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WALLACE & GROMIT AND FRIENDS
THE MAGIC OF AARDMAN

Educational
Animation Kit

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CONTENTS

WALLACE & GROMIT AND FRIENDS:
The Magic of Aardman

Celebrate the arrival of *Wallace & Gromit and Friends: The Magic of Aardman* at ACMI by exploring the history of animation, and then becoming an animator yourself!

This resource can be used by teachers, students, families, or individuals to develop animation skills.

Create optical toys like the zoetrope, learn the ropes of stop motion animation, master the art of claymation characters, and more.

Types of animation

There are many different ways to animate. A familiar contemporary animation form is 3D animation (CG), a type of animation associated with Pixar, Disney and Dream\Works.

Other studios and independent animators continue to use a range of animation techniques. Studio Ghibli, the people responsible for some of Japan's most endearing and enduring animated films, such as *Howl's Moving Castle* and *My Neighbour Totoro,* use a form of 2D hand drawn animation. Aardman Studios are famous for a form of stop motion called claymation on productions such as *Shaun the Sheep* and *Chicken Run*.

Activity

Find out about animation and build on what you already know. Collect examples of as many different types of animation as you can discover.

Present your discoveries using a digital mind-map, using software that enables you to include images or even videos.

A free and easy online visual mapping software is www.mindmup.com/. You don't have to register, simply follow the link, click 'Get Started', and then 'Create a New Map'.

Find an example of each of these animation types:

- Stop motion animation
    - cut-out animation
    - claymation
- 3D animation (computer generated)
    - digital 3D animation
    - motion capture animation
- 2D animation

- o traditional 2D cel animation
- o digital 2D (computer animated)
- o 2D animation and live-action cross

Place them on your visual map.

Include technical information: What tools are required for claymation? How is 3D animation created? How does cut-out animation differ from claymation? What's the difference between 2D computer animation and 3D computer animation?

You could include clips from the animations you list to enhance your mind-map.

History of animation

Find out about some of the important steps that took animation from cave paintings and shadow puppets, all the way to feature length 3D CG films.

Use the 'History of animation research topics' (below) to explore the development of animation over time and produce an online timeline.

If you're working in groups, pick a topic each and present your findings to the class for a great overview of the history of animation!

If you're working alone, focus on areas of interest to create your timeline.

Getting started

We recommend the online timeline maker **Timeline** at
http://www.readwritethink.org/files/resources/interactives/timeline_2/

There's no joining up required, you can start your timelines straight away.

Simply click on the timeline to add an event, and you can also add labels, date/ year in 'short description', and the more detailed information you discover in 'full description'. It's great to include images by uploading them into your timeline event. You can also move and manipulate where your events sit on their timeline or on the event space afterwards.

History of animation research topics

Focus your research with inquiry questions: Who? When? Where? How? Why?

Include significant dates, images, and links to examples in your descriptions.

We've included a link as a starting point, but you will also need to conduct your own research.

Ancient animation

Modern animation's roots go back thousands of years, with drawings and other methods used to tell stories. On your timeline indicate the time period of these storytelling forms. When did they emerge? Be sure to include images and information.

- cave paintings
    - https://www.britannica.com/art/cave-painting
- Chinese shadow puppets
    - https://www.chineseshadowpuppetry.com/
- Greek vase drawings
    - http://greece.mrdonn.org/vases.html
- Indonesian Wayang shadow puppets
    - http://www.travelfoodfashion.com/indonesian-shadow-puppet-indonesian-traditional-culture/

Optical Toys

Before film, the illusion of movement was achieved through optical toys – devices that used different methods to bring still images to life. These are early examples of animation. Find out when each of these techniques was invented, Describe the illusion created and how it was achieved.

- phantasmagoria
    - https://en.wikipedia.org/wiki/%C3%89tienne-Gaspard_Robert
- magic lanterns
    - http://www.magiclanternsociety.org/about-magic-lanterns/
- thaumatrope
    - http://courses.ncssm.edu/gallery/collections/toys/html/exhibit06.htm
- phenakistiscope
    - http://courses.ncssm.edu/gallery/collections/toys/html/exhibit07.htm
- zoetrope
    - http://zoetrope.org/zoetrope-history

Hand-drawn animation, cel animation, and more

When most of us see an animated film in the cinema the chances are we'll see a form of 3D or CG animation. It's good to remember though that there are many different types of animation. Find out more about these styles of animation through the following events, inventions and discoveries. Describe why you think each was significant, and be sure to provide visual examples to help illustrate what you've discovered.

