Focus on Animation: My Filmmaking Class
Unit Guide for the Theme
Create and Animate

Isabelle Laferrière, MA student in Education
Université de Montréal, Montreal, Quebec

Overall Objective
Enable students to understand the fundamental principles of animation.

Grade Level
Students aged 9 to 12

Content Areas
Science and Technology
Visual Arts

Films Used in this Unit
Hen Hop (1942, 3 min 40 s)
A Chairy Tale (1957, 9 min 53 s)
Le merle (1958, 4 min 39 s)
Juke-Bar (1989, 10 min 25 s)
Animando (1987, 12 min 42 s)

NB: The films can be viewed online free of charge at www.nfb.ca/focusonanimation, in the My Film Class section.

Optical Illusions Required
- A zoetrope
- A thaumatrope
- A flip book

Materials
Computer, Internet link, videocassette player, TV set, drawing of a chicken, chair, white paper strips that can be used to form a bird (as in the film *Le merle*), 3-dimensional characters (figurines, dolls, statuettes or stuffed animals), string and two paper clips, and one sheet of paper per student. If necessary, the animation glossary (Appendix III).

Summary
This unit will help students discover the techniques and optical principles that make animation possible, through a series of activities involving both arts and sciences. The students' journey of scientific discovery will be made through four classics from the NFB's short film collection, plus one film (*Animando*) that describes various techniques.

The unit contains two activities relating to the theme Create and Animate, one recap and reinforcement activity, and three hyperlinks to other recap and reinforcement activities.

Introduction Activity
Approximate duration: 15 minutes

Step 1: Tell the students that there will be an educational activity that involves viewing films made by the National Film Board

Step 2: Show the class the NFB logo (Appendix II). Ask students what they see in it. Then, on the board, break down the NFB logo to help students understand the different things that the National Film Board does.

Step 3: Explain the NFB's role and the kinds of films the organization makes. Start off by asking the students to name different film genres. On the board, sort the films by category and complete the list if necessary. Then, announce that the films the students will be seeing in this unit are animated films.

ACTIVITY 1: Asking questions about animation
Approximate duration: 1 hour

Step 1: There are five films in this unit, but students will not see *Animando* till Activity 2 since it describes some of the "secrets" of animation. Introduce the characters starring in the four films:

- A drawing of a chicken (for *Hen Hop*)
- A chair (for *A Chairy Tale*)
- White paper strips that can be used to form a bird shape (for *Le merle*, or blackbird in English)
- Three-dimensional characters, such as figurines, dolls, statuettes or stuffed animals, to serve as cockroach figures (for *Juke-Bar*)

Explain that these objects will come to life and move in the films. Then, state the question: How does the animation process make inanimate objects look as if they are moving on screen? Stating the question is the first stage in a scientific investigation.

Step 2: Divide the class into four teams, and assign each team one of the "characters" from the list above.

Step 3: Show each film to the class, and mention the year each was made. While watching, the teams should pay close attention to try to figure out how "their" inanimate object comes to life on screen.

Step 4: As a class, ask the team members to explain their hypotheses. (This is the second step of a scientific investigation.) Each student chooses the hypotheses that appear most plausible, and writes them down on a sheet of paper. The sheet should already have the question written on it. When the students have finished writing, collect and keep the sheets.

ACTIVITY 2: Learning about animation

Approximate duration: 90 minutes

Step 1: Have the students form the same teams as in Activity 1. Remind everyone of the main question they're trying to answer and return to the students the sheets with their hypotheses. The teams then all come together briefly to recap all the hypotheses and choose at least one spokesperson.

Step 2: The spokesperson for each teams explains their ideas, while the teacher takes notes on the board. Each team may add ideas from other teams to its own list.

Step 3: Everyone is now ready for the third step in the scientific investigation: the research phase. The tool is *Animando*, a film that explains a variety of animation techniques. Each team's technique will be illustrated. Repeat the fundamental question: How can an inanimate object be made to move on the screen?

Step 4: Show *Animando* to the class. During the screening, point out to individual teams the section that could help them answer their particular question.

Step 5: After the screening, have each team meet and suggest new hypotheses. Each student chooses the hypotheses that appear most plausible and writes them out on the sheet of paper bearing the initial hypotheses.

