STOP MO Studio

Stop-Motion Animation Workshop

LESSON 3

OVERVIEW OF TECHNOLOGY AND PRINCIPLES OF ANIMATION

ONF NFB

Introduction

This section provides an overview of the basic equipment required for stop-motion animation. It discusses the importance of timing in relation to animation production and presents the Three Main Principles of Animation. Students will also learn how to make a flipbook and be introduced to the Twelve Principles of Animation, as established by Disney animators.

Learning Outcomes

Upon completion of this guide students will be able to:

- Describe an overview of the set-up for stop-motion animation;
- Discuss the importance of timing in relation to animation;
- List the Three Main Principles of Animation;
- Demonstrate the gestures related to each principle, as taught to children at NFB animation workshops;
- Create a simple flipbook;
- Review an example of a professional “flipbook” animated film;
- Discuss how to integrate the Twelve Principles of Animation.

Basic Equipment Overview

Please watch the following video about the basic equipment set-up for stop-motion animation.

Basic Equipment Overview
(1 min 3 s)

Timing and Three Main Principles of Animation

Timing is extremely important in animation, as it relates to frame speed, while all animation is based on three main principles. In NFB workshops, hand gestures are assigned to each principle to help children remember them.

The three principles are:

1. A Picture or Image

The image can be two-dimensional, three-dimensional or digital.

2. Repetition with a Small Change

In order to create life, the same image must be repeated with a small change each time. The image must be repeated twenty-four times to create one second of animation. **Note:** Animation can be adapted—speed and frequency can change based on the intentions of the animator.

3. Speed

The addition of speed brings images to life, fooling the eye into believing that a collection of still images is animated, also known as the human phenomenon of *persistence of vision.* The brain retains images for a short period of time, so still images that are projected very quickly look like moving images.

Watch the following video to find out more about these concepts.

Three Principles of Animation (3 min 13 s)

Creating a Flipbook

Now that you have an understanding of timing and the Three Main Principles of Animation, it's time to put them together. You can do this by creating a flipbook.

To find out how to make a simple flipbook, watch the following:

Creating a Flipbook (3 min 1 s)

Class Learning Activity: Create a Simple Two-Page Flipbook

This is a fun activity! Create your own two-page flipbook. Use your imagination to create your own unique two-step animation.

Handout: "How to Make a Simple Flipbook" provides step-by-step instructions and ideas to help you create your flipbook.

Learning Activity: View Examples of Professional Flipbooks

Click on the following clips to see examples of "flipbook" animated films. These flipbooks allow you to study the progression of movement and offer ideas to further inspire your own flipbook creations.

Music Flipbook (34 s)
youtube.com/watch?v=AslYxmU8xlc

Break Dance (flipbook) (42 s)
youtube.com/watch?v=Ej_jiUq06Ko&feature=related

Grandpa Bee Flipbook (32 s)
youtube.com/watch?feature=endscreen&v=jgWuG7ypJXY&NR=1

Photocopy Flipbooks (1 min 7 s)
youtube.com/watch?feature=endscreen&v=TGE0nl__s8k&NR=1

Optional Learning Activity: Making a More Complex Flipbook

First, visit the NFB's The Flipbook Game at
www3.nfb.ca/animation/objanim/en/class/students/game.php?theme=30633&gameid=3 www3
(Click on each prompt to get all the instructions.)

Then, create more complex flipbook animation using a small notepad, sticky pad or sheets of paper stapled together.

Other impressive flipbook examples can be found below:

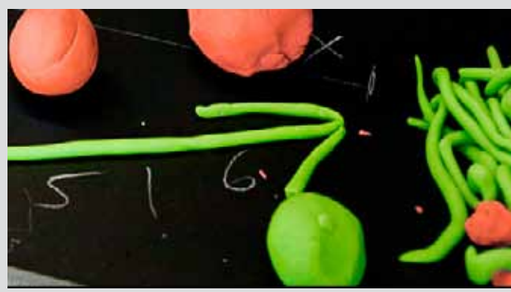
***Flip-Mania Part 1: Sports* (1 min 2 s)**
youtube.com/watch?v=FH97UerMW6I

