

**Lights, Camera, Science**  
*By Barbara C. Kengor*  
*Pittsburgh Gifted Center*

**Index:**

**Overview**

**Rationale**

**Objectives**

**Strategies**

**Classroom Activities**

**Annotated Bibliography**

**Appendix**

**Standards**

**Overview**

*Lights, Camera, Science* is an elementary curriculum dealing with science concepts, scientific thinking and experimentation through a popular medium. The science of how movies are made, the way that scientific theory is used to develop a story and how ideas for research and study can be found in modern films is the three-way focus of this unit. The unit is designed to complement the third and fourth grade science experience at the Pittsburgh Gifted Center. The school wide theme for the year is related to animals therefore the films used in the curriculum will deal with that topic also. Students in the gifted program attend the center for one day each week and the class period is two hours long. The gifted program is based on teaching the process skills of scientific thought rather than science content. This curriculum will make up the lessons for the last fifteen weeks of the school year and be a supplement to the regular curriculum. Prior to this time the students will have covered material in various fields of science that relate to animals. The scientific method and the proper way to conduct an experiment will have been addressed in the first semester classes. This curriculum will allow students to transfer and apply the scientific knowledge and expertise that they have developed in the first semester to the information presented in the second part of the year.

**Rationale**

The purpose of the curriculum is also three-fold. The use of movies in the classroom will serve to encourage young students to view movies in a new way and to use critical thinking skills as they watch a film. Students will watch movie clips that will help them to sharpen observation skills, make predictions, and

organize data. Providing examples of cinema art will enhance creativity in the classroom. Students will watch movie clips to gain an appreciation and an understanding of the effort and creativity that goes into making a movie. Using a relevant and kid friendly approach to science will connect the real/reel world to the science classroom. Students will watch movie clips to recognize how science is used in all aspects of filmmaking. Students will gain knowledge about various topics related to animals through the film medium.

### **Objectives**

The behavioral objectives of this curriculum are

1. The student will become familiar with the early devices used to make moving pictures.
2. The student will be able to recognize science theories and laws that are used in moviemaking.
3. The student will be able to make detailed observations related to science information presented in movies with an emphasis on animal life.
4. The student will be able to form and defend opinions concerning science fact or fiction in movies.
5. The student will experience science as a basis for creativity and art
6. The student will be able to relate classroom science to the real world.
7. The student will be able identify careers that deal with science and cinema.
8. The student will be able to develop a simple movie plot or story premise that incorporates science.

### **Strategies**

The main teaching strategy for this curriculum is to combine science and motion pictures to teach science in the second semester. The curriculum unit will begin with lessons dealing with the origins of the modern day movie. Inventors and pioneers of this early form of entertainment will be researched and discussed. Students will explore early animation devices and construct models. Optical illusions and three dimensional effects will be studied. Movies and clips from movies will be used to demonstrate examples of how animals are dealt with in movies and what we can learn about wildlife from watching films. After each class session and film clip viewing students will be encouraged to watch the entire movie at home with their parents and write a paragraph about it or complete a survey sheet. The curriculum, *Lights, Camera, Science* will conclude with a cooperative learning project. Groups of students will write a movie script that

teaches about an aspect of animal studies. The formula approach to movies would be used as a guideline for student writers. This part of the curriculum could be done as an interdisciplinary lesson with the Humanities Department in our school.

## **Classroom Activities**

### Early History

People have always been interested and involved in creating images to tell a story. From the drawings on cave walls to the computer generated films of today people are informed, entertained and inspired by the art and science involved in cinema production. The earliest rumblings of today's motion pictures began in the 1700's in France. The Magic Lantern was a device that used candle light shining through pieces of glass which had pictures on them to project images on a screen. Etienne Roberts produced a lantern show called "Fantasmagorie" that made skeletons and ghosts appear to jump off the screen. These inventions used the science concept of shadow images. Have the students relate how shadows provide information to naturalists and use this as a starting point for the lesson. Shadows are one way that ornithologists identify birds. Many bird watchers cannot get close to a falcon or a hawk when starting out and they must rely on the bird's silhouette in the sky to determine what bird they are observing. Have the students watch a clip from the movie "Fly Away Home" and have them note the shape of the wings of the geese as they fly in the sky." Use a bird identification field guide and/or visit "All About Birds" at <http://birds.cornell.edu/programs>. Have each student make a bird shadow out of black construction paper. Label these with the name of the bird and place them around the classroom.

