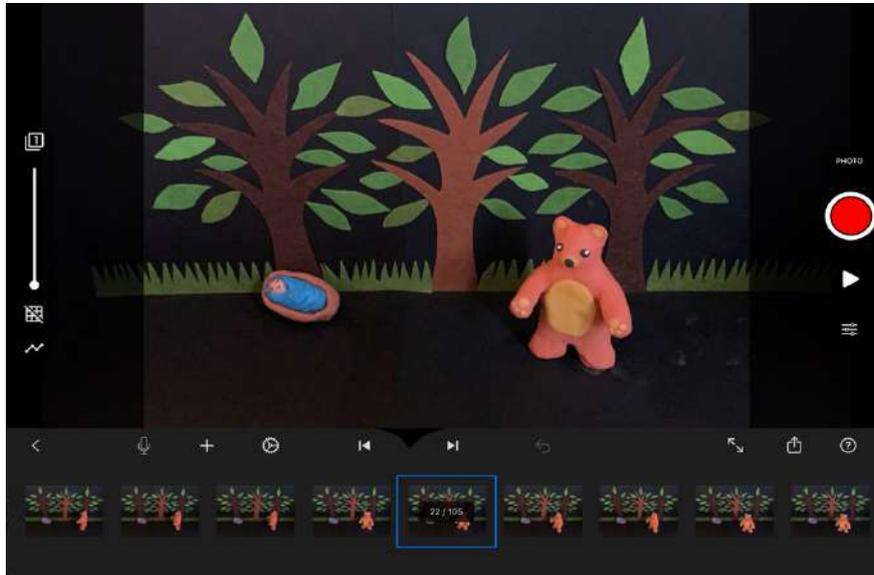# Exploring Animation!
Linked to *The Winter's Tale*

A project suitable for KS2 children

Introduction

This Art and Design unit develops children's understanding and skills in working with analogue and digital animation. The passing of time is a resonant theme in *The Winter's Tale,* and the many scenes of transformation, action or surprise lend themselves well to exploring time-based media as an accessible method of visual storytelling. Over the course of the unit, children will learn about the history and principles of animation, including the scientific discovery of *persistence of vision*, which led to the development of the first animated films. They will recreate early analogue optical illusion gadgets such as thaumatropes and flip books, before moving on to explore simple digital animation using two free apps; *Flipaclip* for drawing, and *Stop Motion* for 3D model making.
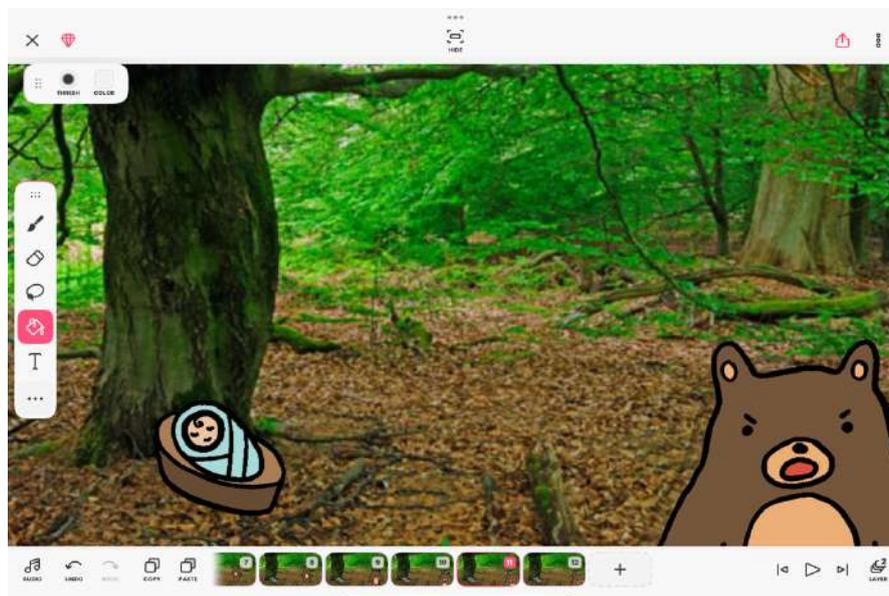
Why Teach Animation?

There are lots of benefits to developing children's digital art skills through animation! Animation naturally excites and engages children who might be familiar with older classic animated films like *Toy Story* or *My Neighbour Totoro,* and are more than likely to have seen contemporary animated features like *K-Pop Demon Hunters* and *The Wild Robot.* Your class may also know the names of some successful animation studios, such as Disney, Pixar, Studio Ghibli, Laika, Dreamworks or Aardman.

Toy Story (1995)

My Neighbour Tortoro (1988)

While children may be keen consumers of animated content however, allowing them to experiment with digital technologies and teaching them the skills to create content of their own gives them the ability to become more than consumers, but *creators* too!

Learning to animate helps children to develop many fundamental art skills, such as drawing (using storyboarding to plan a project) and physical making (building sets, characters and models). It expands their computing knowledge through the creative exploration of different software. Finally, it allows children to develop their digital literacy, build communication skills and improve their problem-solving and collaboration – essential skills for the modern world.

Structure of the Unit

To deliver this unit successfully, we've suggested breaking it down into 6 sessions of around 1.5 hrs each. In the early sessions, children will learn about the history of animation and recreate two early optical illusion devices (thaumatropes and flipbooks) which led to the development of the first animated films. The remaining sessions investigate modern animation techniques using digital apps (either *Flipaclip* or *Stop Motion Studio*). We'd advise you to choose only one of these apps – whichever feels more suited to your class's needs and interests – and give children extra time to play and experiment so that they can become confident in using it. The more time you can dedicate to exploring, planning, character designing, set building and even audio recording, the higher quality your final animations will be!

