

# iCompute

for iPad

Year 3

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2014**

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# iPad

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## Overview

This unit duplicates iProgram (Year 3) from the whole-school pack, providing the option to teach algorithms and programming using iPads instead of pcs. Using the context of art and drawing, the children will be engaged in creatively developing simple animations using the Pyonkee app – a visual programming language based on Scratch 1.4.

## Objectives

- See p2 for a detailed breakdown of lesson assessment focuses and associated success criteria.

## 2014 Computing Programme of Study

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information

## Assessment

p25 contains a record of progress pro-forma

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## Computing with iPads

### Year 3 – Unit 2

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## Apps

Pyonkee (free) app available here:

[Pyonkee - Visual Programming with iPad](#)

## Other Resources

Scratch reference guide download available here:

- <http://info.scratch.mit.edu/support/>

Royalty free sound files available here:

- <http://fxhome.com/sound-effects>
- <http://www.grsites.com/archive/sounds/>

## Curriculum Links

- Mathematics
- Art/Design
- Music
- PHSE

# Objectives

Lesson	Title	NC Links	Objectives	Vocabulary	Cross-Curricular Links	Success Criteria
3.2.1	<b>iMove</b>	<ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>Use sequence, selection and repetition in programs</li> <li>Use logical reasoning to explain how a simple algorithm works and detect and correct errors in algorithms and programs</li> </ul>	<ul style="list-style-type: none"> <li>To understand that a program is a sequence of statements written in a programming language (Python)</li> <li>To program an animation that executes a sequence of statements</li> </ul>	Sprite; up; down; left; right; repeat; x y coordinates; if statement; wait	Mathematics	<ul style="list-style-type: none"> <li>Chn can make a sprite move using programming blocks containing directional language and repetition</li> </ul>
3.2.2	<b>iExplore</b>	<ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals</li> <li>Use sequence, selection and repetition in programs; work with various forms of input and output;</li> <li>Use logical reasoning to explain how a simple algorithm works and detect and correct errors in algorithms and programs</li> </ul>	<ul style="list-style-type: none"> <li>To understand that computer programs containing graphics use x y coordinates and turns are measured in degrees</li> </ul>	Sprite; up; down; left; right; x y coordinates;	Mathematics	<ul style="list-style-type: none"> <li>The children can move a sprite on stage by programming x y coordinates to change and make it turn</li> </ul>
3.2.3	<b>iAnimate</b>	<ul style="list-style-type: none"> <li>As above</li> </ul>	<ul style="list-style-type: none"> <li>Program a sequence of statements that create visual effects</li> </ul>	sequence; animate; repeat		<ul style="list-style-type: none"> <li>The children create an animation where a sprite changes costume</li> </ul>

Lesson	Title	NC Links	Objectives	Vocabulary	Cross-Curricular Links	Success Criteria
3.2.4	<b>iMake Music</b>	<ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals</li> <li>use sequence, selection and repetition in programs</li> <li>use logical reasoning to explain how a simple algorithm works and detect and correct errors in algorithms and programs</li> <li>use search technologies effectively, be discerning in evaluating digital content;</li> <li>select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information</li> </ul>	<ul style="list-style-type: none"> <li>Record and import sound into programs</li> <li>To understand that algorithms and programs can involve repetition</li> </ul>	Import; record; repeat	Music	<ul style="list-style-type: none"> <li>The children make an animation with sound effects that are repeated</li> </ul>
3.2.5	<b>iShape Up</b>	<ul style="list-style-type: none"> <li>As Above</li> </ul>	<ul style="list-style-type: none"> <li>To predict the outcome of a simple algorithm</li> <li>To use a repeat function to draw a 2D Shape</li> </ul>	2D; pen; degrees; turn; repeat	Mathematics	<ul style="list-style-type: none"> <li>The children can predict the shape a drawing function will make when executed</li> <li>The children amend a program to draw a circle using repeats and the pen tool</li> </ul>
3.2.6	<b>iCreate</b>	<ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals</li> <li>use sequence, selection and repetition in programs</li> <li>use logical reasoning to explain how a simple algorithm works and detect and correct errors in algorithms and programs</li> <li>select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information</li> </ul>	<ul style="list-style-type: none"> <li>To import pictures from a computer and/or the internet</li> <li>To combine images, sounds and movement to create a personal animation</li> </ul>	Import; internet; image	Art; PHSE	<ul style="list-style-type: none"> <li>The children make an animation containing a combination of images, sounds and movement that tells people something about themselves.</li> </ul>