### Inventions

In the 1800's many inventions came to the fore that were based on the scientific and physiological phenomenon of persistence of vision and retinal retention. Scientists who studied the human eye determined that an image remains on the retina of the eye for part of a second even after the image changes. This creates the perception of motion when still images are viewed one after another in quick succession. John Ayrton Paris invented a Thaumatrope that consisted of a disk connected to two strings. This round card had an image on each side. When the strings were spun and then pulled taut, the round card quickly flipped. This motion made the images on the card's sides appear to move giving the impression that they were one moving action. Other inventions at this time that relied on the same principle of human sight included Joseph Plateau's Phenakisticope, and Emile Reynaud's Praxinoscope. These both relied on a spinning motion to produce the illusion of movement. Have the students make a thaumatrope that symbolizes a fact about the food chain. Students can choose an animal and

research what that animal eats and or what eats that animal. The disk can be made from an index card or piece of foam board that has been cut into a circle 2 inches in diameter. On one side of the disk have the student draw the animal eating or hunting. On the other side of the disk have the student draw the food, prey or predator of the animal. Make two small holes in the disk across from each other near the edge of the circle. Use two pieces of thread or yarn and tie them through the holes. Demonstrate how to work the thaumatrope by holding the ends of each piece of thread and spinning the threads for 10 seconds and then pulling them taut. Have each student demonstrate and explain her thaumatrope to the class. (A good resource book is **Making Movies**.) Show a clip from *A Bugs Life* that deals with the food chain discussion to reinforce the content for the thaumatrope. Students can also construct a spinner on a pencil. Fold an index card in half and draw an animal on one side and its home or habitat on the other side. Tape a pencil up into the folded index card. Tape it securely so that the index card does not slide around. Spin the pencil between your palms and the animal will seem to go into its home or habitat.

### Photography

Up until the first photograph was made by Joseph-Nicephone-Niepce in 1826 the moving images of the big screen were all drawings. Using chemicals, glass plates and exposure to light he was able to produce a photograph. In 1885 George Eastman changed the glass plate to light sensitive paper and then five years later he changed the paper to celluloid. These advancements led to the motion pictures that we see today. The Kodak website [www.kodak.com](http://www.kodak.com) has many resources for teachers. One of which is a booklet that explains how to take a good photo and a list of helpful hints.

Using this website have students use school digital cameras to take pictures of classroom animals or their own pets at home. Divide students in groups of four or five. Each student should take three shots of the same animal one after another. The animal will probably have moved. Have each group download the pictures and view the thumbnail photos. Print out the page of thumbnails and cut them apart. Order the photos so that the animal appears to move and make a stack. Staple the top of the stack and flip the pages quickly to see the animal move. Have students visit the Silent Animal website. (<http://silent-movies.com/Animals/SAAnnex03.html>) Show a clip from the NOVA production of *"The Little Creatures Who Run the World"*. This movie demonstrates how photographers must use very powerful lenses to study small animals.