***Cut-Out* (9 s)**
youtube.com/watch?v=xSrDnIVgVv0&feature=relateFlipbook

***Simpsons Fight* (19 s)**
youtube.com/watch?v=AuZadShulbI&feature=related

***I Love You* (13 s)**
youtube.com/watch?v=zyke9aZjwQY&feature=related

***[Flipbook] Escape* (25 s)**
youtube.com/watch?v=LRx5RDCWgq8&feature=related



How to Make a Simple Flipbook

Time: Approximately 10 minutes

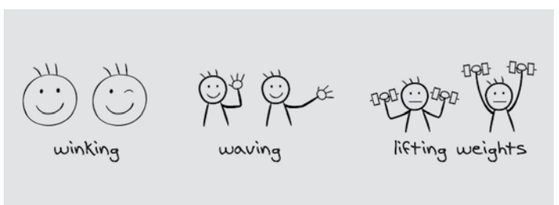
Materials

- Pencil
- 4¼ x 11 sheet of paper folded in half (1/2 of an 8½ x 11 sheet of paper)

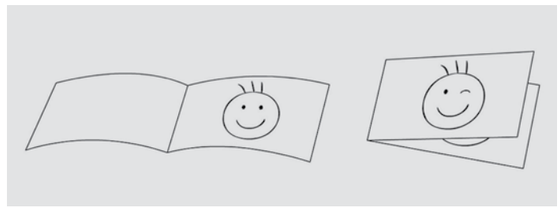
There are 3 elements to animation:

- Creating an **IMAGE**
- **REPETITION** with a slight change
- **SPEED!**

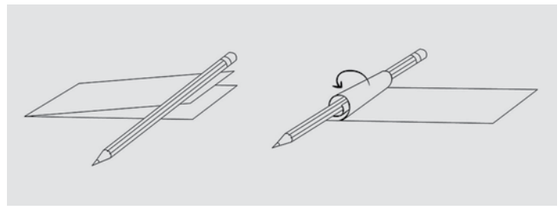
1. The first step in creating your own flipbook is to think of a simple action that can be shown in only two drawings. Here are a few examples:



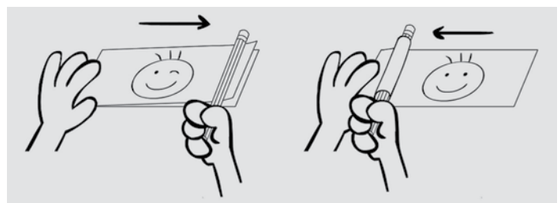
2. Next, draw your **IMAGE** on the inside page of your flip-book. This will allow you to trace your first drawing when you close your book. Now you can **REPEAT** the image and add a slight change.



3. Roll the first page around a pencil to curl the paper.



4. Now you are ready to add **SPEED!** Hold the flipbook on the folded side with one hand and use your pencil to quickly curl and uncurl your top page by moving it back and forth.



Congratulations!
You have created an animated drawing!

The Twelve Principles of Animation

The Twelve Principles of Animation were introduced by Disney animators Ollie Johnston and Frank Thomas in their 1981 book, *The Illusion of Life: Disney Animation*. These principles are representative of the philosophy of nine Disney animators from the 1930s and reflect their collective efforts to produce more realistic animation. The main purpose of the principles was to produce the *illusion* of animated characters complying with the basic laws of physics. However, they also explore more conceptual issues, such as emotional timing and character appeal. You are encouraged to try to integrate these principles into your animated works when storyboarding and filming characters for your stop-motion animated movie.

Optional Activity

For more information and examples of the Twelve Principles of Animation, view the following videos:

***12 Principles of Animation* (4 min 37 s):**

youtube.com/watch?v=wECvv4ehm7g&feature=related

***12 Principles of Animation* (9 min 41 s):**

youtube.com/watch?v=kDIyysAf3O0&feature=related

Class Learning Activity: View Examples by Students

Before proceeding further, explore the NFB's Stop-Motion Animation playlist for professional examples of stop-motion films, or view interesting examples from student's workshops found here nfb.ca/playlist/mediatheque. These will provide you with ideas about the type of stop-motion animation that you will be creating, or aspire to create. Viewing photos of animation and examples of short animated videos that have been created at NFB workshops and by other students will help you to understand how these clips are made and demonstrate the concepts of fluidity and motion.

