March 2000
Activity 2: All About Film

What is Motion Picture Film Like?

When we watch a movie, we think we are seeing people and objects moving across a lighted screen. The term "movie" is short for moving pictures. But the motion is an illusion. What is really happening is that a series of still pictures are being projected on the screen in rapid succession—fast enough that our eyes and brain are tricked into thinking we see movement.

Almost all movies are shot using photographic film, using a technique invented over 100 years ago. The film is a long strip of plastic consisting of a series of individual pictures called "frames." Motion picture film is not much different from film used in ordinary cameras except that it is much longer.

Film serves two purposes in the motion picture industry. First, it is used to shoot the scenes that make up the movie. An editor selects the best shots and splices them together to create a master copy. Then the master is then copied onto other rolls of film, and the copies are sent to movie theaters.

If you've ever seen a film projector as it works, you may think that the film is moving through the projector continuously. If you look closer, you will notice that the film seems to be shaking or vibrating. In fact, a special mechanism slides each frame into position behind the lens and then stops it while a flash of light is projected through the film and onto the screen. To allow the film to move precisely, a series of holes are punched in the sides of the film.

Most feature films and many TV shows are shot on 35 mm film that has 64 holes per foot. There are 4 holes on each side of each frame.

1. The earliest commercial movies did not have sound. They were called silent movies, even though there was usually a band playing music when the film was shown. Most silent moves were projected using a film speed of one foot per second. How many frames per second were displayed in a silent movie?

2. When sound was introduced in 1929, the motion picture frame rate was increased to 24 frames per second. The same rate is still used in movies today. How fast does the film move at this rate, in feet per second?

3. The movie *Toy Story 2* runs for 92 minutes. How long is the projector film for this movie? Try estimating the answer first.

4. How many frames were in the movie *Toy Story 2*?

5. In a live action movie, only a small fraction of the film that is shot makes it into the final movie. Each scene may be shot several times ("Scene 6, take 3!"), and only portions of each shot are used. Suppose only 1/20th of the film that is shot is eventually used. How much film must be purchased to shoot a 90 minute movie? If a 400 foot roll of camera film cost $220 and developing costs $0.20 per foot, how much money would you put in your budget for film and developing?

6. Documentaries, many independent films, and some TV shows are shot using 16 mm film. The smaller size means smaller, more portable cameras and lower costs for copies. How much do you think a 400 foot roll of 16 mm film would cost? Hint: Think about what might affect the cost of the film (area, length, labor hours).