**Subject area/course**: Science

**Grade level/band**: 5

**Task source**: Colorado Department of Education; Colorado Content Collaborative in Science

**Renewable and Nonrenewable Resources**

**TEACHER'S GUIDE**

1. **Task overview**:

The student is a city utility engineer tasked to research the depletion of coal and a possible viable resource replacement option that they will then present to the city council (e.g. oral, Power Point, Prezi, debate, etc.). They must identify the potential impacts once it is depleted and the logical options for energy replacement. They must identify the different possible sources of energy production (hydroelectric, wind, geothermal, solar, natural gas, petroleum, nuclear, etc.). They must choose a replacement resource, justify their choice, and justify why they did not choose at least three other sources of energy. They must include sustainability of their choice, renewable or non-renewable energy, and geographical availability.

1. **Aligned standards:**
2. **Common Core State Standards**

CCSS.ELA-Literacy.RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

CCSS.ELA-Literacy.W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic

1. **Critical Abilities**

Research: Conduct sustained research projects to answer a question (including a self-generated question) or solve a problem, narrow or broaden the inquiry when appropriate, and demonstrate understanding of the subject under investigation. Gather relevant information from multiple authoritative print and digital sources, use advanced searches effectively, and assess the strengths and limitations of each source in terms of the specific task, purpose, and audience.

Analysis of Information: Integrate and synthesize multiple sources of information (e.g., texts, experiments, simulations) presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to address a question, make informed decisions, understand a process, phenomenon, or concept, and solve problems while evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

Use of Technology: Present information, findings, and supporting evidence, making strategic use of digital media and visual displays to enhance understanding. Use technology, including the Internet, to research, produce, publish, and update individual or shared products in response to ongoing feedback, including new arguments or information.

Communication in Many Forms: Use oral and written communication skills to learn, evaluate, and express ideas for a range of tasks, purposes, and audiences. Develop and strengthen writing as needed by planning, revising, editing, and rewriting while considering the audience.

Interpersonal Interaction and Collaboration: Develop a range of interpersonal skills, including the ability to work with others, to participate effectively in a range of conversations and collaborations.

1. **Other standards**

*Colorado Academic Standards:*

SC09-GR.5-S.3-GLE.1-EO.a Develop and communicate a scientific explanation addressing a question of local relevance about resources generated by the sun or Earth (DOK 1-3)

SC09-GR.5-S.3-GLE.1-EO.b Analyze and interpret a variety of data to understand the origin, utilization, and concerns associated with natural resources.

*Next Generation Science Standards:*

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

ESS3.A. Natural Resources Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.

4-ESS3-2. Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods. Obtain and combine information from books and other reliable media to explain phenomena.

1. **Time/schedule requirements:**

This task will take approximately 3 weeks to complete.

1. **Materials/resources:**

* Primary and secondary sources for classroom
* Access to the internet or other sources for research

1. **Prior knowledge:**

* Renewable or nonrenewable energy sources
* Natural resources used to provide energy
* Examples of nonrenewable resources provided by mining operations
* The limited nature of nonrenewable energy sources
* Ways in which the distribution of resources is accomplished to meet human needs
* The reasons why towns are often built around resource extraction
* The variety of renewable and nonrenewable resources the Earth and Sun provide
* The ways in which the environment affects humans and vice versa

1. **Connection to curriculum:**

This task is the culminating activity in an environmental science unit (full unit available here: http://www.cde.state.co.us/standardsandinstruction/sc5-renewablenonrenewableresources-pdf ).

This unit, [Renewable and Nonrenewable Resources](http://www.cde.state.co.us/standardsandinstruction/sc5-renewablenonrenewableresources-pdf), focuses on how humans, plants, and animals use renewable and non-renewable energy resources, and how the use of these resources impacts the environment both positively and negatively. The physical environment limits available resources, which dictate human use, decision-making, and activity. Beginning with the natural resources (renewable and nonrenewable), across the unit students investigate energy, info-graphics, resource availability and consumption, and the interconnectedness of humans and energy production and use. The unit culminates in a performance assessment that asks students to take the role of a city utility engineer and come up with a solution for coal depletion and present to the local city council.

1. **Teacher instructions:**

* Students should be provided time (approximately two weeks) and computer access to utilize the research skills developed throughout the unit on renewable and nonrenewable resources to accumulate the evidence needed to develop their presentations
* Students should be provided computer access and time (approximately one week) to generate their evidence based presentations

1. **Student support:**

* The teacher may allow students to use multiple presentation options (e.g. oral, Power Point, Prezi, debate, etc.).
* The teacher may allow students to list a reduced number of replacement energy options and impacts.
* The teacher may allow students to justify their choice and at least one replacement choice.
* The teacher may allow students to use picture books to identify the different energy resources.
* The teacher may allow students to use a word bank with graphics.
* The teacher may allow students to use an outline/graphic organizer to assist with the planning and organization of their presentation.
* The teacher may allow students to have oral presentation of assessment.
* The teacher may allow students to use assistive technology.
* The teacher may allow students to use extended time and/or frequent check-in on progress.
* The teacher may allow students to have sections of their presentation graded in intervals.

1. **Extensions or variations:**

To extend this work, students might choose a different location around the world that also relies on a non-renewable resource. Their recommendation must be written through persuasive writing.

1. **Scoring:**

Student work can be scored using the Renewable and Nonrenewable Resources rubric.