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# Preparation

- Read the lesson plans
- Check the Scratch reference guide glossary of terms to make sure you are using the correct vocabulary
- Spend an hour or so familiarising yourself with the software you will be using and the application's interface

# Resources

- iPads
- Ensure that the app is installed on each iPad you will be using
- Worksheets for each lesson – entitled: Worksheet<year.unit.lesson> (eg. Worksheet3.2.1)
- Support materials for each lesson – entitled Resource <year.unit.lesson> (eg. Resource3.2.1)

## Links

Before you start, you may find these weblinks useful.

- Pyonkee can be downloaded at:  
[Pyonkee - Visual Programming with iPad](#)
- Scratch Reference Guide:  
[http://info.scratch.mit.edu/Support/Reference\\_Guide\\_1.4](http://info.scratch.mit.edu/Support/Reference_Guide_1.4)

## Updates

If any links are not working, visit the iCompute website which contains up-to-date links:

<http://www.icompute-uk.com/Links.html>

Resources: iPads; Pyonkee app; Resource3.2.1a; Resource3.2.1b; Resource3.2.1c; Resource3.2.1d (support materials)

### Objectives

- To understand that a program is a sequence of statements written in a programming language (Pyonkee)
- To program an animation that executes a sequence of statements

### Success Criteria

- The children can move a sprite around the screen using sequential blocks of code.

### Vocabulary

Sprite; blocks; programming; coordinates; up; down; right; left; **if** statement (conditional statement)

### Step 1

- Discuss computer games that the children might know. Show the children examples of some games on the IWB and talk about how the children think these games might have been made
- Talk about how we use instructions in every day life to perform certain actions (eg. make a sandwich) and that the instructions need to be clear and ordered

### Step 2

- Load Pyonkee and display your iPad on the IWB or a computer that all of the children can see
- Explain the main elements of the interface. Explain that characters and objects are known as **sprites** and we can make them do lots of different things by using the script blocks which snap together like lego blocks
- Model using the app to delete the default sprite and select a new sprite from file


## Step 3

- Open the blue motion block and drag to the script area



- Open the yellow control blocks drag and snap to the motion block



- Click  to make the sprite only go from left to right



- Click  to show the sprite moving right



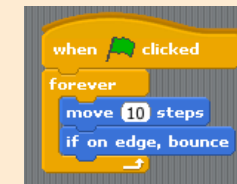
- Change the number of steps to -10 and repeat to show the sprite moving left

## Step 4

- Ask the children which block we could use if we wanted the sprite to repeat the actions
- Drag out a **forever** block and wrap it around the motion block
- Show the children what happens when the sprite hits the edge of the stage
- Ask the children what kind of instruction we could give the sprite to tell it what to do when it hits the edge. Eg. 'if hit edge bounce'
- Show the children the blue motion blocks and ask if any of them will achieve what we want
- Drag out **if on edge bounce** motion block and snap under the move block



and wrap it around



- Tell the children that this is an **if statement** and discuss how it could be **true** or **false**. Stand up and walk to a wall, when you hit the wall ask 'am I hitting the wall - true or false?', repeat by walking into the middle of the room. Explain that if statements in programming can only be true or false

## Core

### Step 5

- The children use computers and Pyonkee to select two sprites from file
- They then use motion blocks to make them move left and right across the screen
- Challenge them experiment with another control block eg. **wait**.
- Challenge the children to make a sprite turn: clockwise and counter clockwise

