The Animation Academy

Teachers' Guide

STAGE NINE
EXHIBITIONS

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Introduction to the Exhibition

"The Animation Academy" takes students on a journey through the history of animation, from pre-film animation devices to the computer generated animated films of today. Discover the men and women who have contributed to animation through the ages and learn what films, tools, or characters they introduced to the world. Take a behind-the-scenes look into the making of your favorite animated shows and movies, and view old drawings, sets, and notes used in these productions. You can even try your own hand at animating!

This Teachers' Guide has been developed as a resource for teachers to use before and after the museum and to enhance the visit itself.

This guide has several sections. The Exhibition Orientation contains information regarding the contents of the exhibition. The Content Standards outline how the exhibition correlates to the California Common Core Standards and Next Generation Science Standards. The Classroom Activities can be used to prepare for a visit or to continue themes of the exhibition after the visit. Activities During Your Visit provide added value to your trip by engaging students at a deeper level.

What to Expect:
While you and your students visit the exhibition, you will:
- discover untold stories of the animators and studios that brought your favorite characters to life
- learn to draw or trace famous characters
- explore the extensive collection of preserved sketches, sets, and frames from famous films and animators

When you and your students leave the exhibition, you will understand:
- the exacting, revision-filled process animators are tasked with, and how this process has changed over time with new technologies and animation styles
- how voice actors add an extra element to bring animated characters to life
- how music and sound effects can influence the tone of an animation
- how your favorite animated characters have influenced (and were influenced by) the animation genre

General Safety & Guidelines:
- Young children should be supervised at all times.
- Some areas have higher than normal sound levels.

Real-Life Animators
Discover the inspiring stories of famous and groundbreaking animators throughout the years as they pioneered new animating techniques and created memorable animated masterpieces. Throughout the exhibit, stop and read to see what inspired these animators to such great success.

Tools of Animation
View tools, machines, sets, and props used to create animation throughout history, such as the multiplane camera and clay models used in Claymation films.

Origins of Animation
As you enter the exhibit, discover some of the earliest animation techniques and the first successful animated films that contributed to the rise of animation in the 19th and 20th centuries.

Classic Cartoons
Bugs Bunny, Porky Pig, Tom and Jerry, Tweety Bird…These classic characters helped popularize cartoons. Learn about these characters and more from Warner Bros. Studios.

Stop-Motion Animation
From clay figures, to models, to puppets, stop-motion animation makes use of physical characters rather than ones drawn on paper. Take a look at sets and figures from famous stop-motion films from animators like Tim Burton.

Be the Animator!
Using various 3-D models, create a stop-motion scene one frame at a time. Take a picture, move the figure slightly, and take another picture to create the illusion of movement. Once you are finished with a scene, you can view it, edit it, and share it!

Animation University
Learn how to draw your favorite characters by following the lead of an animation instructor, or use a light table to trace a character on your own.

Saturday Morning Cartoons
Explore the world of Saturday Morning Cartoons! Learn the tricks animators from Hanna-Barbera and Nickelodeon used to save money on these low-budget, just-for-kids shows.

Computer Animation
Watch how animation has left the drawing board and entered the computer world in films like "Shrek" and "How to Train your Dragon 2".

Zoetrope
Watch stationary models come to life as this device spins, creating the illusion of movement.

Build Your Own Set!
Use Keva Planks to replicate any of the sets on display in "Get Animated!" or build your own unique setting.

The content written for *The Animation Academy* supports student understanding of key ideas developed within the California Common Core State Standards and National Next Generation Science Standards.

The goals of these activities include:
- having students recognize themselves as researchers.
- developing critical thinking skills to problem solve.
- learning new concepts through discovery.