- Winsor McCay – the first animated character with *Gertie the Dinosaur*
- invention of 'rotoscoping'
    - https://en.wikipedia.org/wiki/Rotoscoping
    - http://www.ufunk.net/en/insolite/disney-rotoscoping/
- invention of cel (cellulose acetate) animation. What was the first Disney feature film that used this kind of animation?

- *The Adventures of Prince Achmed* – the first feature length animated film made using cut-out animation
  - http://www.openculture.com/2015/09/the-first-animated-feature-film-the-adventures-of-prince-achmed.html
- arrival of the first animated film with synchronised sound
  - https://www.boomboxpost.com/blog/2015/11/8/the-history-of-animation-sound

Stop motion animation

Claymation is just one form of animation. Find out more about the history of stop motion animation, including the establishment of Aardman Studios (*Wallace and Gromit, Morph, Shaun the Sheep*). For this area of research, investigate when these events occurred, when these films were made, and why they were important.

- invention of plasticine
- J Stuart Blackton's *Humorous phases of funny faces*
- Emile Cohl's *Fantasmagorie*
- establishment of Aardman Studios
- Tim Burton's *The Nightmare Before Christmas*

Extra activity: the history of Aardman Studios

Want to know more about Aardman Studios? Create your own timeline to track the introduction of Aardman TV shows and the release dates of important films.

Begin with Aardman Studio's own amazing 'history of': http://www.aardman.com/the-studio/history/

Listen: Peter Lord, David Sproxton and Nick Park from Aardman talk about how the studio started out in episode one of ACMI's special podcast: https://www.acmi.net.au/ideas/listen/wallace-gromit-exhibition-podcast/

Computer-generated imagery and animation

Explore the history of CG animation and consider how it continues to change and evolve. Begin with these significant milestones and explain why they are so important:

- *Tron* (1982)
- *Toy Story* (1995)
- Pixar's *Luxo Junior* (1986)
- *Shrek 2* (2004)
- *Final Fantasy* (2001)

Make your own Thaumatrope

Thaumatrope means 'turning wonder' in Greek. It is an optical toy that uses a spinning disc to merge two separate pictures to create the illusion of one complete still picture.

The first known thaumatrope was invented by John Ayrton Paris, an English doctor, who used it to demonstrate a theory he called 'persistence of vision' to the Royal College of Physicians in London.

Research: The theory of the persistence of vision has since been disproved. What new theories have been developed in its place?

Activity

Before you make your very own thaumatrope, you can experiment with one we prepared earlier. Print out the **Shaun the Sheep** thaumatrope and follow steps 3-5 below. Once you've got the hang of it, you can make your own from scratch.

Brainstorm ideas for pictures that can be separated into two key parts, for example, a bird and a nest, or a person and their bicycle, a spider and a web. Stuck for ideas? Have a look at all the great examples on this Pinterest page:
https://au.pinterest.com/abistar02/thaumatropes/

Materials

- a blank piece of A4 cardboard or thick paper – preferably white
- a ring ruler or something circular to trace two circles on your cardboard/ paper
- a small stick, blunt skewer, wooden chopstick or firm drinking straw
- pencils or felt-tip pens
- glue
- adhesive tape

Create:

1. Trace the outline of your two circles on your piece of cardboard or paper. Try to use a fair amount of your A4 piece so your thaumatrope isn't too small.
2. In circle one, draw your first image, and in circle two, draw the other image. Practise first on a scrap piece of paper and trace your second image over the first one, so they are aligned.
3. Cut out your circles.
4. Place the stick or straw onto one card and tape it firmly, then stick the two cards together (with the stick in between) using glue, making sure that your two pictures are aligned.
5. After it's all dried, hold the stick between the palms of your hands and quickly rotate it back and forth.

