

Community in the Classroom Presentation Plan

Lesson Name How to Get Renewable Energy from the Sun

Presenter(s) Anthony Fu, Anna Goldstein, Stephen Silveira

Grade Level 3 **Standards Connection(s)** Physical Science: Energy comes from the Sun to the Earth in the form of light. Energy can be stored in many forms.

Teaser:

Students will learn about the important concepts of renewable resources and solar energy through two fun activities! First, a mini-water mill to demonstrate how water can be reused. And then (weather allowing), we will help them assemble a solar-powered car. We want to emphasize the benefits of energy from the sun vs. energy from fossil fuels, and get students talking and thinking about energy in new ways.

Vocabulary/Definitions:

3 – 6 important (new) words

- Energy Source
- Fossil Fuel
- Renewable
- Solar Cell

Materials:

What will you bring with you?

- solar kits (x3)
- water mills (x3)
- paper cups (x6)
- worksheets (x25)

What should students have ready (pencils, paper, scissors)?

Classroom Set-up:

Student grouping, Power/Water, A/V, Light/Dark, set-up/clean-up time needed

- Need water from the faucet
- Students should be divided into 3 groups for activities
- Chalk/whiteboard for writing student responses

Classroom Visit

1. Personal Introduction:

5

Minutes

Who are you? What do you want to share with students and why? How will you connect this with students' interests and experiences?

Stephen: I am a Mechanical Engineering student studying at Berkeley. I love engineering because I get to learn about how stuff works and how to build things. One of my greatest interests is energy efficiency which means as we get smarter, we can do more things while using less energy.

Anthony:

Anna: I am a student at UC Berkeley studying Chemistry. I do science because I want to invent things that make people's lives better. The world needs energy from a source that won't cause pollution and global warming, so I'm trying to find new ways to get energy from the sun.

Topic Introduction:
Minutes

7,7

I. Before Exercise #1:

- Does anyone know what energy is?
- Energy gives us the ability to perform work. Humans need energy to move.
- What gives you energy to move? Our energy comes from food.
- How about cars, lights, TVs, ipods? We give energy to machines by burning fuels like coal or oil or gasoline. These are called energy sources.
- Where does gasoline come from? Plants decomposed 300 million years ago under the surface of the earth.
- What are fossil fuels? Fossil fuels are non-renewable fuels, because they come from things decomposing over millions of years. If we use them all, we would have to wait millions of years before we get more.
- What do you think renewable energy is? What is an example of renewable energy?

II. Between Exercises #1 and #2:

- Energy from the sun is one of the best ways we have of replacing fossil fuels. Is energy from the sun renewable? How do you know?
- Have you ever heard of solar cells? What do they do?
- How much energy do you think it takes to move a car? We measure energy use in units called Watts. How many Watts do your lightbulbs take? Lightbulbs are about 100 W. Driving a car takes about 100,000 W.
- How much energy do we get from the sun? Guess how many cars could be powered by the sun if we could capture all of its energy. The answer is 1×10^{11} , 100 billion cars.
- How can we get all that energy from light into something we can use? That's where solar cells come in.

2. Learning Experience(s):
Minutes

15, 20

- Exercise #1: "Using Water as a Renewable Resource"
 - Each group will get a water mill and two cups. Someone in the group will go fill one of the cups with water (ask for a volunteer).
 - One student will pour water over the mill (off center) and make it turn while another student holds the empty cup underneath to collect the water. **maybe have the mill turn something i.e. fan?**
 - They can repeat this process several times and each student can have a turn.
 - The group presenter/leader can show them how to make it a little more efficient by pouring the water in the ideal spot.
- Exercise #2: "Getting Energy from Sunlight"

- Solar car kits (one per group) will already be partially assembled. These do not work indoors, so we need to come up with a backup activity or a very strong lamp/flashlight for cloudy days.
- The leader asks students to identify the different parts of the car: body, wheels, motor, solar cell.
- Point out that the energy from the solar cell has to travel through a wire to get to the motor - ask for a volunteer to connect the alligator clips.
- Students will see the motor start to turn, then brainstorm ideas about how to bring that energy to the wheels - ask for a volunteer to connect the rubber band.
- Have students play with the angle of the front axle to make the car turn in different directions.

3. Wrap-up: Sharing Experiences

5 Minutes

- What did we learn about? Write points on the board.
- What are the problems with fossil fuels? It takes too long to get it back from fossils. When you poured the water through the water mill, you collected the water back at the end, and you get to use it again. Do you get the gasoline back after your car uses it? Pollution from fossil fuels harms the environment and harms our health.
- What is good about solar energy?

4. Connections & Close:

3 Minutes

- Try to think about energy sources through out your day. Anytime you see something moving or producing heat and light, ask yourself where does it come from? How do we get the energy to cook our food? Or to turn on a flashlight? There are many sources of energy, and only some of them are renewable.
- Think about how important energy is to your life. Can you think of anything you do that doesn't require energy? What would your life be like if we didn't have any sources of energy?

60 Minutes

TOTAL 50 –

Follow-up – After Presentation

- Students can make a list of energy sources and their pros and cons.
- This website has fun activities about energy efficiency and renewable energy sources: <http://www.eere.energy.gov/kids/>. They also have a list of energy related lesson plans for teachers.
- Students can write a letter to their parents or to the governor's office about why it's important to use renewable energy.