

Build Something That Moves

Mechanical Engineering

Objective

This lesson helps students learn how to create potential energy: through rolling, torque, pressure, springs, etc. Students learn how to create movement through potential and kinetic energy.

Standards and Objectives

- 8th Grade Standard 4, Objective 3
- Physics Standard 2, Objective 3 and Standard 4, Objective 1

Learning Outcomes

Students will learn:

1. How to convert potential energy to kinetic energy
2. How to create potential energy
3. How to apply simple machines to engineering problems
4. How to solve problems
5. That for every action, there is an equal and opposite reaction
6. About conservation of energy

Essential Questions

1. How does science apply to real-life situations?
2. What is potential energy?
3. What is kinetic energy?
4. What is the conservation of energy?
5. How do you create potential energy?

Time Required (Itemized)

1. 30 minutes introduction and summary of energy
2. Time in class to work on project—as necessary
3. Time in class for demonstration and report on design

Assessments

Students Explain their design either in a formal report to the class, in an informal presentation to the teacher (as the teacher walks around the class to ask questions), or a 1-page summary and explanation of design submitted to the teacher.

Materials

Teacher or students may provide materials at the teacher's discretion of the teacher.

1. Students will need anything that creates potential energy. Examples include: balloons, springs, gears, motors, Hot Wheels/Tonka Trucks, fans, balls, marbles, levers, etc.

Lesson Description

Explain what potential and kinetic energy are. Place a textbook on a desk and ask the students if there is any energy in the desk. Let the textbook fall to the ground and explain the difference between kinetic and potential energy. Ask the students how they would create more energy with the textbook (raise it higher and higher), and demonstrate the energy with each height change.

Teach the students that roller coasters use the concepts of kinetic and potential energy. Ask the students when they have the most potential energy (at the crest of the first hill). Explain to the students that Mechanical Engineers build up the energy at the beginning of the ride by raising them to a high point. The rest of the roller coaster uses kinetic energy—energy in motion. The remainder of the ride is only expending the energy that was created at the beginning. This is an example of energy through rolling.

Have the students break into groups of three. Have the students create potential energy by building something that moves. One idea is to assign a different type of movement to each of the different groups, and then have them present their project and type of movement to the class. This will avoid all groups using the same type of energy. The goal is to show that potential energy can be created in a variety of ways.

Notes from the College of Engineering

This is meant to add a practical, hands-on component to what teachers already teach.