California Common Core State Standards
Reading Standards for Literature, K – 12th Grade

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

10. Read and comprehend complex literary and informational texts independently and proficiently.

Writing Standards, K – 12th Grade

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structure event sequences.
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

9. Draw evidence from literary and/or informational texts to support analysis, reflection, and research.
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Speaking and Listening, K – 12th Grade
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Language Standards, K – 12th Grade
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialize reference materials, as appropriate.
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings
6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

For additional information on California Common Core State Standards and grade-specific requirements, visit
http://www.cde.ca.gov/re/cc/

Next Generation Science Standards
Standards for Engineering Design, K-8th grade

- K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
- 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- MS-ETS1-Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Standards for Life Sciences, 6th-8th Grade:

- MS-LS1-8: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

For additional information on Next Generation Science Standards visit http://www.nextgenscience.org/next-generation-science-standards

Vocabulary and Concepts

Animation may be thought of as an art, but there is a lot of science behind it that explains how animation works in our brains. On the following pages, you will find numerous classroom and exhibit activities you can do with your students to reinforce these concepts, but a prior understanding of these key terms will enrich these activities and provide a foundation for satisfying the Next Generation Science Standards applicable to these activities.

Vocabulary Terms:
- **Perception** is the organization, identification, and interpretation of sensory information in order to represent and understand the environment.
- An **optical illusion** is a visually perceived image that differs from objective reality.
- **Apparent motion** is an optical illusion in which a series of static images on a screen creates the illusion of a smoothly flowing scene.
- **Persistence of vision** is the optical illusion whereby multiple discrete images blend into a single image in the human mind and believed to be the explanation for motion perception in cinema and animated films.

How these terms relate to each other:
- When your visual **perception** is not in agreement with what you are really seeing, that false perception is an **optical illusion.**
- **Apparent motion** and **persistence of vision** are both **optical illusions**. They work together to create the false **perception** that allows us to enjoy animation rather than seeing a bunch of static images.

How these terms relate to the activities:
- **Persistence of vision** and **apparent motion** are both present in the following animation activities: Phenakistoscopes, Zoetropes, Stop-Motion Animation, and Flipbooks. For these activities, persistence of vision blurs the still pictures into one image, and apparent motion causes us to perceive movement from the collection of still pictures.
- The Thaumatrope activity relies only on persistence of vision to blend the images into one. As there are only two images being rapidly viewed in succession, we see the blending effect, but no apparent motion is seen.
- Every activity except the scavenger hunt relies on **optical illusions**, which are just false visual **perceptions.**

Important Concept:
- **Why Optical Illusions Happen:** Optical illusions occur due to properties of the visual areas of the brain as they receive and process information. In other words, your perception of an optical illusion has more to do with how your brain works than it does with the optics of your eye. The sensory information your eyes gather is correct, but your brain, due to the way it interprets that information, creates the optical illusion. Optical illusions reveal how the brain normally organizes and interprets sensory stimulation. Though illusions distort reality, they are generally shared by most people.

Flipbooks

Flipbooks are stacks of heavy-weight paper that are held together, such as with staples or binder clips. Each page in the stack has an image that is slightly different than the previous card. When you quickly thumb through the stack, your brain assembles the series of images into one moving image. This is occurs due to the phenomena of **persistence of vision** and **apparent motion.**

Student Learning Objectives:
- Students will learn how to create their own simple flipbook animations.
- Students will discover the concepts of: perception; optical illusion; apparent motion; and persistence of vision.

Materials:
- 3 inch x 5 inch index cards (cut into 3 inch x 2.5 inch): 25 halves for each student
- Binder clips: 1 for each student
- Markers: 1 set for each student
- Optional: examples of flipbooks can be purchased on Amazon
  http://www.amazon.com/gp/product/B003V4YR9W?psc=1&redirect=true&ref_=oh_aui_detailpage_o08_s00

Time Required: 45-60 minutes

Directions:

For a simple flipbook:
Each student will take a stack of index cards and make a series of "animated dots" along the right side of the cards. By placing one dot on each card in a progressively upward and then downward location, students can make the dot appear to rise and fall when flipping through the cards in succession. You can also suggest for students to use the lined side of the index cards to more easily control the size and "movement" of the dots. For example, they can jump one line for every card as they move their dot up, and then down. Students' dots should stay towards the right so they are easily seen when flipping through the stack. Students can also change the size of the dots as well as how fast they move up and down the lines.

For a more ambitious animation:
If your students want a bit more of a challenge, have them create a more complex animation scene, again using slight differences in the images on each card. Can they draw a stick man running? A dog wagging its tail? A ball bouncing? A fire burning? The sky is the limit.