## Differentiation

**Easier:** Some children may need support with reading

**Harder:** Challenge the children to modify their program so that one sprite moves **slowly** around the screen

### Step 6

- Gather back and model how move the sprites up and down by changing the x and y co-ordinates
- Move the sprite on screen and draw the children's attention to the changing co-ordinates showing on screen as you do so
- Use the **when space key pressed** control block and change the value of **space** to **up arrow**
- Snap a motion block



and show the children that the sprite moves upwards ten steps

Repeat with **-10** to show the sprite moves downwards



## Core

### Step 7

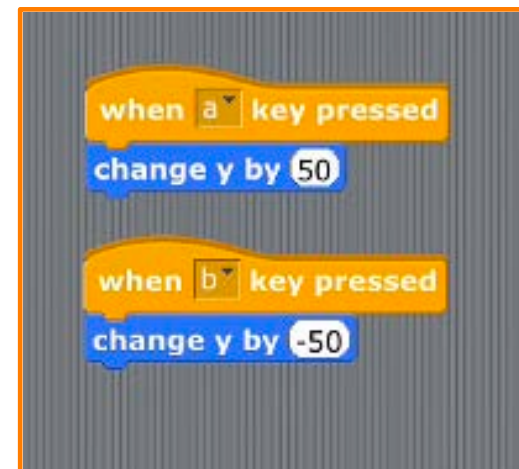
- The children use the trampoline sprite from the sprite folder and then choose any other sprite to add to the stage
- The children then create a script that allows the sprite to bounce up and down on the trampoline.

### Step 8

- Show some of the children's saved work on the IWB
- Invite the children to talk about their scripts
- Could any of the blocks of code have been wrapped in a repeat statement?

## Extension

Challenge the children to make a sprite turn (clockwise and counter clockwise)



Resources: iPads; Pyonkee app; Resource3.2.2

### Objectives

- To understand that computer programs containing graphics use x y coordinates and turns are measured in degrees

### Success Criteria

- The children can move a sprite on stage by programming xy coordinates to change and make it turn

### Vocabulary

Sprite; up; down; left; right; xy coordinates;

## Step 1

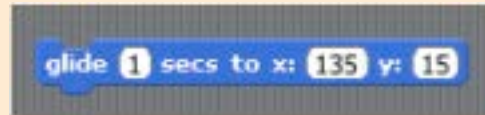
- Explain that, in this session the children will be learning how to move sprites around the screen using coordinate positions and they will create an animation that involves movement and images

## Step 2

- Ask the children to move the sprite on the stage and observe the xy coordinates changing on screen
- Ask a child to try to move the sprite to (0,0)
- Show the children how the x coordinates change as the sprite moves left to right and the y coordinates change as the sprite moves up and down
- Ask the children to point at a position on stage that they want your sprite to move to
- Tap on the stage roughly where the children are pointing to obtain the x y coordinates

## Step 3

- Open the blue motion palette and drag out a 'glide' block
- Tap on the x,y coordinates and enter your own
- Add a control to your script



## Core

### Step 4

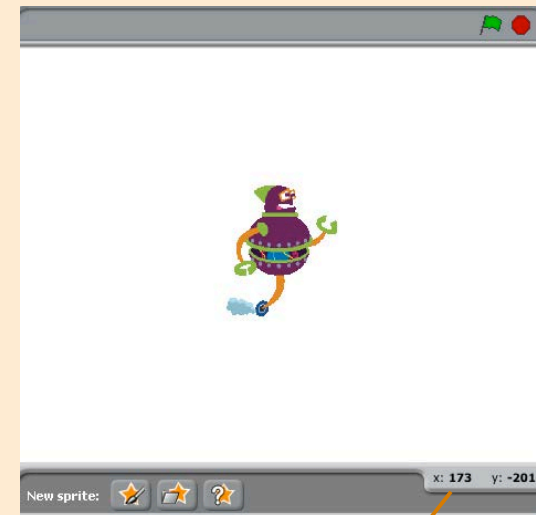
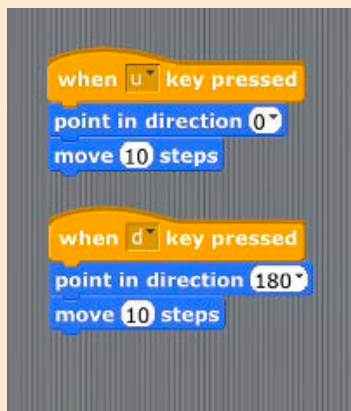
- The children select two bird sprites from file and choose a suitable background
- They use glide blocks to make the sprites move across the screen (Resource3.2.2)

## Extension

Challenge the children to change the glide time and see what happens

### Step 5

- Gather back and model how move the sprites up and down adding keys for user control
- Add two controls for **up** and **down**



Gives the x-y coordinates of the mouse

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## Core

### Step 6

- The children create a themed animation using backgrounds and some related sprites. They incorporate different types of movement into their animations (left/right, up/down, glide).

