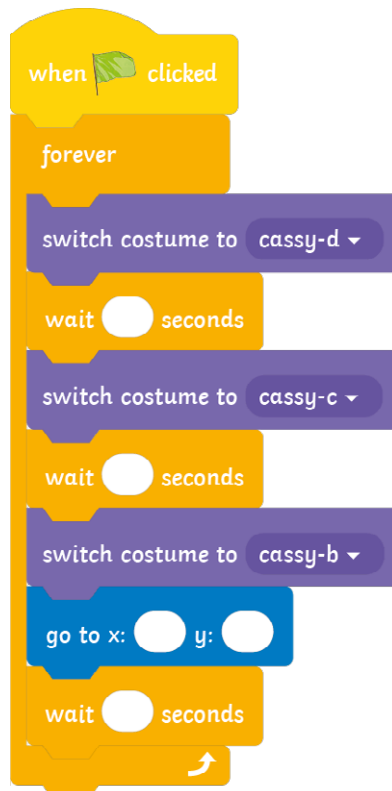
```
when clicked clicked
forever
switch costume to anima pop R arm
wait seconds
switch costume to anima top freeze
wait seconds
switch costume to anima top L step
wait seconds
```



```
when clicked clicked
forever
play sound Dance Magic until done
```



```
when clicked clicked
forever
change color effect by
wait seconds
```



```
when clicked clicked
forever
switch costume to cassy-d
wait seconds
switch costume to cassy-c
wait seconds
switch costume to cassy-b
go to x: y:
wait seconds
```

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		

Coding with Scratch: Learning Loops | Forever Loops

To use a forever loop to repeat instructions continuously.		
I know the difference between a repeat loop and a forever loop.		
I know when to use a forever loop.		
I can use forever loops in algorithms for a particular purpose.		
I can explain why loops are useful.		