Each student will neatly stack their cards when they have finished their animation, making sure all the pictures are on the right side and facing up. Then, they will use a binder clip on the left hand side to secure each stack.

As students are flipping through their flipbooks, encourage them to try going slower or faster and to note any changes they see. Students may go back and edit the cards to allow the animation to flow better.

Alternate Activity:
For a younger age group, a flipbook template can be used. This one from Amazon works well for younger students:
http://www.amazon.com/gp/product/B003VWCDLS?psc=1&redirect=true&ref_=oh_aui_detailpage_o08_s00

Thaumatropes

"**Thaumatrope**" comes from the Greek root words "thauma", meaning magic, and "trope", meaning something that turns. Thaumatropes are made by drawing two images on either side of a flat paper disc. The two images fit together, like a bird and a cage or a fish and a bowl. When you repeatedly flip the disc over rapidly, the images from the two sides blend into one image, such as a bird in its cage or a fish in a bowl. The image you see is dependent on the persistence of vision. If the thaumatrope is spun very fast, the illusion is strong. If spun slower, simple movement may be perceived, and both images will be seen separately rather than as one blended image.

Student Learning Objectives:
-   Students will learn how to build their own thaumatrope.
-   Students will reinforce the concepts of: perception; optical illusions; persistence of vision; and apparent motion.

Materials:
-   2 index cards (3 inch x 5 inch) and 2 rubber bands for each student
-   Hole punch
-   Markers, crayons, colored pencils, etc.

Time Required: 30 minutes

Directions:
Prior to the activity, explain the concept of a thaumatrope to the students. Develop a list of images that go together, like a sailboat on water, or a bird in cage.

Choose a set of images and draw the first picture in the middle of one index card. Take the second index card and place it on top of theirst card. If you can't see through the second card to the drawing on the first, hold both cards up to the light or against a window. Draw your second picture the way you want it to fit with the first picture.

When both drawings are complete, turn the second card so that the image is now upside down. For example, if you drew a bird in a cage, if you hold the cards to the light at this point, it will look like the bird is in the cage upside down. When the thaumatrope flips over, both images will be right side up when they are facing you.

With the cards pressed together, punch two holes – one on the left and one on the right – through both cards. Keep the holes horizontal to one another so that when the thaumatrope spins, it doesn't wobble at all.

To make the handles, take a rubber band and thread it halfway through the cards' left holes so that loops extend on either side. Take one loop and thread it through the other, pulling it to create a half-hitch knot

securely against the cards. Take a second rubber band and thread it through the cards' right holes to make a handle for the right side.
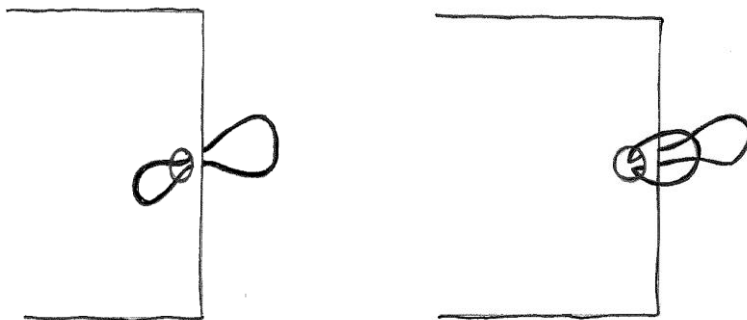
The thaumatrope is now ready. Grab both handles and wind up the thaumatrope by flipping the cards over until the rubber band handles are wound tight. Next, let go of the cards to let them spin, holding on only to the handles. You should see their images blend together and form their desired picture.

After testing the thaumatropes, students may notice they need some tweaks to work just right. If needed, have them add more color to make the drawings bolder, so that blended images show up clearly. Or, if they noticed that one image is upside down in the blended picture, they can take the handles off, turn one of the cards upside down, and rebuild the thaumatrope. Lastly, if the blended picture doesn't fit together quite right (let's say the fish is sticking outside his bowl), distribute another index card, have them line up the cards again, draw a new image, and fix whichever image was out of place.