National Curriculum Aims (Art, Design and Technology, and Computing)

Animation has many cross-curricular links and meets key objectives in the Art and Design, Design and Technology and Computing curriculums.

In Art and D&T, this unit will support children to:

• produce creative work, exploring ideas and recording their experiences
• become proficient in drawing … and other art, craft and design techniques (digital media)
• know about great artists, craft makers and designers (animators and film-makers) and understand the cultural development of their art forms
• generate, develop, model and communicate ideas through talking, drawing … and … information and communication technology

Key Art Skills include:

- Using drawing as a starting point for planning and developing creative work (storyboarding)
- Creating and following a step-by-step plan, and communicating this to others
- Planning, designing and constructing 3D elements in a range of materials
- Making design decisions considering time and resources
- Selecting and using appropriate programs for computer aided design
- Testing, evaluating and presenting final outcomes

In Computing, this unit will support children to:

• understand and apply fundamental principles and concepts of computer science, including… algorithms
• apply information technology, including new or unfamiliar technologies… to solve problems
• (be) … creative users of information and communication technology
• become digitally literate… as active participants in a digital world

Key skills will include:

• Selecting and using appropriate software to create digital content
• Designing and editing programs to accomplish specific goals
• Using sequence, selection, and repetition in programs (capturing frames in order to create movement, programming loops)
• Evaluating and presenting data and information, in the form of sharing animations

Materials

You will need:

SESSIONS 1-2	SESSIONS 3-6
For Thaumatropes: • Paper and card discs, cut to size • Bluetack • String • Holepunch • Drawing tools: pencils, pens **For Flip Books:** • Paper or card cut to size • Bulldog clips • Drawing tools: pencils, pens • Alternative options: notebook, old book or block of post-it notes	**For Cartoon Animation:** • Digital device, e.g. iPad or iPhone • Animation software (e.g. *Flipaclip* free to download) • Optional: stylus pens **For Stop Motion Animation:** • Digital device, e.g. iPad or iPhone • Animation software (e.g. *Stop Motion Studio,* free to download) • Soft, non-drying modelling clay, e.g. Plasticine or Hue Clay • Background material for – e.g. coloured card/fabric • iPad stand or similar to keep device stable

SESSION 1: INTRODUCING ANIMATION

Session One introduces our animation unit!

Children will look at what animation is, and consider the history of its development, as well as learning about key practitioners working in the field of animation – both historically and today. In the practical element of the session, they will learn to make thaumatropes, an early animation toy.

Image: Scientific American

WHAT IS ANIMATION?

Animation is the art and science of making still images (drawings or photographs) appear to move, or come to life! An early form of animation can be seen in the optical illusion gadgets of the 19th century, such as thaumatropes, zoetropes and flipbooks, which use the scientific phenomenon of *Persistence of Vision* for their effect.

Traditional Animation (sometimes called 'cel animation') developed from these gadgets and went on to become the dominant form of animation in the 20th Century. Traditional Animation is characterised by its time-consuming nature with frames painstakingly drawn or photographed by hand.

Today, ***Computer Animation*** is the dominant form of animation, with most major animated features being made digitally on computers. The advanced software used significantly speeds up production times. Within Computer Animation, ***Digital 2D Animation*** employs techniques such as character rigging and vector-based motion graphics, and examples of animations made this way include *The Lion King, Spirited Away* and *The Simpsons. **Digital 3D animation*** offers more depth and realism and involves making digital models that can be rotated and viewed from different angles. *The Polar Express, Frozen*, and *The Wild Robot* are examples of Digital 3D Animation.

STOP MOTION ANIMATION

Stop-Motion Animation is discussed in more detail in this resource. Exemplified by animation studios such as Aardman, known for making *Wallace and Gromit*, Stop Motion animation often uses puppets or models built by hand. The time-consuming, handmade nature of stop-motion animation means it is usually considered a form of traditional animation, even though modern technology may be employed to capture

frames. Free stop motion software for phones and digital devices has made the process a very accessible entry point into animation for children.
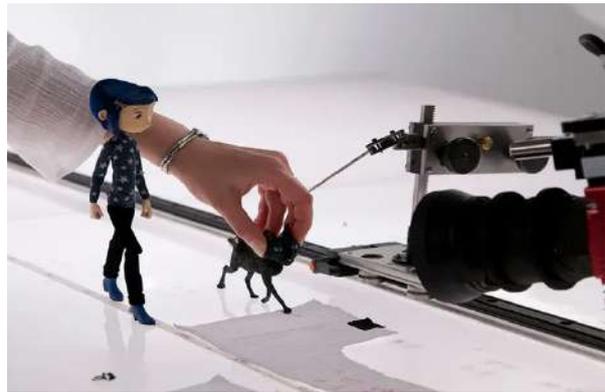
Images L-R: Aardman, *Wallace and Gromit,* The making of *Coraline* (Laika Studios)

HOW DOES ANIMATION WORK?

The illusion of movement in an animation happens when a sequence of images ('frames') passes before our eyes, usually at a speed of 24 frames per second. Our brains join these images together and perceive motion due to a phenomenon called *Persistence of Vision*.