## Extension

Play someone else's animation and evaluate using 2 stars and a wish

Resources: iPads; Pyonkee app; Resource3.2.3

### Objectives

- To program a sequence of instructions that create visual effects

### Success Criteria

- The children create an animation where a sprite changes costume

### Vocabulary

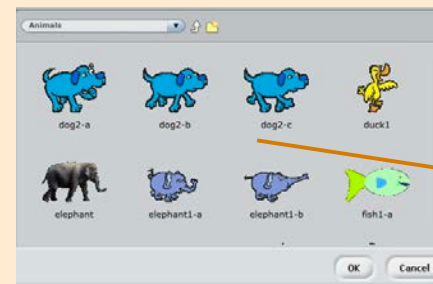
sequence; animate; repeat

## Step 1

- Explain that, in this session the children will be learning how to make a sprite change its appearance during an animation.

## Step 2

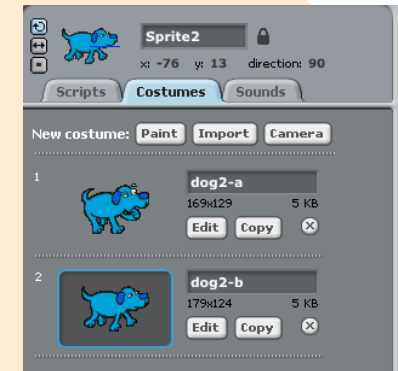
- Choose a sprite from file that has more than one costume (eg.the dog which has different leg positions)



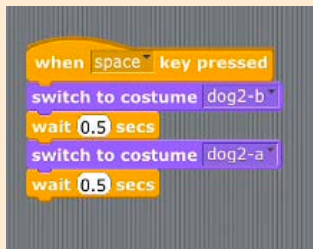
The dog has three costumes for different leg positions, which can produce a walking/running effect

## Step 3

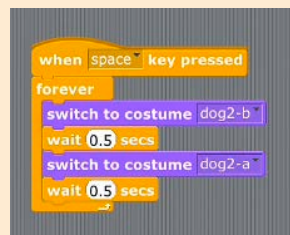
- Click on the costumes tab (next to scripts) and then import the second dog costume, this will make the dog appear to walk



- Now move back to the scripts area, select a control block and then drag out a **switch costume to dog2-b** block. Demonstrate that when we click the block it, nothing appears to happen and explain that this is because it's happening too fast. We need to add a wait block.

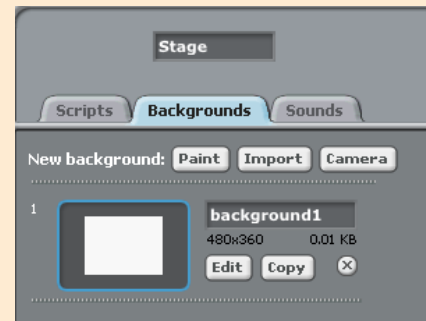
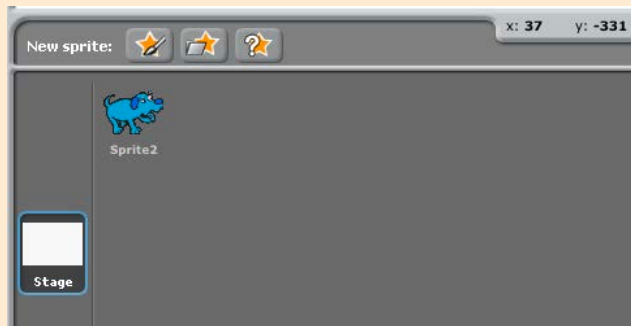


- Point out that the dog only moves once. Ask the children to suggest a block that would allow the dog's movements to repeat. Establish that we could use a **forever** block.



## Step 4

- Demonstrate how to do the same to change the background by selecting the **stage** in the sprites area and importing a background from file.





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## Core

### Step 5

- Hand out Resource3.2.3 (resources)
- Ask the children select a sprite from file that has at least two costumes. They should import a suitable background.
- Use the looks palette to change costumes and incorporate a wait and repeat action into their programs.
- They also use blocks from the motion palette to make their sprites move around the stage as it changes costume.

