Create Your Own Reality

The zoetrope—an early device for creating "motion pictures."

Background

In this unit, you have studied both how to describe different kinds of motion and how physicists provide explanations of why objects move the way they do. In developing your understanding, you highlighted that objects move in relation to a frame of reference. The manipulation of this relationship between an object and its frame of reference allows film-makers to create different "realities."

Challenge

In groups of three or four, you are to research, write a storyline for, and produce a short animated film sequence, video, or special effects show that demonstrates an aspect of how film-makers use physics to create a virtual reality. Think about how filmmakers make use of the following. In Chapter 2, you examined how an object that is speeding up will have an increasing displacement between each consecutive time frame. In Chapter 3, you explored how objects appear to be moving differently relative to different frames of reference.

Here are the components you are required to include in the project.

A Entertainment Technology
Decide on which era of the entertainment industry you wish to study. You could decide to make one of the early film technologies such as a magic lantern to present your finished product. Or, you may wish to explore software for creating three-dimensional, computer-generated objects.

B The Physics of Motion
Decide what aspect of physics you are going to demonstrate. How do you create the illusion of an object changing speed or direction? How can frames of reference be manipulated to portray a rocket flying off into space when in reality the whole film is created inside a studio? How do special sound or light effects help create a desired virtual reality?

C Plot and Setting
Decide on a situation and short story as a context for your cartoon or film. Your special effects or virtual reality will have more impact if it is based on a believable story.

Web Link

www.mcgrawhill.ca/links/atlphysics
For more information about computer animation, special effects, and virtual reality, go to the above Internet site and click on **Web Links** to find out where to go next.

Design Criteria

A. Brainstorm ideas and conduct preliminary research to enhance them.

B. For further ideas, consider some of the following:

- Interview the technical staff of a theatre group about how they create special effects.
- Visit a theme park and note carefully how virtual realities are created. For example, how do they use movable chairs to simulate a thrilling auto race?
- View a digital videodisc (DVD) that contains additional segments that explain how special effects were created. Make notes on the physics involved. Bear in mind that your own effects will be much simpler than those in big-budget movies.

C. Write a proposal for a *manageable* amount of work. Include a flow chart with time lines for tasks for each member of the group.

- If your project is to build an early piece of technology, you will develop relatively few frames. If you are using computer simulations, your animation or video will be longer.
- Part of the evaluation of your project will be the evaluation of your ability to develop a proposal for a reasonable amount of work.

D. Prepare a written presentation of your project, including

- a title page with the names of your group members
- a summary of several pages that lists the technology you used, the aspect of physics that you dealt with, and the reality that you created in your animation sequence, video, or special effects show

- a log of your work, including your proposal, outline of initial research, storyboard, a description of any problems encountered and how you solved them, and a list of references and resources.

Three-dimensional modelling used by engineers is one example of an application of virtual reality.

Action Plan

1. Construct the technology based on self-made or ready-made plans, and become familiar with the operation of the technology.

2. Develop a storyboard (a shot-by-shot sequence of your storyline).

3. Outline the physics that you are using to guide the development of your storyline.

4. Complete production: complete storyboard artwork, block scene-by-scene staging, and film the video or rehearse the live show.

5. Present the completed project.

Evaluate

1. As a class, design a rubric to evaluate the projects, including proposal and presentation.

2. Use your rubric to evaluate your project.