Step 6: As a group, the teams share their hypotheses, while the teacher takes notes on the board. Each team may add ideas from other teams to its own list. Collect and keep the students' sheets.

Step 7: Provide additional explanations to help the students properly understand the techniques on which animation filmmaking is based. Compare the techniques to those used in 3-D animation. Illustrate your explanation using string and two paper clips that could take the form of an animated film character and move before our eyes, as the characters do in *Animando*.

Step 8: Show each of the four animated films again to illustrate the various techniques used.

Closure Activity

Have the students make a thaumatrope, flip book or zoetrope. These are optical illusions that will help them better understand the basic principles of animation. Animated illustrations of the illusions, as well as printable instructions (in MS Word and PDF versions) for making them, are available online at www.nfb.ca/focusonanimation, in the My Film Class section. Just click on "Optical Illusions."

If your school is in Montreal or Toronto, tell your students about the CineRobotheque and Mediatheque, two NFB storefronts that are open to the public and organize educational workshops on animation. Find out about visits and activities available for school groups.

CineRobotheque:
1584 Saint-Denis, Montreal, Quebec H2X 3K2
Tel: (514) 496-6887
www.nfb.ca/cinerobotheque

Mediatheque:
150 John Street, Toronto, Ontario M5V 3C3
Tel: (416) 973-3012
www.nfb.ca/mediatheque

If you would like to see examples of what young people do at CineRobotheque and Mediatheque workshops, go to My Film Class section at the Focus on Animation site, and click on Animation workshops.

Check for Understanding

Hand out the sheets on which the students wrote their hypotheses. Individually, the students can go back over what they have learned and complete the scientific investigation process by writing, in their own words, an answer to the fundamental question.

Evaluation

You can conduct a formative evaluation throughout the unit, though only the closure activity comprises evaluation sheets. One of the evaluation sheets is to be completed by the teacher and the other by the individual students. Hand out the self-evaluation sheets at the very end of the unit. If you wish, arrange an in-class discussion before having the students complete the self-evaluation sheets.

Web Resources

http://nfbkids.ca
The NFB's Animation and Youth Studio has been producing fabulous websites for several years now. Already recognized at a number of major events, the sites provides rich, intelligent, non-violent and creative content ideally suited to young people. NFB Kids contains The Mission, a site where children 9 to 12 can test their scientific knowledge through clear and exciting quizzes, as well as the Ultrabug Cliposcope, a media education site intended for the same age group. Kids can experiment with making their own animated film, from the storyboard to the editing stage.

www.nfb.ca/doclens
This site is intended for students in Grades 5, 6 and secondary school, as well as for their teachers. It provides a window to viewing many NFB documentaries and documentary clips. The Behind the Camera section helps young people become familiar with the documentary genre and the basics of documentary filmmaking.

www.nfb.ca/education
Educational Resources is a site providing support for educational uses of NFB films. It includes a bank of resources on the use of media in teachin g, and provides links allowing users to explore NFB videos and Web projects.

Appendix I

Teacher's Notes

Introduction

Step 2:
N: National (Government of Canada organization)
F: Film (organization that produces and distributes films)
B: Board (office)

Step 3:
The visionary:

- A character that sees: a person's view of humanity and his world.
- A director who shows us his/her view of the world through film.
- Canada's vision of the world and itself.

Step 4:
Examples of film genres and categories:

- Feature (story put together by the filmmaker and acted out by actors: comedy, drama, horror, non-fiction).
- Documentary (provides information on a specific subject).
- Animation (brings life to an inanimate object, a drawing or even human being filmed frame by frame).

Activity 2

Step 3:

- *Hen Hop* team: A drafter draws a character on white paper as the film begins, somewhat like the drafter who drew the chicken in the initial film.