If you'd like a visual guide to help, follow this link to YouTube
https://www.youtube.com/watch?v=gLNJ_FQTRMQ

Experiment and report: Work with your partner to test different twirling speeds to discover how different speeds affect the illusion of motion. Discuss your findings and answer the following questions:

a. Did the illusion work when you spun your stick slowly?

b. Did it work when you spun it really fast?

c. Describe the spinning speed where the illusion worked best. Explain why you think it worked best at this speed?

Experiment further: Make another thaumatrope with a new set of images. Repeat steps 1 – 4 but instead of using a stick, use a hole puncher to create two holes on the left and right hand side (near the edge) and thread a piece of string through both. You can then wind up your thaumatrope and see if this method works better than your first thaumatrope.

Make your own zoetrope

A zoetrope is an optical illusion toy and a way of making a short-looped animation. Zoetropes have been around for a long time, and pre-date film animation.

They use a series of sequenced images that form an animation loop, when they spin. The loop is created by matching the first and last image in the series.

To make a zoetrope, a sequence of images is pasted onto the inside of a cardboard cylinder. The cylinder has thin slits along the side. Once the cylinder starts to spin, you look through the slits to see your animation come to life,

Check out this video to see what one looks like

Beta movement

Before you get started it's worth learning a little bit about beta movement.

This describes the phenomenon whereby our eye and brain interpret a series of static images (when put in sequence) as a moving image. In film and television we call the images 'frames'.

Most films and television shows have 24 or 25 frames for each second of footage. Beta movement can normally be achieved by using 10 or more images per second. Any fewer and our eye would see them as separate images, not moving ones.

Make your own

Print the Shaun the sheep zoetrope template from the ACMI website. Remember to print A3, and print on cardboard if possible. If you can't use cardboard, print it on paper and paste it onto cardboard.

1. Cut out the zoetrope frame (bottom of the page) as instructed.

2. Form a cylinder out of the zoetrope frame and stick it together where it says 'glue here'

3. Cut out the base, and punch a hole through the middle circle. This is where your stem will go; it could be a thick strong straw or something similar.

4. Use the flaps on the base and fold them into three spaces left at the bottom of the zoetrope frame; then fix the base to the zoetrope.

5. Take your stem and work it through the hole in the base; then fix it to the base. Try and have the stem as straight as possible in relation to the base, which should be as even as possible.

6. Cut out the animation strip, and place it inside your zoetrope with the images facing inwards.

7. Look through the slits and start spinning the stem of your zoetrope. Make sure you experiment with different speeds until you see your animation come to life.

Make your own zoetrope strip

Now you've practised with a ready-made animation strip, it's time to make your own. Use the blank template we've provided.

Remember the first and last frames need to be similar for the animation to keep repeating. For example a walking or running motion can be easy to loop. A ball going into the air and falling back down to where it came from could form an animation loop. A person smiling, then frowning, then returning to a smile can form a loop. It's up to you!

Experiment to find out what works best.

Sketch to clay: make your own claymation character

Drawing your characters

Sketch your character before you make it out of plasticine. Your character is three dimensional so draw it from different angles: from the front, the side and behind. Use the Creating your character worksheet to get started.

Watch: Nick Park from Aardman shows you how to animate Gromit from Wallace and Gromit in this video: https://www.youtube.com/watch?v=K_r_9cvPxxM

Listen: You can hear the Aardman team talking about the importance of drawing in episode two of ACMI's *Wallace & Gromit and Friends* podcast: https://www.acmi.net.au/ideas/listen/wallace-gromit-exhibition-podcast/

Creating an armature for your character

Once you're happy with the design of your character, you need a frame for your character. These are called armatures.