## Motion Pictures

It was Thomas Alva Edison and his assistant W. K. L. Dickson who are given credit for developing the first motion picture camera. A sprocketed wheel was turned by an electric motor. The wheel held the celluloid film as it was pulled through the camera. This machine was called the Kinetograph. This invention inspired the Lumiere brothers to build a Cinemagraphe which built on Edison's idea and was able to project a moving image on a screen. One such moving image was that of a train which was so realistic that some moviegoers ran from the theater in fear. It was at this time when many innovations in movie making started to appear. Special effects in movies were actually born as a result of a jammed camera. In 1896 Georges Melie's camera malfunctioned while filming a street scene. As he was filming a bus the camera stopped for a few seconds. When he got it working again the bus had moved and a hearse was passing by. When the film was viewed later it looked as if the bus had magically changed into a hearse. This led him to try other camera maneuvers and come up with the forerunners of the special effects we see today. Explain to the students that movies often depend upon scientific "magic" to create their special effects. Find a newspaper or magazine story in the movie section that tells about some of these special effects and how they are accomplished. Discuss which scientific principles were involved in creating the effects. Discuss if the newspaper account explained the scientific background. If so, underline the background sentences in the story. If not, create the background sentences that could help others better understand the special effects. Have the students view a clip from *Honey I Shrunk the Kids* and talk about the special effects. In the movie the kids are at the mercy of the ecosystem. Have the students look for interactions between the kids and the organisms. Talk about how the moviemakers made the kids seem to shrink.

## Special Effects

Special effects have always been an important aspect of the movies. In 1896 the movie, *Demolition of a Wall*, simply ran the film of building a wall in reverse to create the special effect. Over the years many innovative efforts have made moviegoers see things on film that cannot happen in real life. One special effect is to use models and miniatures to create an illusion of size. In 1933 *King Kong* used almost every special effect known at the time. However the most memorable was the construction of the 18 inch models of a gorilla designed and built by Willis O'Brien. Each model contained a moveable skeleton housed in rubber and rabbit fur. O'Brien used stop-motion animation to have his creation move. He shot hundreds of photos of the gorilla and moved his limbs slightly after each pose. King Kong seemed to walk through the jungle. Today "claymation" movies use clay models as the stars. Nick Park is the creator and

director of a series of claymation films that have won academy awards. His first movie took six years to complete. Have the class watch *The Close Shave*, a Wallace and Gromet film. Discuss how the animals are constructed and how they move. Have students make animal figures from Model Magic and create a diorama of the animals in their proper biome. These clay figures may be used later in the culminating activity of the curriculum.

### Science Fiction

The science fiction classic, *A Trip to the Moon*, was filmed in 1902. Since then there have been movies made each year that deal with the major changes taking place in our world. Early science fiction movies dealt with a concern for the future and for the unknown. Later movies dealt with a concern about rapidly changing technology and social values.

The first science fiction film series was *Flash Gordon* filmed in the 1930's. It made moviegoers think about what might be out there in our universe and got people thinking about the future. Buster Crabb traveled to other planets to save the day. In the 1950's life began to quickly change as newer technology became available to most of the population and audiences at science fiction movies swelled. Movies like *20,000 Leagues Under the Sea* showed how far technology had come as explorers went deep into the ocean where no one had been before. Stanley Kubrick's *2001: A Space Odyssey* moved science fiction out of the 60's and searched for how mankind will fit into future of the universe. The 70's continued to deal with the problems of the future and with deep moral issues until the *Star Wars* phenomenon which showed a brighter future where aliens and people were friends. *E.T.* in 1982 dealt with human values. The 1990's continued to expand the special effects and the story lines of science fiction with films like *Men in Black* and *Jurassic Park*. Today science fiction movies are still popular with many old films being remade using more remarkable special effects. Have students view a clip from *Jurassic Park*. Discuss how the insect preserved in the amber provided the DNA used by the scientists in the movie. These preserved insects are actually a type of fossil. The organism was trapped in tree sap or resin and did not disintegrate. Have students make an amber fossil. Have each student bring in a small dead bug or purchase small plastic insects to use. Mix two cups of clear glue with a few drops of orange food coloring to give the glue a color that is the shade of amber. This will provide "resin" for a class of 15. Give each student a small square of tin foil and a small container of "resin". Bead a few drops of glue in the foil and drop the bug in the center. Then drop a few more beads of glue to just cover the bug. Allow the glue to harden and then cover the bug with glue again. Repeat this process three or four times. Allow the specimens to dry overnight.

If possible show the class a real amber fossil and have them compare the glue fossil to the real one.

