

# Sample Performance Assessment

**Content Area:** Science

**Grade Level:** Fifth (5)

**Instructional Unit Sample:** Renewable and Nonrenewable Resources

**Colorado Academic Standard(s):** SC09-GR.5-S.3-GLE.1-EO.a; SC09-GR.5-S.3-GLE.1-EO.b

## Unit Description

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This unit, [Renewable and Nonrenewable Resources](#), 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.

## Performance Assessment Description

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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.



### RUBRIC: RENEWABLE AND NONRENEWABLE RESOURCES

|   | <b>Above Mastery</b>   | <b>Mastery of Grade Level Standards</b>   | <b>Approaching Mastery</b>   | <b>Novice</b>   |               |
|---|--|---|--|---|---------------|
| <b>Scoring Criteria</b>                             | <b>4</b>   | <b>3</b>  | <b>2</b>   | <b>1</b>  | <b>Weight</b> |
| <b>Skills And Processes</b>                         | Research and presentation is exceptionally thorough. <ul style="list-style-type: none"> <li>➤ Includes academic and technical language related to energy resources</li> <li>➤ Contains clearly stated resource options</li> <li>➤ Includes analysis and evaluation of data/maps using primary or secondary resources</li> </ul>        | Research and presentation is thorough. <ul style="list-style-type: none"> <li>➤ Includes academic and technical language related to energy resources</li> <li>➤ Contains clearly stated resource options</li> <li>➤ Includes analysis and interpretation of data/maps using primary or secondary resources</li> </ul> | Research and presentation is somewhat thorough. <ul style="list-style-type: none"> <li>➤ Includes some academic and technical language related to energy resources</li> <li>➤ Contains vaguely stated resource options</li> <li>➤ Includes incomplete analysis and interpretation of data/maps using primary or secondary resources</li> </ul> | Research and presentation is incomplete. <ul style="list-style-type: none"> <li>➤ Includes limited academic and technical language related to energy resources</li> <li>➤ Contains unsupported resource options</li> <li>➤ Does not includes effective analysis and interpretation of data/maps using primary or secondary resources</li> </ul> | 33%           |
| <b>Conceptual Understanding Of Energy Resources</b> | Scientific explanation is exceptionally thorough and includes multiple resources. <ul style="list-style-type: none"> <li>➤ Identifies impact of coal depletion</li> <li>➤ Identifies all possibilities of replacement energy resources</li> <li>➤ Includes multiple energy uses in the community and consumption over time.</li> </ul> | Scientific explanation is thorough. <ul style="list-style-type: none"> <li>➤ Identifies impact of coal depletion</li> <li>➤ Identifies all possibilities of replacement energy resources</li> <li>➤ Includes energy use in the community</li> </ul>   | Scientific explanation is somewhat thorough. <ul style="list-style-type: none"> <li>➤ Partially identifies impact of coal depletion</li> <li>➤ Partially identifies all possibilities of replacement energy resources</li> <li>➤ Includes limited information about energy use in the community</li> </ul>                                     | Scientific explanation is incomplete. <ul style="list-style-type: none"> <li>➤ Minimally identifies impact of coal depletion</li> <li>➤ Minimally identifies all possibilities of replacement energy resources</li> <li>➤ Includes inadequate information about energy use in the community</li> </ul>  | 34%           |



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| <p><b>Justification Of Resource Choice</b></p> | <p>Justification of solution is highly effective and includes</p> <ul style="list-style-type: none"> <li>➤ Credible scientific evidence from multiple resources</li> <li>➤ Discussion about sustainability of choice,</li> <li>➤ Renewable or non-renewable nature of choice,</li> <li>➤ Geographical availability</li> <li>➤ Identifies and analyzed different resource options</li> <li>➤ Provides thorough analysis of human impact on energy depletion and includes explanation of how humans can change activities to change environmental impact related to energy use</li> </ul> | <p>Justification of solution is effective and includes</p> <ul style="list-style-type: none"> <li>➤ Credible scientific evidence</li> <li>➤ Discussion about sustainability of choice,</li> <li>➤ Renewable or non-renewable nature of choice,</li> <li>➤ Geographical availability</li> <li>➤ Identifies and analyzed different resource options</li> <li>➤ General analysis of human impact on energy depletion</li> </ul> | <p>Justification of solution is limited and may include some of the following:</p> <ul style="list-style-type: none"> <li>➤ Credible scientific evidence</li> <li>➤ Discussion about sustainability of choice,</li> <li>➤ Description of renewable or non-renewable nature of choice,</li> <li>➤ Geographical availability</li> <li>➤ Identification and analysis of different resource options</li> <li>➤ General analysis of human impact on energy depletion</li> </ul> | <p>Justification of solution is absent or incomplete in the following:</p> <ul style="list-style-type: none"> <li>➤ Credible scientific evidence</li> <li>➤ Discussion about sustainability of choice,</li> <li>➤ Renewable or non-renewable nature of choice,</li> <li>➤ Geographical availability</li> <li>➤ Identifies and analyzed different resource options</li> <li>➤ General analysis of human impact on energy depletion</li> </ul> | <p>33%</p>  |
|  |   |  |  | <p><b>TOTAL</b></p>  | <p>100%</p> |

