



# Discussion Guide for

## FORCE AND WORK: ENERGY IN ACTION

### OBJECTIVES

- After viewing this program, students will be able to:
- Illustrate how two objects that exert a force on each other can be in a State of equilibrium.
- Distinguish between mechanical forces and field forces.
- Explain why the weight of an object will be different on the moon when compared to its weight on Earth.
- Analyze how an electromagnet is created.
- Design a table showing a comparison between an electric motor and a generator.
- Describe the location and function of "strong" forces.
- In your own words, explain the equation, "force equals mass times acceleration."

This program is part of the ALMS Interactive Science Essentials Series. This twenty-four part series covers four subject areas- Earth Science, Biology, Physics, and Chemistry. There are six programs in each subject area. The Individual programs are divided into randomly accessible sections. A glossary provides written definitions of terms used in the program, and in most cases will run a section of the video where the word is used in context.

A script of the narration is accessible, as well as a bulletin board containing a general introduction to the subject. A quiz allows the student to test their knowledge and the results are recorded for you. In the teacher's section you can view each student's test responses and edit or create your own quiz and test questions.

### OVERVIEW

Force and Work: Energy in Action is part six of the Physics Essentials series which examines modern day physics. The program introduces students to everyday mechanical forces and to the mysteries of field forces like gravity and electromagnetism. The concepts of work, pressure, and potential and kinetic energy, power and efficiency are also explored. The program then looks at how simple machines like levers and pulleys are used to provide mechanical advantage and combine to form complex compound machines.

### TEACHER'S PREPARATION

- Before the student uses the program set up the computer so that they can easily reach the mouse and the keyboard.
- Load the CD-ROM into the computer so that it is ready for the student to begin using.
- While students are able to work at their own pace, some students may benefit from using the program more than once.

### SUGGESTED DISCUSSION QUESTIONS

1. Illustrate how two objects that exert a force on each other can be in a state of equilibrium. What happens when the equilibrium is disrupted?
2. Distinguish between mechanical forces and field forces.
3. Explain why the weight of an object will be different on the moon when compared to its weight on Earth.
4. Analyze how an electromagnet is created.
5. Design a table showing a comparison between an electric motor and a generator.
6. Describe the location and function of "strong" forces.
7. In your own words explain the equation, "force equals mass times acceleration."
8. List three situations in which measuring pressure might be important to you.
9. Demonstrate how an object can convert potential energy to kinetic energy.
10. Discuss what must happen in order for "work" to take place.
11. Name common household items that use a lever, a pulley, a wheel and axle, an inclined plane, and a wedge.

### VOCABULARY

acceleration	compound machines
efficiency	electricity
energy	field force
force	gravity
joule	kinetic energy
lever	magnetic
mechanical advantage	mechanical forces
motion	nuclear forces
potential	power
pressure	simple machines
work	

### PROGRAMS DETAILS

#### LENGTH:

26 minutes

#### SUBJECT AREAS:

Physics

#### AUDIENCE LEVELS:

Junior/Senior High

#### ORDER NUMBER:

1-9098SG

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