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Title: Light Energy

Grade Level(s): 4

Time/Date:

School:

Teacher:

Directions to school, class:

Contact Info:

Curriculum Link: Science & Technology, Energy and Control – Light and Sound Energy

Required Reading

<http://www.solarenergy.org/resources/youngkids.html>

Vocabulary: Words & Concepts your class may be learning, look these up yourself too!

Renewable Energy - an energy resource that is replaced rapidly by natural processes

Photovoltaic – a system that uses the sun’s energy to make electricity (photo=light, volt=unit of electric energy)

Solar – of or having to do with the sun

Materials and Equipment: List these before and while you plan and revise so you’re prepared.

Pen and (recycled) paper

Pictures of solar panels, photovoltaic systems and other cool stuff (optional)

What is your class accomplishing?: Learning & Activity Goals, Objectives

- **Understand energetic properties of light**
- **Understand and the benefits and uses of Solar Energy**
- **Basic understanding of photovoltaic’s**
- **Identify technological innovations related to light energy and how they are used and controlled at home and in the community**
- **Identify a variety of natural and artificial light sources**
- **Distinguish between objects that produce their own light and those that reflect light from another source**
- **Recognize that most objects give off both light and heat and identify some objects that only give off light**

PROCEDURE

The Spark: Introductions, Demonstrations, Show and Tell, Topic Intro (Break the ice!) ~5-10min

*Hi everyone! Today we are talking about light energy! Can you all introduce yourself and name 1 thing that gives off light? Do these objects only give off light or also something else? What is it? **Heat!** Can you think of some objects that only give light and no heat? **Light sticks, fire flies, ..***

*Can you think of objects that look like they give light, but are actually reflecting light from some where else? **The moon, glass, windows, water,**! Where does that light come from originally? Where does the light come from that gives us energy? The sun!*

What else have you learned about light so far?

Brainstorming, Getting ideas, Connecting ideas (assess their knowledge!) ~10-20min

*What does solar mean? Can you spell it? What would solar energy mean? What makes you hot laying on the beach on a summer day? **Solar energy.** What creates wind? **Solar energy.** What makes the giant solar panels on satellites work (show a picture if you want)? **Solar energy.** What makes plants grow? **Rain and... Solar energy.** What makes the clouds that make the rain? **Solar energy.** What sets a blade of glass under a magnifying glass on fire? **Solar energy.**¹ What makes volcanoes explode? **So.. ehm.. It’s geothermal energy. Fooled you!***

*All those ways how we use solar energy can be divided into two basic categories; can anyone guess which those are? **First, we can use the sun's energy to heat things--our houses, the water in our houses, the food in a solar cooker, and so on. The second basic way we can use solar energy is to turn light from the sun directly into electricity, using solar panels (show pictures if you want).***

*Why would we use solar energy? What does renewable mean? How do you spell it? What is a renewable energy source? Where do people usually get their energy from? **Fossil fuels, nuclear power, dams, .. Are fossil fuels renewable? Why is it better to use solar energy than burning fossil fuels or using nuclear power?***

*Why do you think not many people use solar energy? Make a column on the board with the heading: **Reasons not to use solar energy.** Make a second column with **Solutions.** What could we do to make more people use solar energy?*

Activity, Game, Exercise, Debate, Puzzles, Problem Solving, Role Play ~10-30mins

The Light Games

Divide the class in 3-5 groups. Ask the teams the questions given below. Let the teams discuss for max. 30 seconds and then write an answer down (count down at 10 seconds for dramatics!). After you've asked all the questions discuss the answers with the class. If they get the answer right, it's one point for their team. Make a score keeping table on the black board; give students a sun for a correct answer. Correct answers are given below in bold. Teams that did not score a point can gain a point by answering a reflection question. These are also worth one point after each question. Write down answers on the board for further use. Have fun!

1. *The side of your house that receives the most sunlight is...* **A. South**, B. North, C. East, D. West
2. *The moon gives light by* A. burning lava B. reflecting the earth's light, **C reflecting the sun's light**
3. *Light heats things up by making molecules vibrate and move faster.* **A. True** B. False
4. *Light travels at* A.186miles/second, **B. 186,000miles/sec**, C.186,000,000miles/sec
5. *How does the sun help people? Write down as many reasons as possible.* They have 30 seconds.
6. *A photograph is a picture, but the word 'photo' has another meaning, what is it?* A. Family, B. Green, **C. Light**
7. *What is a volt?* (spell this one out, v-o-l-t) A. unit of explosive energy, **B. unit of electricity**, C. a box to keep valuable things.
8. *Photovoltaic (write this on the board) is* A. A camera that gives you an electric shock when it takes your picture B. using old photographs to make energy **3. C system that uses the sun's light energy to make electricity**
9. *People that use a photovoltaic system can store their electric energy in a* A. speaker, **B. battery**, C. telephone
10. *1 of the reasons people don't use more photovoltaic solar energy is* A. it's dangerous, **B. it's expensive** C. it makes pollution.

Reflection questions

1. *Why does the South have the most sunlight? Where should you have windows?*
2. *What happens when Earth puts a shadow on the moon?*
3. *How do you keep warm in the cold? What happens to water when it boils?*
4. *What travels faster, light or sound? What do you hear or see first, thunder or lightning?*
5. *What answers are similar? Different?*
6. *Do you know of any other words with 'photo' in it?*
7. *What do you know about volts?*
8. *Can you explain how photovoltaic's works?*
9. *Why would people save their energy in a battery?*
10. *How can we make solar energy cheaper?*

Activity, Game, Exercise, Debate, Puzzles, Problem Solving, Role Play(Pt. II or Cont...) ~10-30mins

Photovoltaic energy systems can be used in far away places where there are no electric power lines to provide us with 'normal' electricity.

What are some faraway places with no electricity? **Desert, Ocean, Mountains, Forests, Outer space.**

How would you use electricity in some of these places? **Computer, telephone, water pump, transportation**

Have students design the use of a photovoltaic system. Next to their design have them create an advertisement.

Give students the following criteria: 1. Must include a photovoltaic system, 2. Must include two sentences selling the product.

Afterwards discuss the designs with the class, draw a schematic picture of a photovoltaic system on the board.

Contingency, Plan B, extra game or activity (Back up plan) ~5-10mins

Think of some other activities to 'shed some light' on the topic of solar energy.

Review, Conclusion and steps towards continued action ~5-10mins

What would happen to the world if there was no Sun? **No plants: no food & oxygen.**

What are some ways that the sun can help us? How do people use solar energy?

Why is it important to use Solar energy? How can you use solar energy?

References

1. <http://www.solarenergy.org/resources/youngkids.html>
<http://www.infinitepower.org/pdf/FactSheet-06.pdf>

Great work ecoMentor! After use of Lesson Plan, revise, add ideas and repeat!