### Science Fact

Animals are a favorite subject of children's films. While most of these animals are given human qualities in the movies they also retain and use the characteristics common to their species. Much study and research goes into the creation of each animal. Animators must observe animal behavior and movement. Script writers incorporate facts into the conversation that stay true to the particular animal. Set designers must know the habitat in which an animal should be found. At times moviemakers take liberties with animal characters and with their habitat, and it is interesting to watch a movie with a critical eye and the right knowledge. This part of the curriculum will deal with facts versus fiction in movies set in the climate regions of the world. The world can be organized into five biomes: aquatic, desert, forest, tundra and grassland. Under each biome there are several subcategories. When moviemakers put animals in their proper habitat it is an easy way to learn more about the animal. Looking at the following biome categories paired with a film will complete the course work for this section of the curriculum.

#### Aquatic Biome

The world's aquatic regions cover 75% of the earth and are home to many species of animals. There are two main categories of aquatic biomes; freshwater and marine. Ponds, lakes, streams, rivers and wetlands are examples of freshwater regions. Oceans, coral reefs and estuaries are examples of marine regions. Coral reefs are made up of a substance that comes from the skeletons of animals. It clusters together in brightly colored polyps. Coral reefs are formed when ridges of coral develop in a strip. Coral reefs occupy less than  $\frac{1}{4}$  of 1% of the marine region but they provide a home for  $\frac{1}{4}$  of all known species of fish. These reefs have been in existence for over 200 million years. The Great Barrier Reef, located off the northeast coast of Australia, is actually a long chain of over 2,000 smaller reefs. Many animals live in the Great Barrier Reef and new species are discovered each month. The setting for the movie *Finding Nemo* is the Great Barrier Reef and the characters in the movie are based on the real aquatic life found there. The story is about a clownfish named Nemo who wants to explore the ocean and gets caught in the current of the open water. His adventure leads to his capture and the plot continues with his attempts to rejoin his father and his father's journey to find him. The cast of characters in *Finding Nemo* is made up of the marine animals who live in the Great Barrier Reef. Nemo and his father,

Marlin, are clownfish which are also called anemone fish because they live among the tentacles of sea anemones. Clownfish are protected by the tentacles of the sea anemones and are immune to their poison. Clownfish fear the open water. Other sea creatures in this drama include three sharks. Bruce is a Great White Shark which is also known as an Apex predator because it is at the top of the food chain and has no natural predators. Chum is a Mako shark, the fastest moving shark. Mako sharks can move 60 miles per hour in the open water. Anchor is a hammerhead shark. The flat head of this shark helps it to sense the electrical fields that are generated by some of its prey. Other marine life is represented by Crush, Dory and Gill. Crush is a Green Sea Turtle. These animals are famous for migrating thousands of miles to find nesting grounds. Dory, Regal Blue Tang, represents the many tropical fish found in the coral reef. Gill is a Moorish Idol, a fish dating back to prehistoric times which is rarely seen by humans in its natural habitat.

Have students view a clip from the movie *Finding Nemo* and choose a sea animal from the film for further study. Using a large box lid and colorful foam pieces ( These can be found in craft stores.) have the class design a coral reef . As the research on each animal is completed have the students draw the animal on an index card and write one interesting fact about it before placing it in the coral reef box.

## Desert Biome

One fifth of the earth's surface is made up of desert land. Desert land can be divided into four major types: hot and dry, semi-arid, coastal, and cold. Most of the desert land in North America is hot and dry. Deserts receive little rainfall and experience extremes in temperature. Summer days can be very hot because the desert surface contains little humidity to block the sun and at night the land loses most of the heat because nothing is there to absorb it. The animal life of the desert must adapt to these harsh conditions. Amphibians in the desert have accelerated life cycles which improve their chances of survival. Reptiles have evolved to need little moisture to stay alive. The movie *Holes* is set in a fictitious desert in Texas that resembles the Chihuahuan Desert which stretches from the Rio Grande Valley to Mexico City. It is 800 miles long and is home to tarantulas, scorpions, millipedes, giant centipedes, frogs, snakes, nocturnal mammals and birds.