Persistence of Vision

Persistence of vision is the theory that the human eye/brain retains an image for a fraction of a second after seeing it. This is called an *after image*. You can demonstrate this to your class by asking children to focus on a highly contrasting image (like the one below) for around 30 seconds. They should then close their eyes or look at a blank wall. Briefly, the image should appear to them in positive.

Image: Scientific American

Optical toys that use the concept of persistence of vision (zoetropes, thaumatropes, praxinoscopes, flipbooks, etc) became extremely popular in the early 19th century. Scientists discovered that the human eye and brain is only able to process 10-12 separate images per second (retaining each for around a fifteenth of a second). If another image replaces the one before within this period of time, the illusion of continuity is created. This understanding quickly led to the development of the first animations and films.
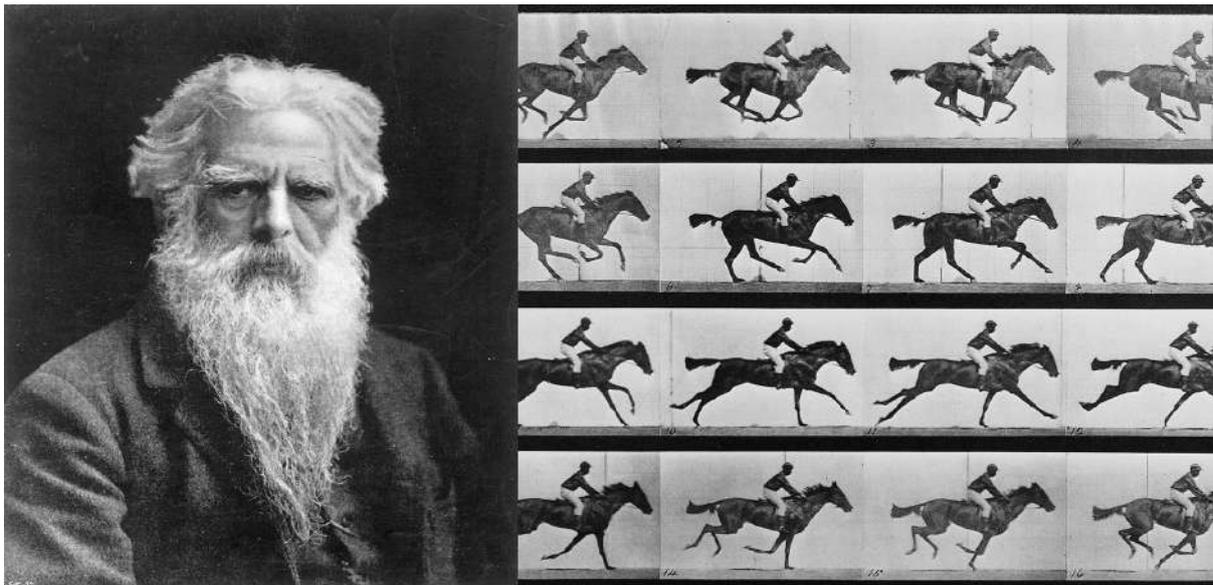
KEY FIGURES IN EARLY ANIMATION

Image: Petapixel.com

Eadweard Muybridge
Considered a forefather of cinema for his pioneering photographs of motion. His compilation *Animal Locomotion (1887)* is still used by artists and animators today as a reference for understanding movement.

Stuart J Blackton
His film *Humorous Phases of Funny Faces* (1906) used stop-motion and cut-out techniques.

Emile Cohl
Fantasmagorie (1908) is widely considered to be the first fully animated film, consisting of 700 drawings filmed on negative, to create a "chalkboard" effect.

Walt Disney
Snow White and the Seven Dwarfs (1937) was groundbreaking as the world's first full-length cel-animated feature film.

Emile Cohl: *Fantasmagorie*

FOCUS ARTIST: LOTTE REINIGER

Lotte Reiniger (1899-1981) was a German film director and pioneer of silhouette animation. She devised the first form of multiplane camera, one of the most important devices in early animation, later used by Walt Disney. Reiniger made more than 40 animations in her lifetime, including what is believed to be the earliest surviving animated feature film, *'The Adventures of Prince Achmed'* (1926) which was created using cut-out puppets that she made herself.

Images L- R, Lotte Reiniger: Stills from *The Adventures of Prince Achmed*

ACTIVITY: MAKING A THAUMATROPE

A thaumatrope is one of the simplest optical illusion toys to make and effectively demonstrates the principle of Persistence of Vision.

Two images on opposites sides of a piece of card appear to blend when rapidly spun together.

The key with making thaumatropes is to think carefully about which images will combine well.

These are a few classic combinations:

- **BIRD + CAGE**
- **FLOWER + VASE**
- **FISH + BOWL**

HOW TO DO IT

• Get your class to make drawings on *paper* and blue-tack these onto their card disc. This way, they can test their thaumatrope to see if the images are correctly positioned and that the illusion is working well.

• To test, punch holes into the sides of the disc and add two loops of string (about 25cm) tying a knot at each end.

• Turn the thaumatrope, twisting the string as tight as it will go. Let go and watch the disc as it spins!

• If children are happy that their illusion works, they can glue their paper drawings down. They should also make the images *as bright as possible* – go over drawings with coloured pens or pencils and strong black outlines so the images really show up!

HANDY HINT
If your class struggles to tie string, make a pencil thaumatrope instead! Follow the instructions above, but tape your card discs together at the top of a pencil instead. Spin the pencil between your palms to see the illusion.