Phenakistoscopes

The phenakistoscope is one of the first forms of moving media entertainment that paved the way for the film industry. The word phenakistoscope (fee-na-kist-o-scope) is derived from the Greek words "phainen", to show, "kinein", to move, and "skopos", to aim or target. A phenakistoscope consists of a circle with slits cut around the edges, and an apparatus to spin the circle. On one side, there are images arranged around the circle, one between each two slits. When you are facing a mirror, you can look through the slits as you spin the phenakistoscope, and the images will appear to blend into one moving animation loop, due to the optical illusions of **persistence of vision** and **apparent motion**.

Student Learning Objectives:
- Students will learn how to create a simple animation loop using a phenakistoscope.
- Students will reinforce the concepts of: perception; optical illusions; persistence of vision; and apparent motion.

Materials
- Black cards (cut into circles about 8 inches in diameter)
- White paper (cut into 1 inch squares)
- Ruler
- Glue
- Geometric compass
- #2 pencil with a full eraser at the end.
- Scissors
- Thumbtack
- Mirror

Time Required: 30-60 minutes

Directions:
Take a black circle card. Carefully mark 12 points around the circle (like numbers on a clock) making sure they're evenly spaced. Once you've made your marks, cut narrow slits at each mark about 2 cm towards the center of the circle and 1 mm wide.

Take 12 white square pieces of paper. Think of an animation that you would like to create. For example, an eye blinking, a ball bouncing, or a person walking would all make great looped animations. The 1st and 12th pictures should be very similar and the 6th picture should be the "extreme" of the animation. Draw your series of images and keep them in order.

Once all of your pictures are made, glue each square in between two slits around the edge of the circle. Then use a thumb tack to poke a hole through the center of the black circle. Take your pencil and stick it to the thumbtack, so that now your phenakistoscope, tack, and pencil are connected. At this point, you should be
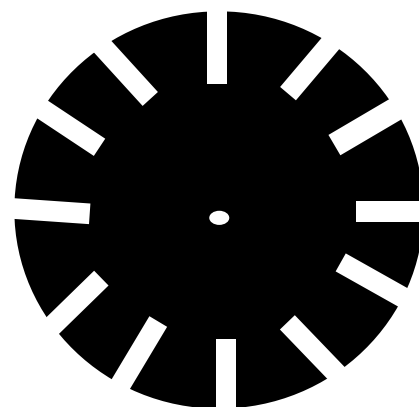
able to spin your phenakistoscope freely. To watch your work in motion, take the phenakistoscope and face a mirror, with the image side facing the mirror. By looking into the mirror though the slits as you spin your phenakistoscope, you will see your animation come to life!

Zoetropes

A **zoetrope** is a pre-film animation device that produces the illusion of motion by displaying a sequence of drawings or photographs showing progressive phases of that motion, creating an animation loop. Zoetropes are similar to **phenakistoscopes**, except they take the shape of a cylinder instead of a flat disc. The images are placed along the inside wall of the cylinder and when you spin the cylinder, you see the animation due to persistence of vision and apparent motion. The name Zoetrope comes from the Greek root words zoe, "life" and tropos, "turning".