## Performance Assessment Development Template

| Who is developing this performance assessment?               |  |
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| <b>Name:</b><br>Colorado Content Collaborative<br>in Science | <b>Position/Affiliation:</b><br>Colorado Content Collaborative<br>In Science |

| I. CONTENT STANDARDS   |  |
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| <b>Content Area: Science</b>   |  |
| <b>Colorado Academic Standards</b><br>Specify the Colorado Academic Standard(s) that will be evaluated by the performance tasks.<br><a href="#">Colorado Academic Standards Online</a><br>(hold CTRL and click to visit the website) | <u>SC09-GR.5-S.3-GLE.1-EO.a</u><br>Develop and communicate a scientific explanation addressing a question of local relevance about resources generated by the sun or Earth (DOK 1-3)<br><u>SC09-GR.5-S.3-GLE.1-EO.b</u><br>Analyze and interpret a variety of data to understand the origin, utilization, and concerns associated with natural resources (DOK 1-3)   |
| <b>Grade Level(s)</b>  | Grade 5  |
| <b>Indicate the intended Depth of Knowledge (DOK) for this performance assessment.</b>   | <input type="checkbox"/> DOK 1 <input type="checkbox"/> DOK 2<br><input type="checkbox"/> DOK 3 <input checked="" type="checkbox"/> DOK 4  |
| <b>What are some real-world situations that relate to the content standards above? Some examples are included in the Colorado standards under "Relevance and Application."</b>   | <ul style="list-style-type: none"> <li>➤ Mining operations provide nonrenewable resources.</li> <li>➤ Resources are not distributed evenly and require transportation systems to move them to where they are needed.</li> <li>➤ Towns and laws are often built around resource extraction.</li> </ul>  |
| <b>Summary.</b> Provide a brief summary describing the task in the boxes below.  |  |
| <b>Performance Task Name</b>   | <b>Brief Description of the Task</b>   |
| <b>Warning!</b>  | 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 |



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|  | 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. |
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| <b>II. Claims, Skills, Knowledge &amp; Evidence</b>  |  |
|--|--|
| <p><b>Claims.</b> <i>What claim(s) do you wish to make about the student? In other words, what inferences do you wish to make about what a student knows or can do? Define any key concepts in these claims.</i></p> | <p><b>Successful completion of this task would indicate that students will know...</b></p> <ul style="list-style-type: none"> <li>➤ Renewable or nonrenewable energy sources (SC09-GR.5-S.3-GLE.1)</li> <li>➤ Natural resources used to provide energy (SC09-GR.5-S.3-GLE.1)</li> <li>➤ Examples of nonrenewable resources provided by mining operations (SC09-GR.5-S.3-GLE.1; RA.1)</li> <li>➤ The limited nature of nonrenewable energy sources (SC09-GR.5-S.3-GLE.1)</li> <li>➤ Ways in which the distribution of resources is accomplished to meet human needs SC09-GR.5-S.3-GLE.1; RA.2)</li> <li>➤ The reasons why towns are often built around resource extraction (SC09-GR.5-S.3-GLE.1; RA.3)</li> <li>➤ The variety of renewable and nonrenewable resources the Earth and Sun provide (SC09-GR.5-S.3-GLE.1; N.2)</li> <li>➤ The ways in which the environment affects humans and vice versa. (SS09-GR4-GLE.2; IQ.3) (SC09-GR.5-S3-GLE.1-EO.b; N.1)</li> </ul> |
| <p><b>Skills.</b> <i>Refer to the standard(s), grade level, and DOK levels you listed in Section I. Given this information, what skills should be assessed? All skills should align with the above claims.</i></p>   | <p><b>Student should be able to...</b></p> <ul style="list-style-type: none"> <li>➤ Develop and communicate an evidence-based scientific explanation (SC09-GR.5-S.3-GLE.1-EO.a)</li> <li>➤ Analyze and interpret data to generate evidence (SC09-GR.5-S.3-GLE.1-EO.b)</li> <li>➤ Review and analyze information presented by peers (SC09-GR.5-S.3-GLE.1; N.1)</li> <li>➤ Provide feedback to peers based on reasonable scientific evidence (SC09-GR.5-S.3-GLE.1; N.1)</li> <li>➤ Assess scientific explanations (SC09-GR.5-S.3-GLE.1-EO.c)</li> <li>➤ Speak clearly and accurately to persuade an audience (RWC10-GR.5-S1-GLE.1-EO.a; IQ.3)</li> </ul>   |
| <p><b>Knowledge.</b> <i>Refer to the standard(s), grade level, and DOK level you listed in Section I. Given this information, what knowledge/concepts should be</i></p>  | <p><b>Student should know/understand...</b></p> <p><u>SC09-GR.5-S.3-GLE.1-EO.a</u><br/>Develop and communicate a scientific explanation addressing a question of local relevance about resources generated by the sun</p>  |