THAUMATROPES FOR THE WINTER'S TALE

When children have made a successful first thaumatrope, let them take inspiration from *The Winter's Tale!*

See if they can animate any of the following combinations:

• **CUP + POISON**
• **HERMIONE + PRISON**
• **BABY + BASKET**
• **BEAR + ANTIGONUS**
• **PERDITA + CROWN**

Flipbooks are so much fun to make! A flip book is a small booklet that contains a short sequence of images, each differing slightly from the one before it. When flipped with a thumb, the images combine to create the illusion of motion. Frenchman Pierre-Hubert Desvignes is generally credited with inventing the flip book in 1860 with his 'folioscope', however British lithograph printer John Barnes Linnett was the first person to patent a flipbook, which he named the "kineograph" (moving picture), in 1868.

DID YOU KNOW? Flipbooks are still made by artists today!

Image: Juan Fontanive

Andy Bailey
A creator who makes popular flipbook animation videos on YouTube (Andymation)

Ben Zurawski:
Known as *The Flippest*, specializes in custom, often comedic, flipbooks, and uses platforms like Instagram to share his work

Juan Fontanive
Makes complex, motorized, and often bird-themed "flipbook machines" that combine sculpture and animation.

FUN FACT: The German word for flip book, '*Daumenkino'*, means "thumb cinema"!

HOW TO MAKE A FLIPBOOK

The simplest way to make a flip book is to pre-cut small sheets of paper and clip them together with a sturdy bulldog clip (it helps to put the paper together at a slant for ease of flipping.) Alternatively, you can use a ready-made notebook, post-it notes, or even an old book! Try to source some flipbooks for children to hold and play with in advance of this session, so they can clearly understand how the illusion works.

What to Animate?

When it comes to deciding what to animate, simple is best for a first attempt! Encourage children to choose ONE action only. The more frames they draw, the more effective the animation will be – 12 is a good number to aim for. Note: to animate a person, it's easier to make stick people sketches.

Some ideas that work well are:

• **Person jumping or waving**
• **Flower growing from a seed**
• **Rocket taking off into space**

HANDY HINT
Take the pages of your flip book apart to draw, then put it back together when all the images are finished. Also think about which way you prefer to flip, and assemble the images accordingly!

FLIPBOOKS FOR THE WINTER'S TALE

When you class gets the hang of making flipbooks, it's time to make one inspired by *The Winter's Tale*! This will be more challenging, but again, aim for simple illustrations and choose only one action or transformation to animate.

Here are some ideas to get your started:

• **Baby Perdita grows into a young girl**
• **Hermione faints on hearing of her son's death**
• **Antigonus' ship is wrecked in a storm**

USING STORYBOARDS

Storyboarding is an extremely useful skill for animators! Storyboarding helps children to plan their animations by identifying 'key frames' in a sequence. Key frames can be thought of as the important milestones in a timeline. They include the start frame and end frame, and significant images in between. Try to spend some time looking at animation storyboards and making them with your class – this knowledge will come in useful in the next sessions.
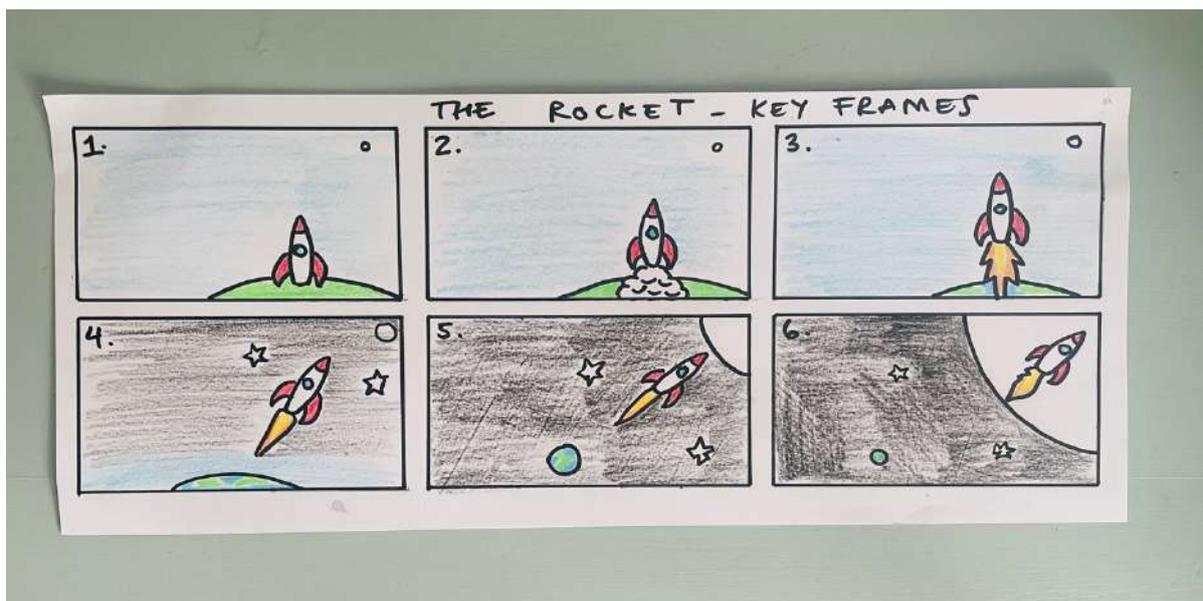
SESSIONS 3 - 6: DIGITAL ANIMATION (FLIPACLIP and STOP MOTION STUDIO)

The next sessions focus on Digital Animation using the apps *Flipaclip* and *Stop Motion*. As mentioned before, it's best to choose between these apps, thinking about which is more suitable for your class. *Flipaclip* is designed for animating drawings, while *Stop Motion* lends itself to animating models. Remember to always give children time to explore the app before they start a more ambitious project. The following pages will walk you through both apps, discuss their features, and suggest some *Winter's Tale* inspired projects for you to tackle in school!

