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| **Lesson Title** | Renewable Energy in Poland |
| **Length of Lesson** | One (50 minute) class period |
| **Created By** | Bo Cherry |
| **Subject** | General Science |
| **Grade Level** | 7th grade |
| **State Standards** | 7th: 1 e,f (Inquiry); 4 g (Earth and Space Science) |
| **DOK Level** | DOK 3 |
| **DOK Application** | Distinguish, Compare, Classify |
| **National Standards** | 5-8: A (Inquiry); F (Science in Personal and Social Perspectives) |
| **Graduate Research Element INTERNATIONAL: Poland** | Renewable energy in the form of hydroelectric power has many benefits, but also many negative impacts on ecosystems. Renewable energy in Poland is becoming increasingly popular in recent years. |

**Student Learning Goal:**

MS 7th Grade:
(Inquiry) 1 (e) Communicate results of scientific procedures and explanations through a variety of written and graphic methods (DOK 2); 1 (f) Explain how science and technology are reciprocal (DOK 1); (Earth and Space Science) 4 (g) Research and evaluate the use of renewable and nonrenewable resources and critique efforts in the United States including (but not limited to) Mississippi to conserve natural resources and reduce global warming (DOK 3).

National Science Education Standards of Content 5-8:
(Inquiry - A) Use appropriate tools and techniques to gather, analyze, and interpret data; (Science in Personal and Social Perspectives - F) Science and Technology in Society.

**Materials Needed (supplies, hand-outs, resources)**
Handout for note-taking and exercise (INSPIRE_HO_Cherry_04.01.12), Energy information packets (INSPIRE_INFO_Cherry_04.01.12)

**Lesson Performance Task/Assessment:**
For this lesson, students will be briefly introduced to the various types of renewable energies. This will tie into a section on conservation and natural resources. Students should be familiar with global warming and sources of greenhouse gases. For this lesson, students will investigate renewable energies in the country of Poland. Students are to be put into groups of 4-5 (ideally, a total of 6 groups). Each group will be given information on their renewable energy. Included in this information are details on their renewable energy as well as statistics on the renewable energy source within the country of Poland. Students will be told to research the potential for their renewable energy (how much energy can they produce with it?), sources of their energy (i.e. biomass energy = forestry scraps), details about how their technology works, advantages/disadvantages (both environmentally and economically), and figures showing the costs of their energy. All of this information will be recorded in a table that will be given to them (INSPIRE_Cherry_HO_04.01.12). Once each group has gathered and recorded their data, they will be expected to communicate their findings to the class. For this part of the lesson, the instructor will be playing the part of a private investor, while the students are trying to convince the investor that their energy is the best. The report should include figures from their table. Graphs and other visual aids are encouraged, but not required.

**Lesson Relevance to Performance Task and Students:**
This lesson is relevant to students through the investigation of technologies and policies in other countries. Students will better understand the global impact that greenhouse gases have on the environment, and ways in which the world is seeking to reduce these impacts. By reporting their findings to the whole class, students will also have an opportunity to practice their communication skills. Students will also be encouraged to create visual displays, further enhancing their communication skills.

**Anticipatory Set/Capture Interest:**
In order to capture student interest, photographs of Poland will be shown and discussed briefly as a segue into the lesson. This introduction should include discussion of present energy sources and the impacts that these practices have on the environment.

**Guided Practice:**
Students will be guided throughout the lesson as the instructor will go around the classroom as students work in order to answer any questions. Also, by supplying each group a table with all of the needed information listed, students can easily pick out what they need to report. Lastly, the information that they need will be supplied to them in a small packet.

**Independent Practice:**
The students will work independently in groups to discuss their type of renewable energy. They will need to discuss all topics on the table, and then they will develop a short presentation for the class.

**Remediation and/or Enrichment:**
Remediation - Individual IEP; allow this to be a two day lesson.
Enrichment – Have students research renewable energy resources within the United States and Mississippi, and report back to the class the next day.

**Check(s) for Understanding:**
The check for understanding will come at the end of the lesson when each group presents their findings to the class. This can serve as formative feedback for the instructor, and it can be summative feedback as the instructor may wish to grade the presentation.

**Closure:**
Question 1: Give three reasons why renewable energy is important.

Question 2: If we know that non-renewable energy (i.e. coal and fossil fuels) is harmful to the environment, then why do we still use them?

**Possible Alternate Subject Integrations:**
Physical Science, Earth Science

**Teacher Notes:**
Sources from Info sheet:
http://www.renewableenergyworld.com/rea/tech/home

http://www.renewable-solarenergy.com/img/what-are-how-renewable-energy-sources-works.jpg

http://en.wikipedia.org/wiki/Biomass

http://www.paiz.gov.pl/files/?id_plik=12126

http://www.need.org/needpdf/infobook_activities/SecInfo/HydroS.pdf