An armature acts like your character's skeleton; it will help hold it together and make your character's limbs and other body parts move realistically. You need to be resourceful. toothpicks work well, as does shaping a skeleton out of aluminium fool. Soft wire or small, strong pipe cleaners are also effective.
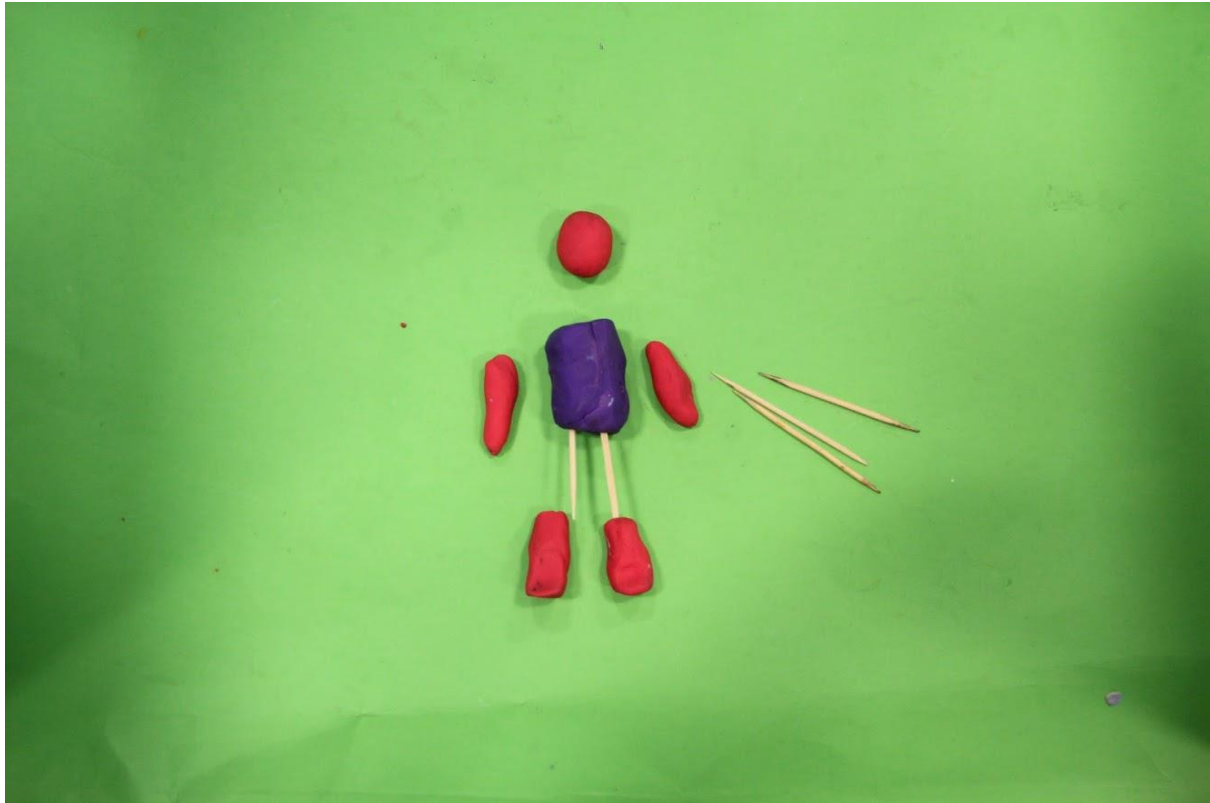
Toothpicks can be useful in creating an armature for your character, particularly for arms, legs, and spines.

You can create an armature out of aluminium foil as well. You can then put plasticine on top.

"Drawing is the starting point, the top of a massive pyramid" – Nick Park

As you create your character, do a 'standing test' every few minutes. Start with legs and torso; if your character falls over, change the design. Make the legs thicker or the body thinner.

Don't make your character **top heavy**. If all the weight is in the head, body and arms, it will probably topple over.

Listen: Learn how to mould plasticine from the Aardman team in episode three of ACMI's *Wallace & Gromit and Friends* podcast: https://www.acmi.net.au/ideas/listen/wallace-gromit-exhibition-podcast/

Making your character expressive

Make interchangeable features for expressions – different sets of eyes, eyebrows, and mouths mean you can add all kinds of facial expressions to your character to show your audience what it is thinking and feeling.

Complete the second page of the **Create your character worksheet** to figure out how your character's range of emotions will look.

When it comes time to make your character expressive, use the worksheet as a reference.

Creating a cracking contraption

If you've watched Wallace and Gromit before, you'll know Wallace is famous for inventing his own 'cracking contraptions', that usually go horribly wrong. And who saves the day? That's right, Gromit!