In the movie a boy is sent to Camp Green Lake, a correctional facility in the middle of the desert. In addition to his encounters with other youth he meets

several dangerous desert animals. In the beginning of the film a young man is bitten by a rattlesnake. These snakes are very common in the desert and their fangs contain a poisonous venom. (In the actual movie a nonpoisonous snake was filmed near the actor. It was replaced by a rattlesnake for the close-up but so was the actor. A trainer's foot was filmed near the real rattler.) Later in the film a scorpion crawls on the bed on the star. A real scorpion was used. A trainer placed the animal on a sheet and prodded his tail with a straw, then blew through the straw to make the scorpion move along the sheet. The last desert animal presented in the film does not exist. There is no such animal as a yellow-spotted lizard, however there are desert lizards which have similar characteristics. In the film nine bearded dragon lizards were used to act as the lizards in the film. A nontoxic paint was put on them to give them their bright color. Have the students watch a clip from the film and take notes about the desert climate. Discuss the adaptations that an animal needs to live in such a climate. For instance, desert lizards can regulate their body temperature to endure extremes of heat and cold. They are omnivores with slow digestion because of the lack of food found in desert climates. Have the students create an original desert animal. Use the information about desert biomes to help with the animal design.

### Forest Biome

Forests cover about one-third of the surface of the earth and are composed of trees and woody vegetation. There are three categories of forests. They are tropical, temperate boreal. The movie *Once Upon a Forest* is an animated film about animals who help a friend who has become ill due to pollution. The temperate forest is the setting. Temperate forests are found in North America and are characterized by well defined seasons with temperatures ranging from -30 C to 30C. Temperate forest wildlife includes squirrels, rabbits, skunks, birds, and many rodents. In the movie there are sixteen characters that represent forest fauna. There are three mice, two moles, a family of badgers, a hedgehog, and a wren. The animals in the film all have human qualities, they interact and get along. In the real forest setting this is not the case. Mice are rodents who have many natural enemies. They are eaten by almost any larger organism that they get too close to. Mice are exceptionally intelligent animals. Much research has been done on mice as strategists. Mice multiply at a rapid pace and are full grown in three weeks. They are cautious creatures who do not take risks. Moles are a group of mammals that eat insects. They stay underground most of the time burrowing and eating. They can consume 70% of their own body weight. They live alone and usually do not have contact with other forest animals. Badgers are nocturnal mammals and live in social groups. Four to twelve adults usually live together. The earthworm is an important source of nutrition for badgers. Nighttime hunting in wet woodland forests yields most of the badger family's

food. Hedgehogs are spiny mammals who are nocturnal hunters. They hibernate in the winter months. The hedgehog is an omnivore who finds most of its food on the forest floor. The wren is a bird that can be found all over the world. There are many types of wrens. Most are small chunky birds with brown feathers. They nest in forest trees and communicate with song. Have the students watch a clip from the movie *Once Upon a Forest* that has all of the forest animals interacting with each other. Develop a chart with columns that contain the following information: the characters, the animals they represent, the way that the characters communicate and the way that the real animal communicates. Have the students discuss how and why animals communicate. Have students choose an animal and research how it communicates. Students should find a picture of the animal and make a small poster. The poster should be made up of a picture or drawing of the animal and a short paragraph about how that animal communicates.

