**Lesson Topic: Grade Level: Time:**

Alternative Energy 3-5 30-45 min.

**Objective:**

Students will examine alternative forms of energy by identifying their characteristics and ways they are useful.

**Materials:**

-pictures of sun, wind, earth, coal, natural gas, and oil (in color for teacher)

-picture of eco-friendly home to be displayed for the class

-brain file (one per student)

**Teacher Resources:**

\*Several websites are suggested to use for this lesson. These sites may take the place of parts of the “explanation” piece. Sites can be projected for the whole class or visited independently by students in order for them to take notes. What the sites replace is up to the teacher’s discretion.

* <http://www.energystar.gov/index.cfm?c=kids.kids_index>

Go to the “Your Planet Needs You” section and then “Types of Energy.” This shows a realistic view of renewable and nonrenewable sources of energy. When you click on the stars it briefly explains the various sources.

* <http://www.eia.gov/kids/>

This is a very resourceful site for identifying the attributes of renewable resources.

**Engagement:**

-Take a plastic bag and put something in it such as paper clips. Pass the bag around telling students to take any number of paper clips.

-Once the bag is empty explain that there are no more paper clips. We have just used them all and there is nothing left. Think about what we can do at this point, because we will have to find something to replace paper clips.

-Collect the paper clips and have students think about what they can do to save or conserve the small amount of paper clips we have now that we know this is all that is left. Have the students discuss their ideas with a partner or with a group. Share some of these ideas as a class.

**Exploration:**

--Display pictures of the sun, wind (or its effects), and the earth. Ask students how these could be used to give something energy?

-Add pictures of coal, oil, and natural gas and ask what all six of these have in common. Now ask students to discuss how the similarity of being energy sources leads to different results. Again, have students discuss this with their group. Share responses as a whole class.

-Students should fill out the “What I Think I Know” portion of the brain file.

**Explanation:**

- What in this classroom uses energy? How and where do these things get their energy from? Lead this discussion into oils and gasses (fossil fuels) and power plants. Discuss what these plants let off into the air (pollution).

-This should transition into pollution and how the fossil fuels we use create pollution and are negative for our environment. Not only do they pollute the environment but they are similar to our paper clip activity, once fossil fuels are all used up they are gone and cannot be replaced.

- What do you know about alternative forms of energy? Have students share with the class what they wrote in their brain file. How do we capture energy this way with these different sources?

-Geothermal energy may be the least familiar with the students. Build students’ background knowledge by discussing the earth’s layers: crust, mantle, outer-core, and inner-core. In groups or with a partner students can discuss what they know about these layers including the temperature of these layers.

-Explain to students that this heat is used as steam or hot water and this is used to heat buildings and generate electricity.

-The sun, wind, and earth are all sources of renewable energy. They are very different from fossil fuels for two reasons. Have students share what these reason could be. They are able to be use over and over and they do not cause pollution like fossil fuels.

-Ask students how they have seen renewable resources used. Solar panels and wind turbines capture the energy from the sun and wind and create power. To create geothermal heat smaller buildings can use heat pumps and for larger sources there are geothermal power plants but because they do not use fossil fuels less than one percent of the carbon dioxide emissions of a fossil fuel plant.

-At this time you can further students knowledge about renewable resources by projecting the following sites are allowing them to take notes on their characteristics independently.

* <http://www.energystar.gov/index.cfm?c=kids.kids_index>

Go to the “Your Planet Needs You” section and then “Types of Energy.” This shows a realistic view of renewable and nonrenewable sources of energy. When you click on the stars it briefly explains the various sources.

* <http://www.kids.esdb.bg/newenergy.html>

Show pictures of renewable energy and gives a brief synopsis. Students will be able to form a visual of how we use renewable energy.

* <http://www.eia.gov/kids/>

This is a very resourceful site for identifying the attributes of renewable resources.

**Extension:**

-Bring the topic back to the paper clip activity. The conclusion of the paper clip activity had students discussing ways to conserve paper clips. Since we do use nonrenewable resources daily how can we conserve what we use?

-<http://www.energystar.gov/index.cfm?c=kids.kids_index>

This site allows students to click on pieces of a bedroom that is similar to theirs so they can view ways they can conserve energy.

-<http://www1.eere.energy.gov/kids/roofus/>

This site shows “Roofus’s House.” It is an environmentally friendly house. Just click on each feature for an explanation.

Have students write the top 10 ways they use electricity daily. Then they should write suggestions about how they can conserve the amount of energy they use.

**Evaluation:**

-Display the picture of the eco-house or display <http://www1.eere.energy.gov/kids/roofus/> for students. Hand out graph paper and a ruler. Allow students to design their own eco-friendly building (teacher supplies).

-Students should then write an explanation about the features of the eco-friendly home and explain why they are positive for our environment.

**Alternative Assessments:**

-Create a Venn diagram to compare and contrast renewable and nonrenewable resources.

-Create a conservation song about what students can do to conserve nonrenewable resources.

-Create a poster that advertises ways to conserve energy and place them around the school.

-Using technology create a class reminder list of ways to conserve energy when they are in the classroom or leave the classroom.

-Choose one form of renewable energy and use the before mentioned sites to do further research in describing the process. Students should use the teacher reference sites as well.