Student Learning Objectives:
- Students will learn how to create their own functional zoetropes.
- Students will reinforce the concepts of: perception; optical illusions; persistence of vision; and apparent motion.
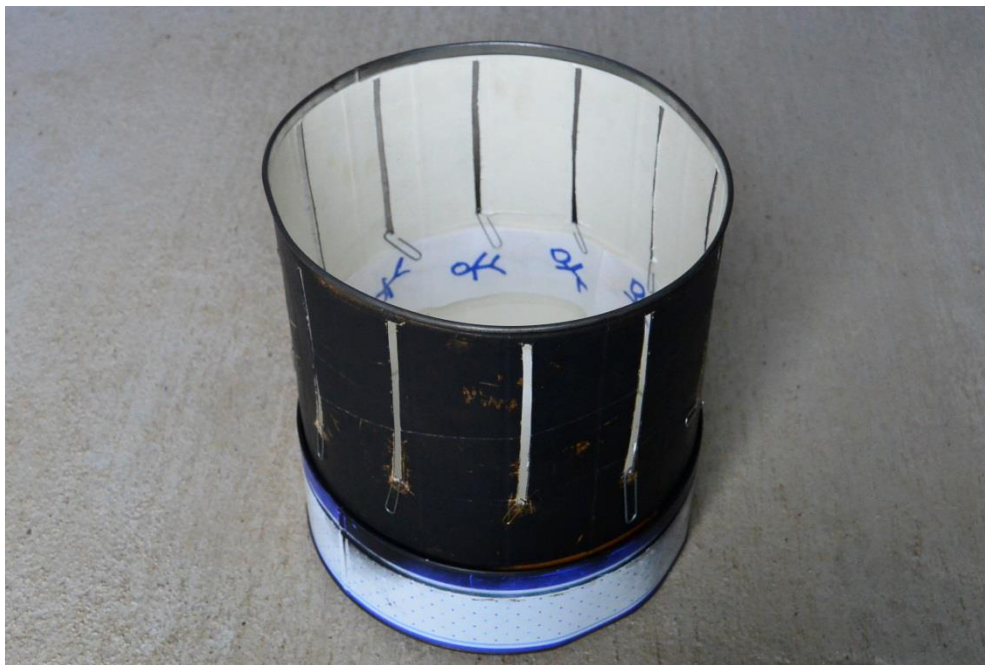
Materials:
- A coffee can lid (or lazy susan, pie tin, or whatever material you can make spin). You will need to make an X with a craft knife in the center, just big enough for a pencil
- Black paper (20 inch x 3 inch)
- White paper (20 inch x 1.5 inch)
- Pencil
- Ruler/straightedge
- Tape

Time Required: 45-60 minutes

Directions:

Take a strip of white paper and fit it around the inside of the coffee can lid. With your pencil, mark the point where your paper begins to overlap itself while inside the lid. Take your ruler and measure the space from the end of the paper to the mark you made. Divide the length by 12 (or however many pictures you would like to create in your zoetrope). Neatly use your pencil to divide your paper into 12 equal "frames".

Now you are ready to draw your animation! Note: zoetropes work best when your animation is cyclical like a horse galloping. That way there is no end or beginning to your animation loop. Like with a phenakistoscope, each image in your animation loop should be only slightly different than the one before it, with the most extreme change occurring in the middle frames but little difference between your first and last frames.

Once your frames have been filled, place your white sheet up against the black paper, lining them up at the bottom left corner. Trace the outside of the white sheet onto the black sheet. Then mark the same 12 (or however many) lines on the black paper, above the outline of the white paper. Cut these lines into slits that are an inch down from the top edge and 1/8th inch wide. They should not pass the outline you made when you traced the white paper.

Set up the black strip so that fits inside the coffee can lid. Tape or glue the black sheet into the lid to secure it. Once it is ready, place your white animation strip in the inside of the black strip.

Poke the pencil through the center of the coffee can so that most of it is underneath. Hold onto the pencil, spin the zoetrope, and look through the viewing slits. You should see your animation come to life.

Make a Stop Motion Movie

Stop-motion animation is a form of animation where physical models are photographed and then moved slightly in between each frame. Each photograph tells a small fraction of the larger story when the entire sequence of frames is played quickly. Relying on the **optical illusions** of **persistence of vision** and **apparent motion**, stop-motion animation comes to life much like other forms of animation.

Student Learning Objectives:
- Students will mold their own characters, develop backstories, create a plot, and direct/edit/produce their own stop motion animation movie.
- Students will reinforce the concepts of: perception; optical illusion; apparent motion; persistence of vision.

Materials:
- Smartphone or iPad (1 per student)
- Disposable plastic cups (1-2 per student)
- Scissors (1 pair per student)
- Sheets of white and construction paper (several per student)
- Markers, colored pencils, crayons, etc.
- Modeling clay or play-dough
- Various props for enhancing characters/scenery
- Wi-Fi access or prior download of the "Stop Motion" phone app

Note: We have found two animation kits to be very useful when carrying out this activity. The first is the "Ani-Mate Mini Movie Maker Kit" by NPW, and the second is "Animation Studio" by Candlewick Press.