## Differentiation

Use mixed ability pairs to scaffold less able children's learning and encourage more able children to explain their ideas and reflect on their work

## Extension

Challenge the children to change the wait time and observe what happens

Resources: iPads; Pyonkee app; Resource3.2.4a.sb (program file); Resource3.2.4b (support sheet)

### Objectives

- To import, create and record sounds
- To understand that algorithms and programs can involve repetition

### Success Criteria

- The children create an animation with sound effects that are repeated

### Vocabulary

Import; record; animate; repeat

### Step 1

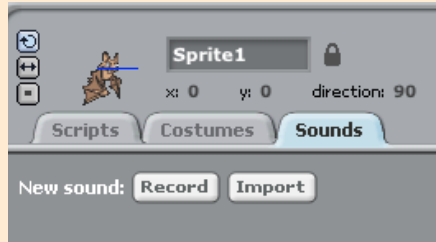
- Explain that, in this session the children will be learning how add sound effects to their animations.

### Step 2

- Demonstrate how to import sounds to attach to sprites by selecting the sounds tab and clicking import to retrieve sound files from file. (Resource 3.2.4a.sb demonstrates a simple animation with sound effects)

You can also import sounds from elsewhere on the desktop or network, which have been downloaded from royalty-free websites (p1 – Other Resources) - sound files can be in .mp3 or .wav formats.

## Step 2 cont..



You could use the iPad's built-in microphone to record the children's own voices directly using the interface.

## Core

### Step 5

- Hand out Resource3.2.4b (resources)
- The children select backgrounds and some sprites to be musicians, dancers or singers.
- They write a script for some of the sprites that makes the sprites appear to be dancing.
- The children should add music.

## Differentiation

### Easier

Use fewer sprites and sounds

### Harder

Add more sprites and sound effects. Experiment with changing backgrounds and attaching sounds to backgrounds

## Extension

Have a battle of the bands with another pupil. Evaluate each other's work and suggest improvements using 2 stars and a wish.

Resources: iPads; Pyonkee app; Resource3.2.5a.sb & Resource5.2.5b(for class demonstration); Resource3.2.5c.sb (for main activity)

### Objectives

- To predict the outcome of a simple algorithm
- To use a repeat function to draw a 2D shape

### Success Criteria

- The children can predict the shape a drawing function will make when executed
- The children amend a program to
- draw a circle using repeats and the pen tool

### Vocabulary

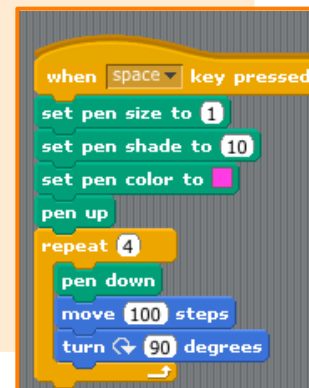
2D; pen; degrees; turn

### Step 1

- Load a project (Resource3.2.5a.sb) that contains this code:
- Look at the code as a class and draw attention to the **repeat** and **turn** blocks
- Remind the children that a 90 degree turn is a quarter turn, stand up and do quarter turn to demonstrate
- What shape do the children think the sprite will draw when the code is executed?
- Establish that the shape would be a square and execute the code

### Step 2

- Display code blocks for a triangle and a hexagon (Resource5.2.5b.sb) and repeat Step 1 for each

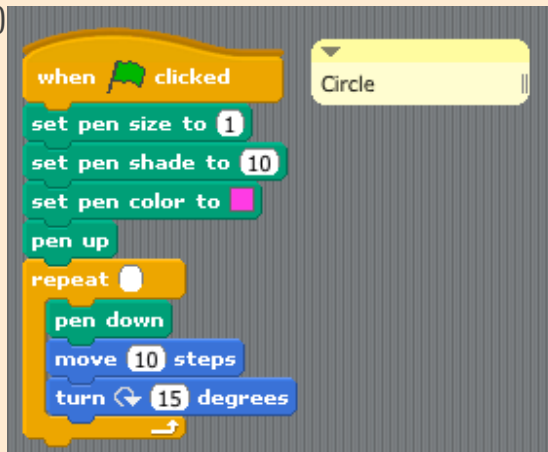


```
when space key pressed
set pen size to 1
set pen shade to 10
set pen color to pink
pen up
repeat 4
  pen down
  move 100 steps
  turn 90 degrees
```

