

# **Community in the Classroom Presentation Plan**

Lesson Name Energy and Energy Conversion

Presenter(s) Groves Lab

Grade Level 3 Standards Connection(s) Energy

## **Abstract:**

We'll do a short power point presentation about the different kinds of energy then break into four stations that will have activities to solidify the presentation to the kids. The stations will be:

- 1) Electrical: batteries lighting a light bulb. Here potential energy is stored in the battery and released via a chemical reaction to power a light bulb which releases heat and light energy. Electrons flow through the wire to the lightbulb and produce energy in the form of light waves. We will model this system with tennis balls representing the electrons and kids representing the wires and bulb.
- 2) Waves: this is an important but abstract concept. Here the potential energy in your body (sugars and fats) are released by a chemical reaction in your body and converted into kinetic energy as you pluck the strings of a guitar. This kinetic energy is then transferred into sound that you can hear by vibration of the guitar strings. To visualize the vibration of the guitar string we will have the kids oscillate a rope or slinky.
- 3) Chemical energy: this will be a vinegar and baking soda reaction. Pour the vinegar over some baking soda and the chemical components will release energy in form of bubbling and fizzing. We will also investigate the possibility of doing a chemiluminescence reaction; this will probably need to be done in front of the class during the closing section.
- 4) Potential and kinetic: this will focus on the simplest manifestation of energy conversion. We will have a car on board: when the board is flat the car won't move but when you introduce a grade (elevate one side of the board), you give the car potential energy. When you release the car the potential energy is converted into kinetic energy and the car will move down the grade and collide into some blocks and legos. Also, a rubber band powered car will show that potential energy can be stored in a twisted rubber band. The teacher can run this station.

## **Vocabulary/Definitions:**

- Vocabulary
  - Energy - the work that a certain force (gravitational, electromagnetic, etc) can do.
  - Kinetic energy - the energy that a body possesses as a result of its motion.
  - Potential energy - the energy of a particle derived from position, or condition, rather than motion. A raised weight, coiled spring, or charged battery has potential energy.
  - Gravity - the natural force of attraction exerted by large objects, such as the Earth, upon objects at or near its surface, tending to draw them toward the larger object.
  - Conversion - the act of changing from one use or function to another
  - Chemical energy - that part of the energy in a substance that can be released by a chemical reaction.
  - Electrons - a fundamental subatomic particle that carries an electric charge.

## **Materials:**

Projector, computer, and the station materials.



## Classroom Set-up:

We will need a white surface to project a power point presentation. Kids well also need to split up into four groups and rotate between four stations.

## Classroom Visit

### 1. Personal Introduction: \_\_\_\_\_ **3** Minutes

This will be variable depending on who is presenting. But the overall them is we are Berkeley Graduate students studying Membrane Biophysics in the College of Chemistry.

### Topic Introduction: \_\_\_\_\_ **15** Minutes

- This will be the powerpoint presentation complete with pictures for examples. We will also have a demonstration with a balloon and static electricity on hair to break the monotony.

### 2. Learning Experience(s): \_\_\_\_\_ **24** Minutes

Stations include:

Electric energy kids will pass around tennis balls which will represent electrons then use batteries to power a light bulb

Energy in the form of waves: we will have a guitar and some oscillating rope for easy visualization.

Chemical energy: pouring vinegar over baking soda makes it bubble.

Conversions from potential to kinetic energy: we'll have matchbox cars on a board and a rubberband operated car.

### 3. Wrap-up: Sharing Experiences and Building Connections \_\_\_\_\_ **5** Minutes

Here we will talk about how all the energies are related (i.e. the batteries are a form of storing chemical energy, which can be released via a chemical reaction and converted into energy in the form of waves like a radio or kinetic energy like a remote control car). Perhaps we will also have a chemiluminescence demonstration.

### 4. Close: \_\_\_\_\_ **3** Minutes

*How can kids learn more? Thanks and good-bye! Clean-up.*

**TOTAL \_\_\_\_\_ **50 – 60** Minutes**

## Follow-up – After Presentation

Suggest students write a letter explaining “How we learned about \_\_\_\_\_?”

List or attach examples of activities, websites, connections for additional learning.

Attach worksheets, hand-outs, visuals used in classroom presentation.