Now you've learnt how to create your own Claymation characters, try inventing your own wacky contraption to use in your stop motion animation.

Cracking contraptions

Watch: Check out some episodes of *Wallace and Gromit: Cracking Contraptions* for inspiration. You can find episodes online here: https://www.youtube.com/watch?v=gu2pxJo3cI0&list=PLSD4QfyS1DxXVYgPkEajIjBak1UkPSpjx

Use the **Creating your own Contraption worksheet** to get started.

Creating your own contraption

Before you get cracking on the second part of the worksheet, analyse the style of Wallace's contraptions. They have a very 'retro' look because they are inspired by machines, devices and contraptions from the 1930s through to the 1960s. ('Retro' is short for retrospective which means to look back).

Get some inspiration for your own device from Pinterest boards that show what some machines and devices looked like in the past.

- Vacuum cleaner: https://au.pinterest.com/pin/335377503474183538/

- Soft drink dispensers: https://au.pinterest.com/duanesylvester/vintage-soda-machines/

- Petrol pumps: https://au.pinterest.com/bellalunagemini/vintage-gas-pumps/

- Fridges: https://au.pinterest.com/tulabifallen/1950s-fridge/

- Vintage robots: https://au.pinterest.com/explore/vintage-robots/

- Retro control panels: https://au.pinterest.com/GeoffreyKB/control-panel/

Feel free to keep exploring and finding your own retro inspiration.

Once you've got an idea of how your contraption might look, it's time to think about what it might do.

Wallace's inventions always seem to have strange but specific purposes as well as lots of different features. Follow the steps on your worksheet to create your own crazy contraption.

Listen: The team from Aardman talk about the wacky and inventive contraptions featured in their films and TV show in episode four of ACMI's *Wallace & Gromit and Friends* podcast: https://www.acmi.net.au/ideas/listen/wallace-gromit-exhibition-podcast/

How to stop motion animate

Stop motion animation can be tricky to begin with because you're dealing with small movements and heaps of images which we call frames.

Animators often work for hours and only end up with seconds of movement! But it is extremely rewarding.

What you'll need

Animation materials (essential)

You can use all kinds of things to make a stop motion animation: Lego, paper and cardboard – but we recommend using modelling clay or plasticine to make characters just like Aardman Studios do, and coloured paper for backgrounds and settings.

Stop motion animation software (essential)

There are loads of programs out there for PCs, Macs, and tablets. We recommend:

- Aardman Studio's Animate It for PC and Mac. Get a free trial or buy a copy at www.animate-it.com/get-the-software/

- Animate It by Aardman Studios for iPhone, iPad and iPod http://www.animate-it.com/get-animating/animate-it-app/

- Stop Motion Studio for Windows. It's free! www.microsoft.com/en-us/store/p/stop-motion-studio/
- iStop Motion for iPad, purchase at itunes.apple.com/us/app/istopmotion-for-ipad/
- iStop Motion 3 for Mac, purchase at itunes.apple.com/au/app/istopmotion-3/

Web camera (best!), iPad or tablet (great!), or digital camera or smartphone (still doable!)

Using a webcam or camera on a tablet is easiest, but if you don't have either you can still make a stop motion animation. There is stop-motion software for a smartphones and some digital cameras can be plugged directly into a computer and will work with stop-motion animation software.

Tripod or similar (essential)

Use something to keep your camera or device steady whilst you record your frames. Keeping your camera steady is essential! Octopus stands work really well for webcams and smartphones.

Editing software (non-essential)

Some stop motion animation software lets you put the finishing touches on your film, but you may need to use editing software like iMovie or Windows Movie Maker. That way you can add music, sound effects and even dialogue. If you don't have anything to edit with, that's fine! You'll still end up with a good looking film.

Getting started

Using a box for your stop-motion animation set can work really well. Make sure you decorate inside though.

"The best films come about through experimentation"

– Nick Park

Step 1: Create the setting for your scene

Make sure it's a space big enough that your camera won't see outside that setting; dressing the inside of a cardboard box with at least one side cut out works well. It's better too if you have a space where you can set up your camera in different positions, that way you can get close-ups as well as wide or long shots.

Step 2: Create your characters and props

If you haven't created characters yet, don't forget to read through the **Sketch to clay** section of this resource.