|  |  |
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| <p><i>assessed? All knowledge should align with the above claims.</i></p>  | <p>or Earth (DOK 1-3)<br/> <u>SC09-GR.5-S.3-GLE.1-EO.b</u><br/>         Analyze and interpret a variety of data to understand the origin, utilization, and concerns associated with natural resources (DOK 1-3)<br/> <u>SC09-GR.5-S.3-GLE.1-N.1</u><br/>         Review and analyze scientific explanations about natural resources presented by their peers, and provide feedback to push their peers to be scientifically accurate and base their claims on adequate and reasonable scientific evidence, not opinion.<br/> <u>SC09-GR.5-S.3-GLE.1-N.2</u><br/>         Earth and Sun provide a variety of renewable and nonrenewable resources. (DOK 1)</p>  |
| <p><b>Evidence.</b> <i>What can the student do/produce to show evidence of the above knowledge and skills?</i></p> | <p><b>Student will show evidence of skills and knowledge by...</b><br/>         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.</p> |



### III.A. PERFORMANCE TASKS: Instructions to the Student

***Think about the performance assessment process from a student's perspective. What instructions does the student need? Make sure the instructions are fair and unbiased. Instructions should be detailed, clear, and written at the appropriate grade level.***

***Give the student an overview of the performance assessment (i.e., purpose of the assessment, tasks the student will need to complete, etc.).***

WARNING! Coal has been depleted as an energy resource and will not be available to your cities daily activities in six months. It is up to you, as a city utility engineer to come up with a solution to present to the local city council.

- Identify the Impacts of coal depletion on your city;
- Identify all possibilities of replacement energy resources;
- Justify your choice of a replacement energy resource (you must include discussion about the sustainability of your choice, the renewable or non-renewable nature of your choice, and the geographical availability of your choice);
- Justify why you did not choose the other resource options.

***Stimulus Material. Describe what stimulus material the student will receive. For example, the stimulus might be a story or scenario that the student reads, analyzes, and to which the student provides a response.***

WARNING! Coal has been depleted as an energy resource and will not be available to your cities daily activities in six months. It is up to you, as a city utility engineer to come up with a solution to present to the local city council.

- Identify the Impacts of coal depletion on your city;
- Identify all possibilities of replacement energy resources;
- Justify your choice of a replacement energy resource (you must include discussion about the sustainability of your choice, the renewable or non-renewable nature of your choice, and the geographical availability of your choice);
- Justify why you did not choose the other resource options.

***Explain to the student what documents/materials they have for the performance assessment. Explain what the student should do with those documents/materials.***

- Notes from classroom activities, presentations and videos
- Primary and secondary sources from classroom
- Evidence from own investigations or research

***Describe in detail any safety equipment that is required. Is safety equipment provided onsite, or are students expected to bring their own safety equipment?***

N/A



**Explain what students need to do when they complete each task (e.g., submit work to the educator, move on to the next task, etc.).**

N/A or up to teacher's discretion

**Provide any other relevant information for the students' instructions.**

N/A

### III.B. PERFORMANCE TASKS: Instructions to the Educator

**Think about the performance assessment process from an educator's perspective. What instructions do educators need? Instructions to the educator should be clear and concise.**

#### Before the Performance Assessment is Administered

**How should the educator prepare the site where the performance assessment will be administered? Be as specific as possible.**

- Provide access to and time computers for presentation
- Time to research resources

**What materials should be provided to students? Be as specific as possible.**

- Notes, materials from teaching unit
- Presentation materials
- Resources to research: primary and secondary resources

**What materials should the student bring to the performance assessment session? Be as specific as possible.**

Presentation materials(see performance task, i.e., power point, prezzi, debate notes)

**What materials should not be available to the student during the performance assessment session (e.g., cell phones, calculators, etc.)?**

N/A





***Should the educator keep track of time? If so, specify how much time the student will have to complete the performance assessment. Explain how the educator should keep track of and record time.***

Yes, variable depending on the amount of time dedicated to science each week.