## Core

### Step 3

- Load a project containing incorrect/incomplete code for drawing a circle (Resource 3.2.5a.sb)



```
when clicked clicked
set pen size to 1
set pen shade to 10
set pen color to pink
pen up
repeat 1
  pen down
  move 10 steps
  turn 15 degrees
```

- The children amend the code to produce the correct number of **repeats** to draw a circle – NB: correct code is 24 repeats.
- They then use the pen tool to draw a garden using shapes (eg. hexagon flowers)

## Differentiation

### Easier

The children could work on incorrect code for a square or a triangle

### Harder

Challenge the children to add move blocks and more repeats to produce series of repeated circles to create helix/spring effect

The angles for a full rotation must add up to 360 degrees. These degrees are divided between the number of vertices a shape has.

## Extension

Get the children to look at their code and amend it, where necessary, to use repeat blocks to make the code as efficient as possible.

Resources: Resource3.2.1a; Resource3.2.1b; Resource3.2.1c; Resource3.2.1d; Resource3.2.2; Resource3.2.3; Resource3.2.4b

### Objectives

- To import pictures from a computer and/or the internet
- To combine images, sounds and movement to create a personal animation

### Success Criteria

- The children make an animation containing a combination of images, sounds and movement that tells people something about themselves

### Vocabulary

Import; internet; image

## Step 1

- Explain that, in this session the children will be making an animation that tells the viewer something about themselves

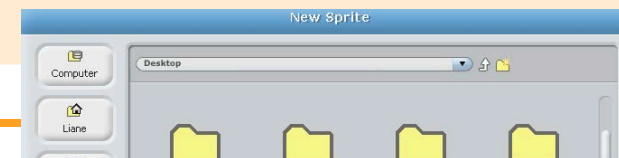
## Step 2

- Model making a search on the internet find a suitable image that says something about you.
- Tap the image, then tap again and choose **'Save Image'**.

Discuss safety issues – importance of using relevant, clear, search terms.; What the children can do if they see an image they find upsetting and copyright infringement.



Discrete lessons on eSafety are in the free iSafe units and a six week unit on using the internet safely and responsibly is in the main scheme for Year 3 - iConnect



## Step 3

- Open Pyonkee interface.
- Tap on the 'Costumes' tab.
- Tap "**Camera**", then the yellow folder icon
- If prompted, grant permission for the app to access photos.
- Choose the image you previously save and tap the green arrow
- Then tap the green download arrow
- Resize the image if necessary using the 'shrink' or 'grow' button



## Step 4

- Show the children how to perform some basic editing of the picture
- Click on the photograph in the sprites area
- Click on the costumes tab
- Choose edit - this will open Paint Editor where you can delete backgrounds, alter colours and size and add text.








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# Core

## Step 5

- Children download some images from the internet - or import images from a digital camera - that mean something to them.
- They combine sound, motion and images to create an animation about themselves.
- They can include hobbies, favourite foods etc.
- They then present their animations to a partner or the class

# Assessment

<h2 style="text-align: center;">Record of progress</h2> <p>Write names in the appropriate box, with jottings on children on children whose attainment differs markedly from their group.</p>	<h2 style="text-align: center;">Expectations</h2> <p style="text-align: center;">What children know, understand and can do</p>
<p><b>Some children will have not made as much progress and will:</b></p> 	<ul style="list-style-type: none"> <li>• Know that Pyonkee can be given commands to produce specific effects on screen</li> <li>• Produce a sequence of blocks that achieves a simple effect (eg. move a sprite around the screen)</li> </ul>
<p><b>Most children will:</b></p> 	<ul style="list-style-type: none"> <li>• Execute a sequence of commands that results in a planned effect</li> <li>• Move a sprite around a screen using turns and repetition</li> <li>• Program and test a simple program</li> </ul>
<p><b>Some children will have progressed further and will:</b></p> 	<ul style="list-style-type: none"> <li>• Design and produce basic programs</li> <li>• Combine sequences of commands into procedures that are repeated</li> <li>• Test and correct simple animations</li> <li>• Evaluate their own work and comment on improvements</li> </ul>
<p><b>Guide - Working at Yellow</b></p>	