CARTOON ANIMATION (Using *Flipaclip*)

What is *Flipaclip*?

Flipaclip works like a digital flipbook and the basic version is free to download. For children who love to draw and are happy working independently, cartoon animation with Flipaclip is very appealing. Children don't need to be brilliant at drawing, however – even the simplest drawings can make effective animations!

How Does *Flipaclip* Work?

Children create pages (frames) and draw with their fingers – although you can give them a stylus to use for more control. They then select from a range of brushes and pens, add colour, create simple shapes, duplicate or delete frames as needed, and playback their work, before exporting their efforts as movies or looping gifs. More advanced elements can be incorporated as children become more confident – such as time-lapse, rotoscoping or glow feature!

ADVANTAGES	DISADVANTAGES
Easy to use	Movies export with Flipaclip logo
Useful tutorials and resources	Limited number of layers
Fun advanced features	Occasional ads

TIME TO PRACTICE

Just as children need time to learn new skills without pressure, so do teachers! Always spend some time familiarising yourself with an app before you use it in your classroom. Flipaclip has lots of simple tutorials to get you started:

https://support.flipaclip.com/category/7-the-basics

KEY THINGS TO KNOW:

1. How to set up a new project
2. How to select and draw with a brush or pen
3. How to insert new pages (frames)
4. How to add colour using the colour picker tool
5. How to delete or duplicate frames
6. How to playback a project and export it

IMPORTANT TERMS

• FPS (Frames Per Second)
New projects in Flipaclip are automatically set at 12 Frames Per Second. This means that for every second of animation, 12 drawings are needed for your animation to run smoothly. Note that fewer drawings (or lowering the FPS) can make your animation seem 'choppy'.

• Onion Skinning
Onion Skinning is a feature that allows you to see a faint version of the frame that comes *just before* the one you are working on. Animators use onion skinning to make sure their drawings blend well together. Make sure onion skinning is turned on for your project!

FIRST CHALLENGE: Make a ball bounce across the screen!

Making this simple animation is a great way to understand and practise using the basic features of Flipaclip.
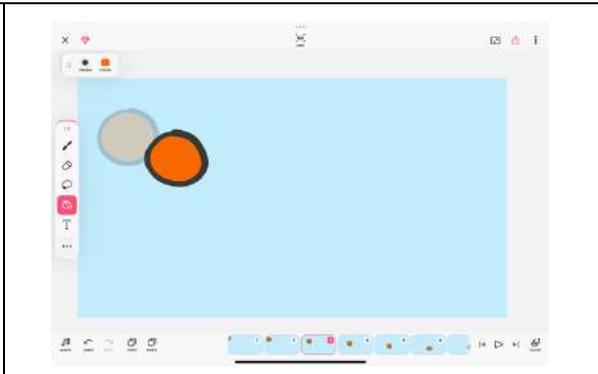
The drawings below show the 12 frames needed to make up this one second animation:
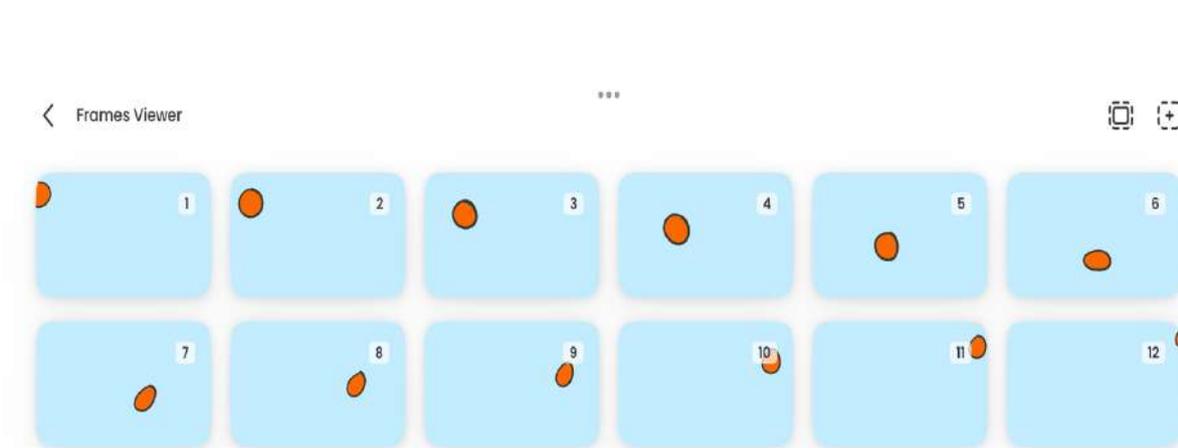
And these five key frames highlight important moments in the process:
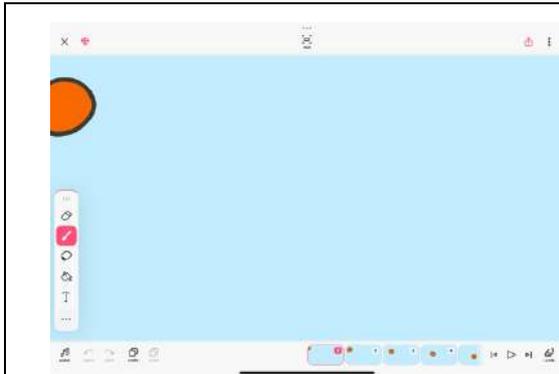
Frame 1
The ball enters the screen from left. A blue background has been set for the entire animation.