### Tundra Biome

The Tundra is the coldest biome and its name means “treeless plain”. The tundra has very little precipitation and very cold temperatures. There are two types of tundra, the alpine and the arctic. The arctic tundra begins at the North Pole and extends down into the northern hemisphere’s coniferous forests. While winter temperatures are extremely low, the average summer temperatures are high enough to allow plant and animal life to exist. The plant life of the tundra is surprisingly diverse. There are grasses, shrubs, flowers and lichen. All are low to the ground with small root systems and short growing seasons. The animals of the tundra are also diverse and include caribou, foxes, wolves, polar bears, salmon, terns and snow birds. Both the plants and animals are adapted to survive the long, cold winters and to grow or reproduce in the short summers. Many of the mammals and birds have insulation. Others hibernate during the cold months while some migrate to warmer climates. The movie and book, *White Fang*, is set in the lower regions of the arctic tundra. The main animal character in the movie is a young wolf whose mother was part dog. The movie deals with the wolf’s relationships with other arctic animals and with his human owners. Most of the other animals encountered by White Fang are also wolves but he does have dealings with a lynx and several domesticated dogs. First have the students watch several clips from the movie *White Fang* that illustrate the harshness of the weather. Discuss the term “adaptation” and review the work that students did as they designed a desert animal in a previous activity. Have the students design the counterpart to their desert animal. The counterpart must be able to survive in the arctic tundra. Take time to show additional movie clips that illustrate the relationship between the humans and animals in the movie. Excerpts from the book can be read aloud in class. Discuss the story of *White Fang*, the story of a man’s love for an animal and an animal’s response. This topic will set the tone

for speakers to present information to the class relating to proper animal treatment.

Animal Friends, the Western Pennsylvania Humane Society and the Kritter Kamp Wildlife Rehabilitation Center all provide classroom programs dealing with proper animal care.

## Grassland Biome

The grassland biome is characterized by lands covered with grasses with few or no large trees or shrubs on the landscape. There are two types of grassland: tropical and temperate. Tropical grasslands are called savannas. Approximately half of the land in Africa is considered a savanna. Savannas are located in hot climates with concentrated periods of heavy rainfall and then dry periods of drought. The soil of the savanna is thin and does not hold many nutrients. The low grasses that grow there provide grazing for many animals during certain times of the year. The animals must move in order to have enough to eat. So while the savanna is home to many animals it is not home to them at the same time. Some of the savanna animals include giraffes, zebras, mice, snakes, beetles, lions, leopards, hyenas and elephants. The movie *Lion King* takes place in the African Savanna and deals with two interesting concepts; the circle of life and the food chain. The term circle of life deals with how animals and plants begin, grow, reproduce and then die. The circle is formed as plants get the nutrients from the earth that were produced from decaying bodies of dead animals. The animals eat the plants and they nourish the plants with their droppings. Then the animals die and the plant gets more nourishment. Each member of the circle uses and is used by another. If the circle is interrupted it can mean problems for the members. The food chain is a term that deals with the fact that living organisms survive by eating other living organisms. The plants and animals that are eaten are lower on the food chain than the animal that eats them. A lion is higher on the food chain than the wildebeest and the wildebeest is higher on the food chain than the plants that it eats. Animals at the top of the food chain have no natural predators. The animals in *Lion King* are all inhabitants of the African savanna. Lions are the largest of the big cat family with the male lion being 50% larger than the female. The females are the hunters and they work together to kill their prey. They hunt at night and rest in the daytime. A group of lions is called a pride and is headed by one male. Meerkats are members of the mongoose family and they live in the Kalahari Desert of Africa. They have adapted their eyes so that they can see in the desert by developing dark eye circles that serve as built in sun glasses to lessen the sun's glare. They have excellent vision and actually can perceive color. Meerkats live in groups and work very well together. Members take turns keeping watch over the group and both males and females take part in caring for

their young. Meerkats eat insects, small animals and roots. The laughing hyena is also called the spotted hyena and is found in Africa and Asia. Hyenas are hunters and scavengers. They live in large packs where the females dominate the males. They have a heightened sense of smell but poor eyesight. Hyenas help to keep balance in the ecosystem by eating the remains of other animals' prey. Warthogs are members of the pig family. They eat grasses, roots and berries. The warthog has a very large head with two sets of tusks. The tusks are used as weapons and as face protectors. These animals actually do have warts on their faces. The males have larger warts than the females. Male warthogs are solitary animals that live in burrows. Warthogs are not aggressive animals and will flee instead of fight in most cases. They maintain a symbiotic relationship with birds as they let the birds feed on the parasites that live on them. Have students watch clips from the movies *Lion King* that show some attribute of each of the animals mentioned above. After the viewing instruct the students work in groups to find information on lions, meerkats, hyenas and warthogs. Students should find out about the physical traits of each animal. Using Plaster of Paris in large shallow trays have each group make a slab that shows the shape and size of the animals footprint, tooth and or jaw, claw, tusk, droppings and/or any other animal sign that might be left behind by the creature. These can be displayed in the classroom and may be used as parts of the set for the culminating activity of the curriculum.