Step 3: Experiment before you begin making your masterpiece

Two of the most important things to think about when making a stop motion animation are **frames** and **movement** and it's worth experimenting with and exploring the relationship between the two before you start filming your amazing film.

Activity: As well as experimenting yourself, try Pixar's online animation activity in which you can experiment with frames and movement on Mike from *Monsters Inc*. http://sciencebehindpixar.org/pipeline/animation/activity

There's also another online activity which will help you understand frame rate. In this activity you can go even further with your frame rate experimentation: https://frames-per-second.appspot.com/

Task: Either with your character or a real life person, raise an arm out to the side, and capture one frame. Now move that arm directly up your head, pointing straight up, and capture another frame. Now move your arm to the other side, so you've created an arc, and capture one frame.

*Experiment by repeating the above, but this time taking more frames (we recommend three) for each movement.

Watch: If you're using Aardman's Animate It software, here's a handy video on how to get started (https://www.youtube.com/watch?v=IiSz6lMTiy4).

Playback your footage. Did your character move slowly, or quickly?

Now, start again but this time start with an arm to the side, and move it along the arc with smaller movements – so at the side (capture a frame), a quarter of the way towards being vertical (capture a frame), half way to vertical (capture a frame) arm vertical (capture a frame) and so on until your arm completes the arc.

*Experiment by repeating the above, but this time taking more frames (we recommend three) for each movement.

"…with puppet animation, you just start at the beginning and you go forward, like real life. I would say it's much more spontaneous" – Peter Lord

Play back and compare. What do you notice when you made smaller movements? What did you notice when you took more frames for each movement?

You should hopefully see how frame rate and movement will affect your film, and the smoothness and speed of your animation.

Watch: Looking for stop motion tips? Then watch this short video from ACMI:
http://generator.acmi.net.au/gallery/media/tips-bringing-things-life-stop-motion-animation

Step 4: Start capturing frames!

It's time to start capturing frames for you stop motion film!

Remember what you learnt about small and large movements, and what happens when you take one or three frames for each movement. So start moving your characters and objects bit by bit, capturing at least one frame for each movement.

Tip: *Ensure your camera shot is in focus. Depending on your equipment you should be able to adjust the focus either via your camera, webcam settings, or computer.*

Depending on what stop motion animation software you're using, you might notice it has a tool called '**onion skinning**'. What this does is show you the last frame you shot as well as what your camera is seeing live at the same time.

This is a really useful tool because you can see exactly how small or how big you make your next movement with your characters.

Your software should have a **timeline** so can you also see how much footage you have captured. Remember, you don't want your animation to move so fast that your audience can't really tell what is happening, so play back every now and then to check your progress.

Tip: *When you capture frames, check to see they appear in your timeline. If they aren't, something might be wrong.*

Step 5: Set up new camera shot and camera angles as you go

Keeping the camera still when you're capturing your frames is really important, but you don't want to shoot your entire film from the same position.

So once you've captured the action or movement you want, move your camera to a new position to capture the next piece of action or movement from a different position. Try a variety of shots, such as a close-up (where your camera is close to a character or object), a mid-shot (where you see a character or two in the shot, but not much of the background) or a long-shot (where you see lots of setting and maybe your characters in that setting)
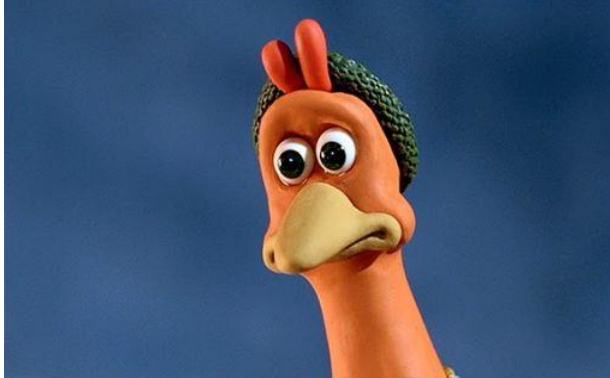
Which shot is which?

Label each of the three shots. Which one is the close up, which one is the mid-shot, and which one is the long shot?