Frame 3
The ball's trajectory can be seen as it moves towards the ground. Onion skinning shows the drawing on the previous frame.
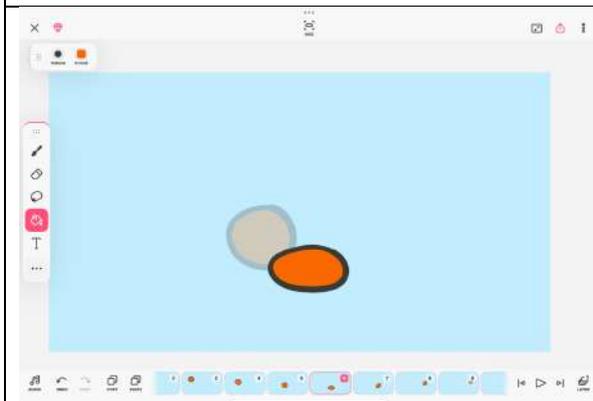
Frame 6
Half way through the animation, the ball hits the ground. An oval shape gives a sense of compression.
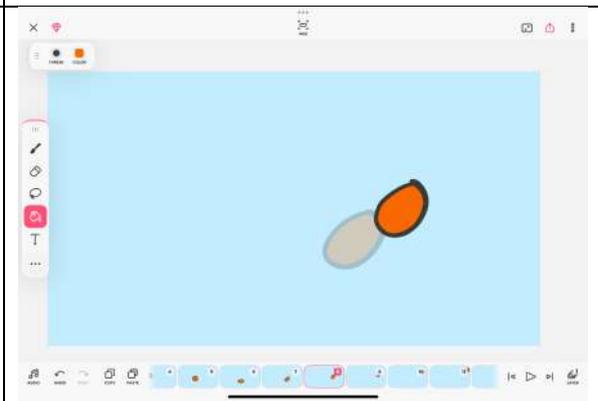
Frame 8
The ball now bounces up and away – an oval shape here helps convey the upward motion.
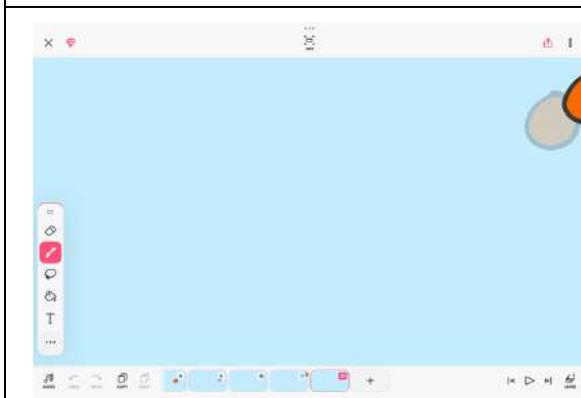
Frame 12
The ball bounces out of screen to the right for the final frame.

EXPORTING YOUR ANIMATION

When you have finished animating, you have two options for exporting your clip:

• a .MOV file exports as a one second movie (with audio)

• a .GIF file exports as a continuous loop (without audio)

# CARTOON ANIMATION FOR THE WINTER'S TALE

When children have mastered the basic skills of Flipaclip they will be ready for a bigger challenge! See if they can animate a simple action from *The Winter's Tale.* The example here takes the well-known stage direction from Act 3, Scene 3: **"Exit, pursued by a bear."**

USEFUL THINGS TO TRY:

- **Practise drawing characters on paper first**
- **Use storyboarding to plan your animation**
- **Import a photo for the background** (save to your photo reel ahead of time)
- **Create layers**
- **Add Audio** (can you record a grizzly bear roar?!)

Some key frames for the above animation are shown below:
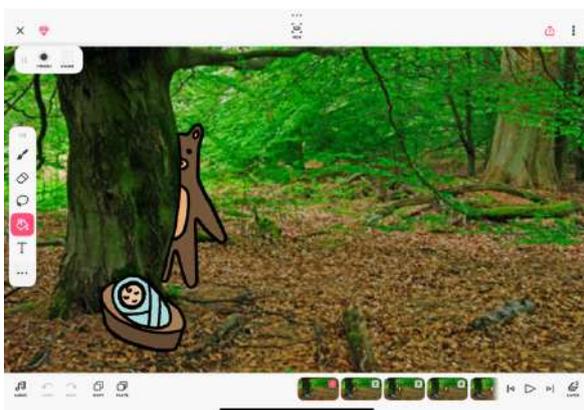
EXTENSION ACTIVITY – Animating a Simple Walk Cycle

Some of your more confident or experienced animators might be ready to try something a little more difficult! A 'walk cycle' refers to the key poses that professional animators use to simulate the movement of walking.