### Movie Production Project Organization

There are many jobs connected with making a movie. The producers of a movie explain the idea to backers who lend money to the moviemakers. The studios can also back the movie and when it is finished they rent copies to theaters. Scriptwriters turn a story into a screenplay. A screenplay contains the dialogue plus all of the technical directions such as the lighting, camera angles and scene changes. The producer then finds a location for the movie and a production manager makes a schedule for filming. The casting director hires the actors and an art director plans the visuals. Sketches of everything are made, costumes are designed, sets are designed and rehearsals begin. Months go by before actual filming can begin. From book to movie can be years in the making. Other people who aid in the production are the special effects technicians, stuntmen, gaffers, camera operators, make-up artists, hair stylists and many others. Give each student in the class a choice as to the part that they would like to play in movie production. Have the student research the work that is done by that person. Assemble the class and discuss the project with the group. Allow the students to decide what the project will entail. Some suggestions might be a short film about a classroom animal or a zoo animal, a Powerpoint or Hyperstudio presentation about an animal, an animation or claymation, a play or live performance project or any others that the class might come up with. All of the projects should follow the formula approach to movies explained in the next section. This will be the

culminating activity for the year and final products will be presented at our Spring Fling celebration at the end of May.

### Movie Production Project Content

The story presented in a movie basically follows a universal format. Each movie has three separate parts which provide information to the view. The first part of the movie introduces the characters, identifies the antagonist and presents a problem for the hero to deal with. The next part is where the problem grows or gets complicated and some action must take place. The final part of the movie is where the problem gets resolved. There can be a happy ending, a tragic conclusion or a middle of the road compromise. Have the students who choose to be producers and scriptwriters meet to develop a story or find a story that can be written into a screenplay. Have them work with the actors to write lines and directions. This group can then present their work to other members of the production team.

### Movie Production Activity

The students will be given time to work on a creative production that deals with animals. Students will have access to computers, digital cameras, video camcorders, the stage and lights. The productions will be limited to 15 minutes each and will be critiqued according to the following: screenplay, originality, factual content and presentation.

## Annotated Bibliography for Students

### Books

Gibbons, Gail. *Lights, Camera, Action! How a Movie is Made*. Thomas Crowell, New York. 1985. (This book explains the jobs of all the people who make films from start to finish.)

*History of Moviemaking*. Scholastic Inc. 1994.  
(This book is interactive and contains engaging pages with touchable film and pullout stickers.)

Oxlade, Chris. *Movies*. Rigby Interactive Library, Crystal Lake Ill. 1997.  
(This book presents information about how science is used to make movies.)

Platt, Richard. *Film*. Dorling Kindersley. London. 1992.  
(This is an Eyewitness book that deals with the story of motion pictures through photographs and short text.)

Powers, Tom. *Special Effects in the Movies*. Lucent Books. San Diego, CA. 1989.  
(This book covers the many techniques used to create special effect in the movies. It uses examples from many well known films.)

Wiese, Jim. *Movie Science*. John Wiley and Sons. New York. 2001.  
(This book deals with science fiction and real science in the movies.)

### Websites

<http://birds.cornell.edu/programs>. All About Birds  
(This website is good for bird identification using the silhouettes.)

[www.kodak.com](http://www.kodak.com) Kodak.  
(This website provides information on all aspects of photography.)

<http://silent-movies.com>  
(This website is a good source of information about the era of silent movies.)