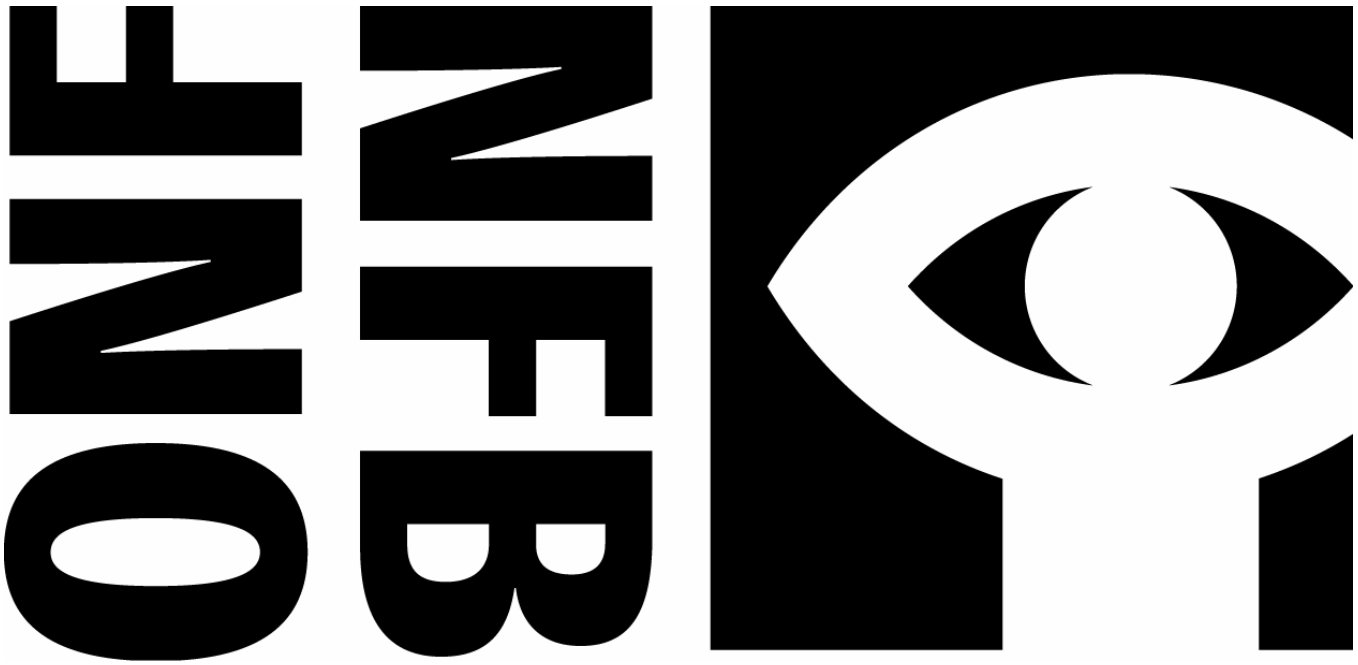
- *A Chairy Tale* team: A character is built out of modelling clay. It moves forward on its own, like the chair in the initial film.
- *Le merle* team: A paper character is cut into several sections. Each of the sections move, like individual parts of the bird in the film.
- *Juke-Bar* team: A character is built out of modelling clay. Its limbs move and it moves forward on its own, like the cockroaches in the film.

Step 7:

- To make an animated film, the filmmaker takes shots (like still photos) of the same inanimate object many times; in each shot, the object is in a slightly different position. Show different positions of a character on the table using string and two paper clips, illustrating the various frames that have to be captured.
- Once we have many frames of the object, with each frame showing the object in a slightly different position, we run the frames very fast: 24 frames of the same object, each with the object in a slightly different positions, flash before our eyes each second.
- When flashed quickly before our eyes, the frames run together and make it look as if the object is moving, like the string character in *Animando*. This happens because of a phenomenon called persistence of vision.
- Persistence of vision occurs at the back of the eyeball on a type of "screen" called the retina. When the eye sees an image, that image is projected onto the retina, which then sends the image to the brain. But when a series of images flash before the eye very quickly in sequence, the first image does not have time to disappear completely from the retina before the next, then the next, then the next appear. This gives the impression that all the images are one continuous sequence, and the object appears to move.
- 3-D animation: To animate a character in three dimensions by computer, an entire team is required. First, a modeller "sculpts" the character on-screen, using special software. Then, a second person adds texture to make the character more realistic. A third person ensures that the character's joints are functional, so that it can be made to move. Lastly, the "set designers" complete the work, generating backgrounds by computer and placing the character against them. The same frame-by-frame principles used in traditional animation are then applied. The person responsible for animation moves the character on the screen to create millions of still frames. When the frames flash before our eyes in very quick succession, the character appears to be moving and the illusion is complete.