***Will the educator need to video/audio record the students during the performance assessment session? If so, provide detailed instructions on how to set up the recording equipment.***

Depends on teacher discretion

### **During the Performance Assessment Session**

***How should the educator respond to students' questions?***

Redirect student to task. Offer accommodations related to the IEP, BLA as needed

***What should the educator do while the student is completing the tasks (e.g., should the educator make notes about the student's process, mark scores on rubrics, etc.)?***

Rubric is scored upon completion of task.

### **Upon Completion of the Performance Assessment**

***What does the educator need to collect from the student?***

Presentation notes, copy of power point, prezi, etc. depending on student choice related to task.

***What information should the educator give the student at the end of the performance assessment session?***

Scored rubric with comments as necessary

***Who is responsible for cleaning/resetting the workstation (if necessary)—the student or the educator? How should the workstation be cleaned?***

N/A

**Other relevant information for the educator's instructions:**

N/A



### III.C. PERFORMANCE TASKS: Other Considerations

**How will students' responses be recorded? Describe how evidence will be collected about each student's performance (e.g., student submits a work product, educator records information about the student's process, etc.)**

Presentation notes, copy of power point, prezi, etc. depending on student choice related to task.

**What needs to be built for this performance assessment? Refer to the materials list above. Think about what materials must be created for this performance assessment. Some examples include: worksheets, instruction sheets for the educator, videos, websites, etc.**

- Notes, materials from teaching unit
- Presentation materials
- Resources to research: primary and secondary resources

### III.D. PERFORMANCE TASKS: Accommodations

**What are the requirements for this set of tasks? What accommodations might be needed? List all accommodations that might apply (e.g., accommodations for language, timing, setting, etc.).**

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



**IV. EDUCATOR INFORMATION**

***What are the requirements to be an educator for this performance assessment? What are the knowledge and skills and educator must possess in order to successfully administer and score this performance assessment. Please provide your recommendations below.***

- Highly qualified educator to serve as facilitator and necessary resources for task completion
- It is useful if the educator taught the unit is present for the performance task
- Be familiar with the scoring rubric
- Modify to meet specific classroom expectations for performance



### **Performance Assessment Development Process**

The work of the Colorado Content Collaboratives is intended to support effective instructional practice by providing high quality examples of assessment and how assessment information is used to promote student learning.

The new Colorado Academic Standards require students to apply content knowledge using extended conceptual thinking and 21st century skills. Performance assessments have the highest capacity to not only measure student mastery of the standards but also provide the most instructionally relevant information to educators. Further, performance assessments can integrate multiple standards within and across content areas, providing educators a comprehensive perspective of student knowledge and giving students the opportunity to demonstrate the degree to which they understand and transfer their knowledge.

*Performance Assessment - An assessment based on observation and judgment. It has two parts: the task and the criteria for judging quality. Students complete a task (give a demonstration or create a product) and it is evaluated by judging the level of quality using a rubric. Examples of demonstrations include playing a musical instrument, carrying out the steps in a scientific experiment, speaking a foreign language, reading aloud with fluency, repairing an engine, or working productively in a group. Examples of products can include writing an essay, producing a work of art, writing a lab report, etc. (Pearson Training Institute, 2011)*

The Content Collaboratives worked closely with the [Center for Educational Testing and Evaluation from the University of Kansas](#) to establish protocols for the development of performance assessments and to use those protocols to develop performance assessments that include scoring rubrics. The Performance Assessment Development Process includes a collection of resources to aid schools and districts that choose to engage in locally developing performance assessments. These resources can be accessed in the CDE Assessment Resource Bank at <http://www.coloradopl.org/node/12765>.

**The Performance Assessment Development Process** is best utilized when intending to create an assessment for culminating assessment purposes such as a unit, end of course, end of semester, or end of year summative assessment. Additionally, a district, BOCES, or school may wish to create a common performance assessment that can be used across multiple classrooms. Engaging in the Performance Assessment Development Process serves as evidence that an educator is participating in valuable assessment work that aligns to the Colorado Academic Standards, district curriculum, and district goals.

The performance assessments developed by the Content Collaboratives serve as high-quality examples of performance assessments that can be used for a variety of purposes. Scores from these performance assessments are used at the discretion of the district or school.