Time Required: 30-60 minutes

Directions:
1. **Brainstorm and storyboard:** What will your film be about? Plan this out first. By deciding exactly what will happen in your film before taking any pictures, you can save time and make a film that flows well. You won't have to stop, think about what comes next, and then change the direction of your film halfway through. When will the character enter/exit the scene? How will the final scene end? Will the film's **tone** be happy, sad, or something else? When you have a basic idea of what your film will look like, you can create a **storyboard** for it. On a piece of white paper, sketch a 5-6 picture sequence of what will happen in your film. This will help you remember what each picture you take is moving towards. You want your film to fill in all of the gaps that your storyboard left out.

2. **Brainstorm your Characters:** By now you have put a lot of effort into creating your story, so be just as careful with your characters. What will they look like? How will they move? Who are they? Just as actors come up with backstories for the characters they are playing, you should come up with backstories for your characters. Since you will be making them move, having a backstory will tell you—

the director—how they should move. Will they move fast or slow? Do they slither or walk? Do they swing their arms?

3. **Set up your scene**: With a story and characters decided on, take some time to decide what setting your film will take place in. Where is this happening? Look at your storyboard to see how you drew the background. Why did you draw that background? Does it fit with your story, or should you change it? Can you use it in your big production? Take a piece of construction paper and draw your background. It can be a desert, a town hall, underwater, or whatever your story needs! You can even add detail with any props your class has. Next, find a place to set up your background. You can prop it up against the classroom whiteboard, or use a textbook or cardboard box to prop it up at your desk. With your background in place, take a disposable plastic cup or two and use scissors to cut notches out of it. These notches should hold your smartphone steady even as you take pictures with it. For iPads, two cups might be needed.
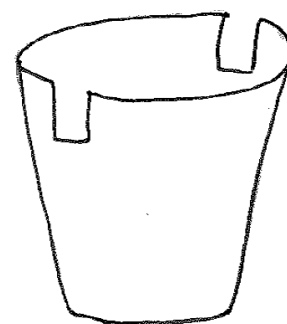
Notches on the plastic cup should be directly across from one another and the same size.

4. **Build the Characters:** Now that your background has been set up, it's time to build your characters. Take the characters you brainstormed earlier and bring them to life by molding them out of clay. You can even use some props like googly eyes to enhance your characters. Note: To prevent a character from falling down between shots, your character's base should be strong enough to support the upper half.

5. **Lights! Camera! Stop!** With the story chosen, the characters built, and the background set up, you can begin directing your stop-motion story. Open your Stop Motion app, and take as many pictures as you need to tell your story, making small changes in your characters' body positions with each picture. Be careful to not move the camera as you take the picture. Even a small wiggle changes things! Don't worry if you take a few pictures that didn't come out quite right. Just re-shoot that frame and move on. You can edit the unwanted frames out later.

6. **Edit your Production:** When you have finished directing your movie, it's time to be the producer. Use the Stop Motion app to choose which frames will make the final cut. You might have had a character fall over, or the camera slipped, or something moved too much/too little. Whatever it is, find the images you don't want to keep and delete them.

7. **Review and Finish:** With your unwanted frames erased, it's time to watch your movie. Use the Stop Motion app to play through your entire movie. If you are satisfied, then congratulations! You have finished your movie! However, you may have noticed parts of your movie that you want to change to make the story or motion flow better. As needed, add, delete, or re-shoot frames to perfect your film. Once you are satisfied, share it with your friends who are finished!

Scavenger Hunt Explore *The Animation Academy* and search for answers to the following questions:

1. Windsor McCay was a famous early animator. What animated film is he famous for making?

2. What was the first cartoon to feature Mickey Mouse?

3. There is a special camera that is used to move different layers of animation at different speeds or directions. What is this called?

4. What is the name of Goofy's voice actor?

5. Animating is hard work! How many frames per second (FPS) do animators use when shooting their films? How many animated images per second is this if cartoons are shot 'on twos'?

6. Nick Clark invented the characters Wallace and Gromit, which he made come to life using this animation technique.

7. Ray Harryhausen famously started an animated film in 1952, but eventually stopped production on it. In 2002, 50 years after he started, Harryhausen revisited and finished this film. What is this film?