A simple walk cycle is illustrated below. Children can practice using stick figures first, before fleshing out their characters.
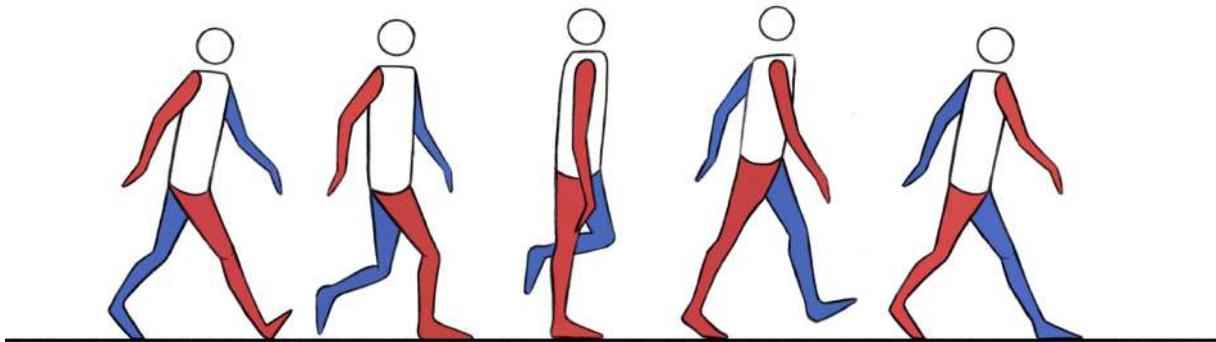
ARTIST FOCUS: Lucinda Schreiber

To enrich their work on animated drawings, your class might be interested in the work of Australian illustrator and animator Lucinda Schreiber. Her music video for the song *Autumn Story* by Australian band Firekites was made by drawing individual frames in chalk on a blackboard, and rubbing out the images between shots. A link to this video can be found in Resources.
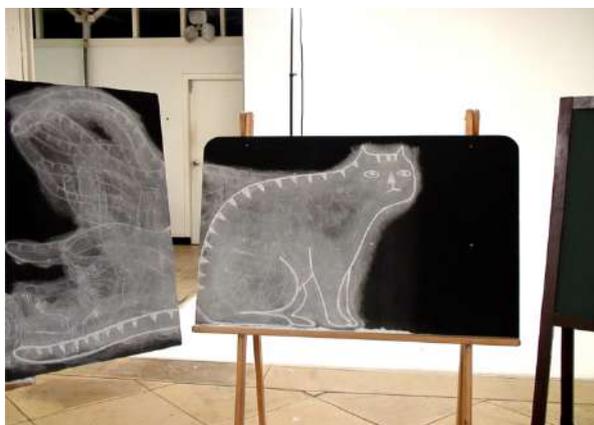
Images L-R : Lucinda Schreiber, the making of *Autumn Story*

ANIMATING WITH MODELS (Using *Stop Motion Studio*)

What is *Stop-Motion?*
Stop Motion is a free app that allows children to design and make animated films by taking sequential, frame-by-frame photos of 3D objects. It's a great choice if your class is not confident with drawing or if children prefer to work in teams/pairs. Stop-Motion animation requires good collaboration, so this app is great for building teamwork and communication skills.

How Does it Work?

Children work together to design a simple set and create puppet characters, for example in plasticine or clay. They then work as a team to choreograph their puppets, using the app to take photographs of each small movement. Many stop motion apps are available – the table below shows the advantages and disadvantages of using *Stop Motion Studio.*

ADVANTAGES	DISADVANTAGES
User-friendly for beginners	Time-intensive process
Includes features like onion skinning	Some advance tools are locked
No ads	

TIME TO PRACTICE
You and your class can familiarise yourselves with the features of Stop Motion by creating a very simple animation. Instead of making models, use a toy (e.g a Lego figure) to save time. It is important that the device you use must be kept stable at all times, so consider investing in a stand, or making one. Stop Motion has a range of useful tutorials to help you understand the basics:

https://www.stopmotionstudio.com/tutorials.html
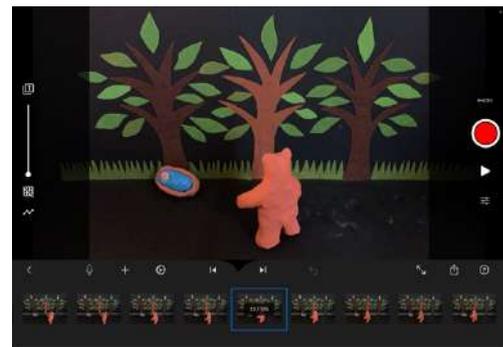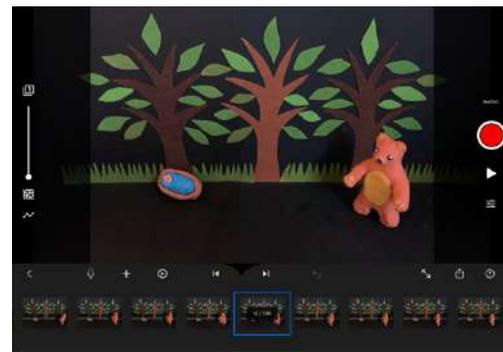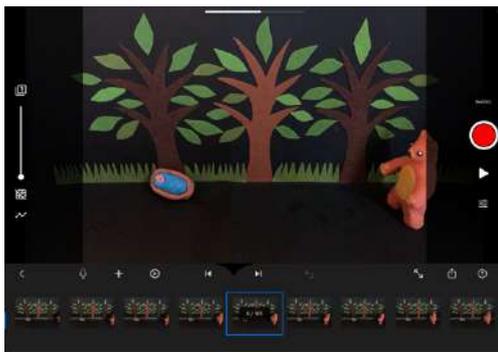
KEY THINGS TO KNOW:

1. How to set up your camera/device for stability, focus, light etc
2. How to create a new project
3. How to turn on and use onion skinning
4. How to capture, duplicate and delete frames
5. How to change the frame rate to adjust playback speed
6. How to playback a project and export it

FIRST CHALLENGE: Make a toy walk across the screen!