Appendix II

National Film Board of Canada logo



Appendix III
Short Animation Glossary

Animated cartoon (or "traditional animation")
Film created by shooting a series of drawings filmed in sequence, one by one. When the sequence is then played at a certain speed, it "fools" the eye into seeing movement as the drawings appear to come to life.

Animation
Principle of filming frame-by-frame to create the illusion of motion in inanimate objects or characters.

Director
Person in charge of a film's technical and artistic elements. The director "directs" all the people working on the various technical and artistic aspects of a cinematic production.

Editing
Action of choosing and assembling the various shots of a film.

Emulsion
Special light-sensitive liquid applied to one side of unexposed film. This is what comes off when you scratch directly onto the film stock.

Film
In movie-making, a strip of transparent material coated with light-sensitive emulsion. Images seen through the lens are recorded when the film is exposed to light.

Flip book
Booklet of drawings that appear to come to life when the pages are flipped through very quickly.

Persistence of vision
Phenomenon that occurs at the back of the eyeball on a type of "screen" called the *retina*. When the eye sees an image (for instance, a bird), this image is projected onto the retina, which then sends the image to the brain. But if two images flash before the eye very quickly in sequence (for instance, an image of a bird followed by an image of a cage), the first image doesn't have time to disappear completely from the retina before the second one appears. This gives the impression that the two images are in fact one picture (a bird in a cage).

Pixillation
Animation technique that photographs live actors or objects one frame at a time. See "Stop-motion animation."

Projector
In cinematic terms, a device used to project the images recorded on film onto a screen.

Reel
300 m of film rolled onto a large spool, enough for 10 minutes of film.

Shooting script
The technical description of the shots (for instance, the camera angle used to film the cat: from the front, from behind, from above, etc.) before filming begins.

Stop-motion animation
Filmmaking technique where a static object is given the illusion of movement by gradually moving the object between shots. The shots are taken photo by photo, one frame at a time.

Storyboard
Series of drawings created before filming begins and used to design the film. The storyboard gives a good idea of the backgrounds, action, camera angles, sound effects, music, and so on.

Synopsis
Summary of the story of a film

Thaumatrope
Optical game consisting of a card with a different but complementary image on each side (for instance, a bird and a cage). When you twirl the card very quickly, the two images appear as one (the bird appears to be inside the cage).

Zoetrope
Optical game consisting of a "drum" (a shallow round box without a cover) with vertical slits cut into the sides, set upon a small base in the centre. A band of images is fixed to the inside of the drum. When you spin the drum on its base and look through the slits, the images inside appear to be moving.

ACTIVITIES 1 and 2: Wondering and learning about animation

Teacher's evaluation grid

Name of student: _____ Date: _____

Evaluation criteria for subject-specific competency: Solve scientific or technological problems

Student	
Develops relevant explanations and realistic solutions to the problem.	

Evaluation criteria for competency: Use information

Student	
Demonstrates genuine understanding of the phenomenon at the end of the process, after effectively using information.	

Evaluation criteria for competency: Adopt effective working methods

Student	
Demonstrates attention and perseverance in performing individual tasks.	

Evaluation criteria for competency: Cooperate with others

Student	
Interacts with others and becomes involved in performing tasks as part of a team.	

Evaluation:

A Exceeds expectations
B Meets expectations
C Experiences some difficulty
D Experiences great difficulty
NE Not evaluated

Solving scientific or technological problems Date: _____

Self-evaluation of competencies in science and technology:

1) **I solve a scientific or technological problem**
2) **I use the information provided**
3) **I work effectively**

Instructions: In the grid below, check the box that corresponds to your self-evaluation.

	Always	Often	Sometimes	Rarely
I suggested serious explanations for the phenomenon of animation.				
I clearly understood the information provided by my teacher and in the film *Animando*, which illustrates animation techniques.				
I made an effort to do the work I was individually responsible for thoroughly and well.				

Self-evaluation of the competency: Cooperate with others

Instructions: Complete the sentences below.

During the discussion on how animation could be explained, I suggested the following ideas:

_____

When a member of my team made suggestions, I ...

_____

Signature of scientist: _____