8. Clay figures don't always stay in position! What is sometimes used inside clay models to help them hold their poses?

9. Walt Disney built a small railroad on his property, which would later be the inspiration for the railroads at Disneyland and Disneyworld. What was this first railroad called?

10. A new genre of animated show was born when people realized kids off from school would have the TV to themselves as their parents slept in. What is this genre called?

11. What 2-D animation process uses common parts between frames and animation loops to reduce the number of frames needed to complete a cartoon? Hint: We see this used a lot in Saturday Morning Cartoons.

12. Which kid's cartoon was originally too scary for its audience, resulting in a revision and name change?

13. There are a few devices in "Get Animated!" that make short animation loops if you watch them move. Name one of these devices.

14. The Castle in "Get Animated!" is a block replica of a castle from which animated movie series?

Congratulations! You are finished!

Scavenger Hunt Answer Key

1. Windsor McCay was a famous early animator. What animated film is he famous for making?
   Gertie the Dinosaur
2. What was the first cartoon to feature Mickey Mouse?
   Answers may vary: *Steamboat Willie* was the first distributed cartoon to feature Mickey in 1928. *Plane Crazy* featured Mickey first, but was not distributed until 1929.
3. There is a special camera that is used to move different layers of animation at different speeds or directions. What is this called?
   The multiplane camera.
4. What is the name of Goofy's voice actor?
   Bill Farmer.
5. Animating is hard work! How many frames per second (FPS) do animators use when shooting their films? How many animated images per second is this if cartoons are shot 'on twos'?
   24 FPS, 12 images per second on twos
6. Nick Clark invented the characters Wallace and Gromit, which he made come to life using this animation technique.
   Stop-motion clay animation, or "Claymation"
7. Ray Harryhausen famously started an animated film in 1952, but eventually stopped production on it. In 2002, 50 years after he started, Harryhausen revisited and finished this film. What is this film?
   The Story of the Tortoise and the Hare.
8. Clay figures don't always stay in position! What is sometimes used inside clay models to help them hold their poses?
   Wire skeletons, or armatures
9. Walt Disney built a small railroad on his property, which would later be the inspiration for the railroads at Disneyland and Disneyworld. What was this first railroad called?
   The Carolwood Pacific Railroad
10. A new genre of animated show was born when people realized kids off from school would have the TV to themselves as their parents slept in. What is this genre called?
    Saturday Morning Cartoons
11. What 2-D animation process uses common parts between frames and animation loops to reduce the number of frames needed to complete a cartoon? Hint: We see this used a lot in Saturday Morning Cartoons.
    Limited Animation
12. Which kid's cartoon was originally too scary for its audience, resulting in a revision and name change?
    Scooby Doo (it was once known as "Mysteries Five").
13. There are a few devices in "Get Animated!" that make short animation loops if you watch them move. Name one of these devices.
    Praxinoscope, Zoetrope
14. The Castle in "Get Animated!" is a block replica of a castle from which animated movie series?
    Shrek.

Stop-Motion Movie Teams

Student Learning Objectives:
- Students will reinforce the concept of stop-motion animation.
- Students will work together and practice teamwork.

Materials:
- No additional materials will be needed.

Time Required: Will vary

Outline:
Divide the class into two teams. Assign each team to one stop-motion movie maker in the exhibit. Students on each team will work together to create a stop-motion film, to be judged by teachers and chaperones.

Have the students start out by planning what story they will tell in their film. Each team should also choose which characters (the toys/models found in the stop-motion movie maker) will star in their production. Once the story and characters have been picked, students will make the movie one frame at a time with one student in charge of each frame. For example, the first student will set up the desired characters and take a picture, completing his/her frame. No other student can touch the production while this student is making his/her frame. When finished, this student cannot touch the production again until every other student in that team has added their own frame. Then, a second round of frames can be taken, with students taking turns in the same order as the first round. Each student should get a minimum of 3-4 frames to tell the story, but teams can complete more rounds if they desire. Students, while waiting their turn, are allowed to give verbal advice or suggestions to the student currently making his/her frame.