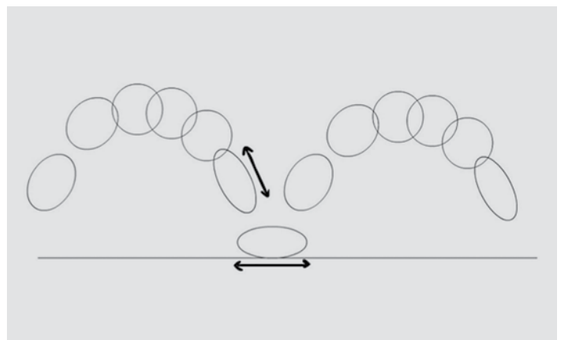
Class Learning Activity: Introduction to Equipment Demo

Your instructor will provide you with an introduction to the animation equipment that you will be using in your class and give you the opportunity to perform simple animation experiments (e.g., animate a chair so that it appears to move). If you get the opportunity, practice with the equipment to increase your comfort level before shooting your final movie.

The Twelve Principles of Animation

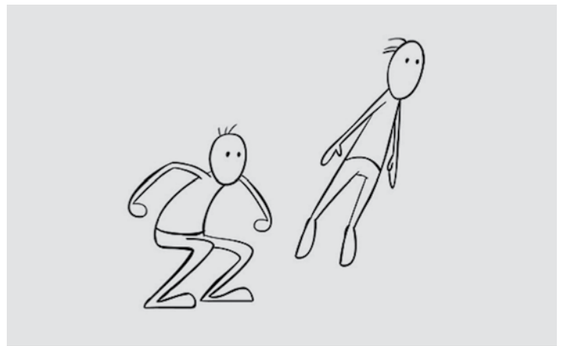
1. Squash & Stretch

A term used to describe different states of the same character or object. Many cartoons use squash and stretch to give the illusion of gravity, weight and mass. Here is an example of a bouncing ball using squash and stretch. As the ball hits the ground, its mass spreads outwards upon impact (squash). When it is moving up towards its highest position, the ball extends to show speed (stretch). It is important for the ball or character to maintain its original volume as it squashes and stretches.



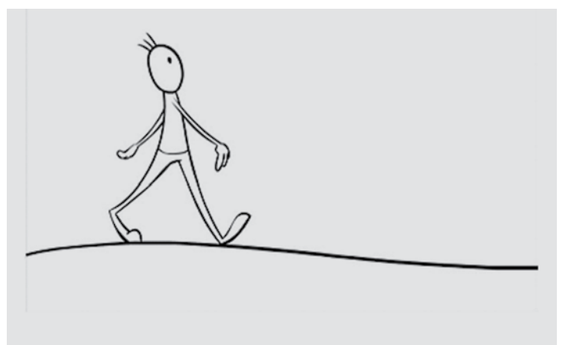
2. Anticipation

Anticipation is a movement of the character to prepare the audience for an upcoming action. An example of this would be a character getting ready to jump into the air by crouching down first before lifting off.



3. Staging

This term describes how you present your animation on screen to the audience. Is the action staged and composed well on screen? Is the action clear? Is there enough room around the character to perform the action? If you are showing a broad action, a wider shot may be best. If a character is showing a specific facial expression, a closer shot would be more appropriate.



4. Straight Ahead and Pose-to-Pose Animation

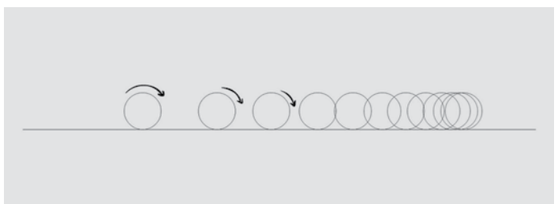
There are two approaches to animating. Straight ahead animation is when you put the character through each pose sequentially to create a scene (which is the method to use for stop-motion animation). Pose-to-pose, also known as key animation, is when you plot out the main poses of movement in a scene and add the in-between movement after your key poses are finalized (mostly used in traditional, hand-drawn animation and computer animation).