<http://www.pbs.org/wgbh/nova/specialfx2/>  
(This website has games and student activities dealing with special effects in the movies.)

## Annotated Bibliography for Teachers

### Books

Anderson, Yvonne. *Make Your Own Animated Movies*. Little Brown. Boston. 1970.

(This book is a how-to book and is a good resource.)

Cross, Robin. *Movie Magic*. Sterling Publishing. New York 1995.

(This book explains special effects and uses many well known movies as examples.)

Dubeck, Leroy and Suzanne Moshier. *Science in Cinema*. Teacher College Press. 1988.

(This book deals with science facts and how they are used in movies.)

Everson, William. *The American Movie*. Atheneum Press, New York. 1963.

(This is a general overview of the movie industry and provides background information.)

Finch, Christopher. *The Art of Walt Disney*. Harry Abrams. New York. 2004.

(This is a nicely illustrated book that can be used as background information.)

Layborne, Kit. *The Animation Book*. Crown Publishers. New York. 1979.

(This book explains the history of animation.)

Locke, Lafe. *Making Movies Without a Camera*. Betterway Books Cincinnati, Ohio 1992.

(This is a workbook for teachers with directions and reproducible pages to help students make movies.)

Monaco, James. *How to Read a Film*. Oxford Press. 2001.

(This book deals with the art and the technology used in making a movie.)

Sinyard, Neil. *The Best of Disney*. Crown Publishers. New York. 1988.

(This book provides information on many children's movies.)

Sobchack, Vivian. *Screening Space*. Ungar Publishing. New York. 1987.

(This book discusses movies that deal with space travel and futuristic themes.)

Staskowski, Andrea. *Science Fiction Movies*. Lerner Publications. Minneapolis, MN. 1992.

(This book looks at the history of science fiction in the movies.)

### Websites

<http://science.howstuffworks.com> How Cameras Work.

(This website has information on all aspects of photography.)

<http://inventors.about.com> Magic Lantern- Slide Projector

(This website has information about inventors and their inventions that helped to start the movie industry.)

<http://physicsweb.org/articles/news/2/2/1> Science Fiction to the Rescue of Teaching?

15 Feb 1998.

(This article has interesting information about teaching science with movies.)

<http://www.ucmp.berkeley.edu/glossary/gloss5/biome> World's Biomes.

(This site has information about the five major biomes of the world.)

<http://www.teachwithmovies.org/> Teach with Movies.

(This website provides teacher guides and lessons for many modern movies.)

### Films Used in the Unit

*Fly Away Home*

*A Bug's Life*

*The Close Shave*

*Jurassic Park*

*Finding Nemo*

*Holes*

*Once Upon a Forest*

*White Fang*

*Lion King*

### **Science Standards**

All students explain how scientific principles of chemical, physical and biological phenomenon have developed and relate them to real-world situations. (1)

All students demonstrate knowledge of basic concepts and principles of physical, chemical, biological and earth sciences. (2)

All students develop and apply skills of observation, data collection, analysis, pattern recognition, prediction and scientific reasoning in designing and conducting experiments and solving technological problems. (6)

### **Art and Humanities Standards**

All students will respond critically to works from the visual and performing arts and literature of various individuals and cultures, showing that they understand the important features of the works. (2)

All students produce, perform or exhibit their work in the visual arts, music, dance or theater and describe the meaning the work has for them. (4)

## Curriculum Unit Timeline

### Second Semester

Week 1.....	Introduction/Early History
Week 2.....	Inventions
Week 3.....	Photography
Week 4.....	Motion Pictures
Week 5.....	Special Effects
Week 6.....	Science Fiction
Week 7.....	Aquatic Biome
Week 8.....	Desert Biome
Week 9.....	Forest Biome
Week 10.....	Tundra Biome
Week 11.....	Grassland Biome
Week 12.....	Movie Production Project Organization
Week 13.....	Movie Production Project Content
Week 14.....	Movie Production Activity
Week 15.....	Movie Production Activity