Ideally, each new frame will only add small movements to a character or characters in order to capture the stop-motion effect. This also helps reinforce the concept of teamwork as students see their small contributions create a spectacular whole in the finished movie.

Once both teams are finished creating their stories, teachers and chaperones will watch both films, with each adult voting for their favorite film. The team that gets the most votes wins. Teachers can decide what prize (if any) the winning team is rewarded with.

Try This:
Have students complete this activity towards the end of their visit to Get Animated! so they can utilize any animating concepts they have learned from the exhibit in their films.

Animator Biographies

Throughout history, animators have developed their skill set all around the world. Some have created memorable characters and developed new techniques to advance the creation of animated characters. Throughout the exhibition, students will have the opportunity to take a walk through the history of animation. This activity can be used during your visit and extended into the classroom.

Student Learning Objectives:
- Students will improve reading comprehension by research a famous animator and report the most significant information about him or her.
- Students will demonstrate the ability to write a focused and engaging introductory paragraph.
- Students will analyze content writing by evaluating and critiquing each other's work.

Materials:
- Pencils
- Paper
- Clipboards

Time Required: 60 minutes

Directions:
In the classroom or prior to entering the exhibition, ask students what they know about biographies and generate a list. Explain to students they will write a short biography of a famous animator. They will need to focus on providing the most interesting and significant information about their subjects. Discuss what would make an interesting biography. Introductory paragraphs should identify the subject, state the main focus of the biography and include an interesting fact to keep the reader engaged. Body paragraphs should show supporting material and examples of accomplishments. Conclusion paragraphs should sum up the importance of the subject.

Split up the students into small groups of three or four. (Students may also work independently, depending on the grade level.) Have each group choose from a list of animators that are part of the exhibition. You may choose to assign an animator to each group.

Allow students ample time to locate and read the information board about their selected animator. From the reading, students should try to answer the following questions:
- Who are you writing about?
- When did this person live?
- Where did this person live?
- What were major events in this person's life?
- What was this person like?

- Was this person important?
- What challenges did this person overcome?
- Provide a quote from this person.

You may choose to have the information in the exhibition as a start-off point and have students continue researching their subjects using the internet.

Allow time for students to create a draft and edit the work of their peers. Students can share out loud or proofread with a peer. Have students make their final edits and produce a final draft.

Create a Character Profile

When creating an animation, the characters themselves can change the tone and direction of the story. It is very important to come up with a well-developed plot, but it is just as important for the characters to be developed themselves. In this activity, students will draw their own character and create their own personality profile for the character.

Student Learning Objectives:
- Students will exercise creativity by designing their own unique character
- Students will discover how the backstory and personality of a character can change a story

Materials:
- Pencils
- Paper

Time Required: 15-25 minutes

Directions:
At the tracing tables in The Animation Academy exhibit, have the students sit down with their pencils and paper to create their own character. They can use any character in the exhibit for inspiration, or they can come up with one entirely on their own! Additionally, students may use some of the transparencies at the tracing tables to help them draw portions of their character, as long as they don't completely trace an existing character. Their characters, even if they borrow from existing animations, should be their own creations.

Once a student has finished drawing their character, they should now give it a name, a personality, and a bit of a backstory. For example: Is it a boy or a girl? How old is it? What is its name? Does the character have any likes or dislikes? Has the character been through any experiences that might make it happy or sad, clumsy or agile, good or evil? Students should write all of these character traits down next to their characters.

When students have finished, have the class flip their papers over. As a class, the students should now come up with a mission for their characters to complete. It can be anything from changing a flat tire, to rescuing a prince or princess, to finding a treasure map. Once students have come up with a task for their characters, have each student write a short story on the back of their paper where their character carries out its mission. Students should keep in mind their character's personalities so that it can come out in their stories. For example, maybe a clumsy character takes much longer to change a flat tire than a more agile character. Or, if a good character saves the prince/princess for the greater good, an evil character might save the prince/princess in order to blackmail the king and queen.

Finally, have each student read their stories aloud so that everyone can see how their personality traits molded the story. If the exhibit is too crowded or loud to allow this, the final story sharing can be completed either when the students return to school or on the bus ride home.