5. Follow Through and Overlapping Animation

This deals with how certain parts of a character will move in relation to the rest of the character. For example, when a character stops walking her body may stop moving, but her arms stop and settle over the course of a few more frames. If a character were to walk into a room and her entire body stopped moving all at once, it would look unnatural and stiff.

6. Slow-in and Slow-out

These terms refer to the timing of characters' or objects' motion on screen. If you want a character or object to settle in to a pose more naturally, add more frames to slow down the movement before coming to a complete stop (slow-in). If a character is about to move quickly, he would start out a bit slower before reaching full speed (slow-out). An example of this could be a car beginning to drive away. It would slowly accelerate before speeding up.



INTRODUCTION TO ANIMATION

7. Arcs of Motion

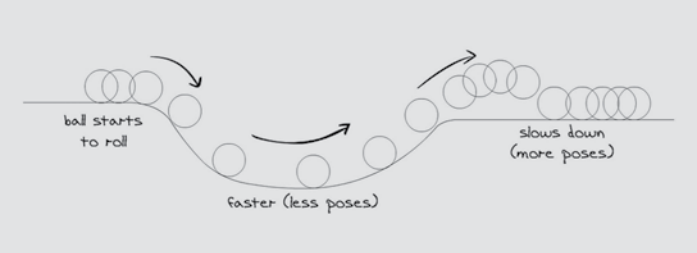
Most characters will move following a slightly curved path of action. This helps the animation appear more natural. Animation would lose its illusion of life if a character moved in straight, direct lines. An example of this would be a ball being thrown across a distance and following a curved path of action.

8. Secondary Action

This is an action that the character performs that is secondary to the main action of the scene. Think about what the purpose of this particular scene is. Why is this scene in your film? What is the character doing? This is your primary action. A secondary action can be added if it will enhance the acting or help the story move along. An example would be a character standing after falling down (primary action). The character dusts himself off as he stands up (secondary action).

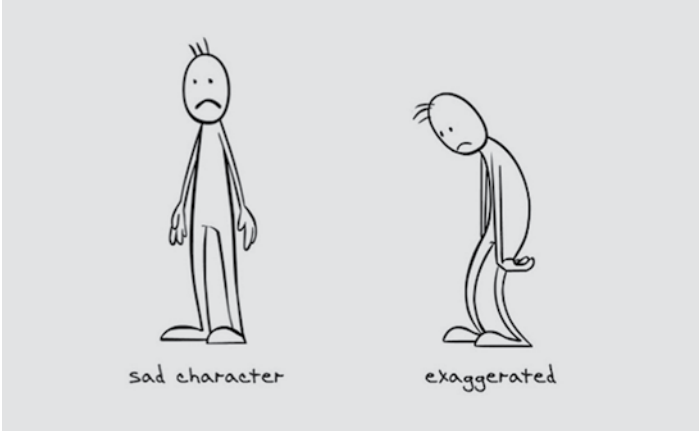
9. Timing

The number of poses you include in a movement will determine the speed of the movement on screen. If you want to make a character move slower, add more frames and smaller movements. If you want your character to move quickly, make larger movements and add fewer frames.



10. Exaggeration

This is used in animation to amplify an action or an emotion to make it easier to understand on screen. You can exaggerate the motion of an action or the pose of a character in order for the acting to be clearer to the audience. Think of the action that you are trying to show on screen and act it out in a mirror or get someone to act it out for you. This way you can get a feel for the right pose that is needed for your character.



11. Solid Drawing

When drawing a character, it is important to make sure that it appears they have weight, depth and balance. A good understanding of perspective is very helpful when drawing for animation.

12. Appeal

The term refers to the look of a character and the overall scene. Is it pleasing to look at? The appeal can also refer to the way you are communicating to the audience. Is your story clear and easy to understand? Can you hold your audience's attention?

Source: The Illusion of Life: Disney Animation, Frank Thomas and Ollie Johnston, 1981.