STOP MOTION ANIMATION FOR THE WINTER'S TALE

Once again, when children have mastered the basic skills, they will be ready for a bigger challenge! Ask them to design, create and animate a simple scene from the play. The following suggestions will all work well for Stop Motion animation:

- **Leontes throws Hermione in prison**
- **Antigonus is chased by a bear**
- **Perdita and Florizel meet and fall in love**
- **Hermione's statue comes to life**
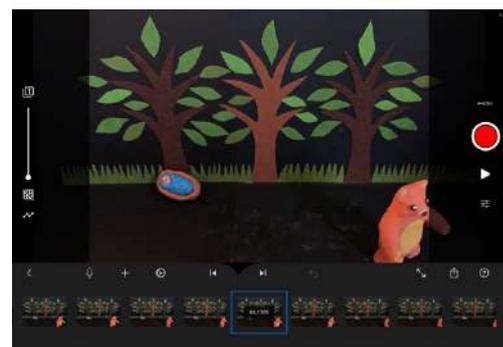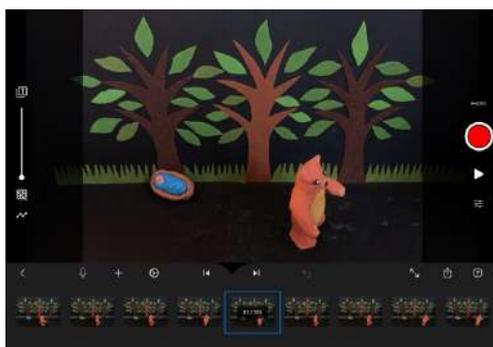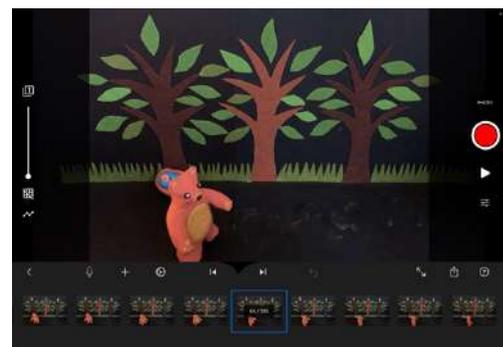
IMPORTANT THINGS TO CONSIDER

• Spend enough time planning
Storyboarding is even more important when working in a team, as all members need to know exactly what is going to happen and work towards the same goal. Encourage children to plan their animation first, sketching out the key frames.

• Allow time for designing and making characters
Stop Motion projects often involve more than one character, so children will need time to design and make these. Remind them that characters must be stable and able to stand up on their own.

• Allow time to make and build your set
The background of your animation is important. Your class might enjoy designing and building sets for their animations, however if you don't have time to do this, your background should still be uncluttered so as not to distract from the action. A fabric curtain or paper backdrop can work well.

• Before beginning, make sure your device is steady
Children should take their time setting up their device because once they start to animate, the device should not move (unless deliberately to create a different shot). You can use an iPad stand, or make your own. Taping it down will make it even more secure.

• Animate 'on twos'
Stop Motion is a time-consuming process that requires lots of patience To speed things up and create slightly longer films, children can set their frame rate to 24 and take 2 frames every time they move their models.

• Add Audio
Once you have made your animation, explore the audio recording feature on Stop Motion to record dialogue or add pre-existing audio!

SHARING YOUR ANIMATIONS

Whether you end up using Flipaclip or Stop Motion with your class, you're going to share your animations with an audience. There are lots of ways to do this! You could put them into a slide sequence, save them to a file sharing platform like Padlet, or upload to a video sharing site like Vimeo. You can create QR codes for each film and share these with parents or even stick these in sketchbooks. The only thing left to do is organise your film-screening premiere!

RESOURCES

HISTORY OF ANIMATION

• A Brief History of Animation:
https://www.youtube.com/watch?v=mbpLpxi9rJY

• A Tribute to 2D Animation:
https://www.youtube.com/watch?v=wU9mnbMJnpM&t=72s

• Persistence of Vision and Early Optical Illusions:
https://theanimatedprofessor.com/persistence-of-vision-early-animation/

SUGGESTED FOCUS ARTISTS/ANIMATION STUDIOS

• Eadweard Muybridge's Cinematic Legacy:
https://www.youtube.com/watch?v=wNU7sXkZmSw

• Stuart J. Blackton, *Humorous Phases of Funny Faces:*
https://www.youtube.com/watch?v=wGh6maN4l2I

• Emile Cohl, *Fantasmagorie:*
https://www.youtube.com/watch?v=zSUUiHQpnlw

• Lotte Reiniger: *That Silhouette Girl:*
https://www.youtube.com/watch?v=NbfMu9K8UdE

• John Barnes Linnett:
https://fliptomania.com/pages/did-you-know

• Juan Fontanive: *Ornithology* (motorised flip book machine):
https://jfontanive.com/ornithology-p/

• Lucinda Shreiber: *Autumn Story*
https://lucindaschreiber.com/Firekites-Autumn-Story

• Aardman: *Morph*
https://www.aardman.com/film-tv-games/morph/

PRINT OUTS ON NEXT PAGES:

• Simple Walk Cycle
• Cartoon Bears