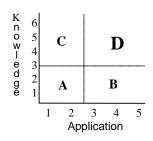


Analyzing Energy Resources

Subject(s) Biology, Ag and Natural Resources Chemistry Grade Level 9–12

Rigor/Relevance Framework



Instructional Focus

Writing: Students write for a variety of purposes and audiences with sophistication and complexity appropriate to the grade level.

Basic Concepts and Knowledge: Students develop an understanding of scientific concepts using facts, theories, principles, and models.

Unifying Concepts and Processes: Students recognize patterns and processes, making connections in terms of systems and subsystems that explain the interrelationships of the natural and designed world.

Habits of Mind: Students develop habits of mind including curiosity, open-mindedness, and persistence.

Communication: Students communicate and apply scientific concepts.

Science in Personal and Social Perspectives: Students apply scientific principles to personal and social issues.

History and Nature of Science: Students develop an understanding of the nature of science, its history, and science as a human endeavor

Student Learning

- Students will conduct research that will result in further understanding of energy resources in terms of the advantages and disadvantages to the environment of each resource, current use in the United States, and the potential for future growth use.
- Students will write reports that support their understanding and compare and discriminate the environmental impacts of energy resources.
- Students will use a variety of scientific sources to provide evidence to support their position.
- Students will demonstrate cooperative skills by working in teams to assemble information for a presentation.
- Team presentations will include computer application of Power Point slide shows, as well as role playing with the audience.
- Students will evaluate each energy resource and rank them for potential use.
- Students will complete a unit test to demonstrate mastery of the unit.

Performance Task

Overview

Students will work together in teams of three or four to research and submit a written report containing information on an energy resource that will be assigned by the instructor. Students will then present this information to the class as part of a Power Point presentation where they will assume the role of an energy sales team in an attempt to win an energy contract and sell their services to a local municipality.

Performance Task (con't.)

Description

The students will be assigned one of the following research topics: (a) Oil/Petroleum, (b) Coal, (c) Natural Gas, (d) nuclear energy, (e) hydroelectric power, (f) wind power, (g) biomass fuels, (h) hydrogen fuel cells, (i) geothermal energy, (j) solar energy.

Each team will use a variety of reference materials including textbooks, newspaper articles, and online resources to gather the following information:

- Brief description of the energy resource and how energy (kinetic) is created in this situation, as per the first law of thermodynamics. Include at least two simple illustrations to help your audience's comprehension of this description.
- What percentage of our national energy needs is being met by this particular resource today?
- 3. If this energy is a renewable resource, what is the goal for the new energy plan?
- 4. What is the potential for growth of this resource? Present a line graph that shows a projection of the future use of this resource over the next 50 years.
- 5. What are the advantages and disadvantages of using this resource? This may include factors such as pollution potential, availability, cost of production, and existing infrastructure.
- 6. In your opinion, do the benefits outweigh the environmental costs of using this particular energy source? Support your argument with two specific examples pertaining to the topic.
- ** All of the information will be properly referenced.

Members of the team will complete a data summary sheet. Students will use the data sheet to complete PowerPoint presentation (with a sales, motivational format) that they will present to the class as part of a role-playing exercise. The presenting team will assume the role of a sales team from a large energy company that is competing for the energy contract to supply electricity to the local municipality. The sales team will create a name and logo for their company, as well as designate a team leader to run the presentation. The audience will assume the role of the town board, which will evaluate each energy resource for use in its town.

The audience is encouraged to ask questions during the presentation. The sales team therefore will need to designate an "expert" in their group to respond to specific questions. This is easily done by each person on the team taking responsibility for one or two of the questions above that formed the presentation. The team leader will take questions from the audience and defer to the team "expert" in the area corresponding to the question for the response.

Copies of the presentation will be made available to all other class members at the time of the presentation. Teacher will allow time after each presentation for a Q & A session if necessary.

A teacher-made test with multiple-choice questions generated directly from student presentations will be administered at the completion of the unit. This test will also include the following free-response activity:

You as the information director for the town are in charge of creating a report that evaluates all six energy resources by ranking them in order from 1 (the most desirable) to 6 (least desirable). You need to identify one advantage and one disadvantage for each energy source and present a brief analysis of your number

	selection to support your assessment of rank.	
	udents should be made aware of this free response question before to have time to construct an articulate response.	the exam so
Assisting English Language Learners	fter students conduct their research, take a break to check for come ave the groups do a brief roundtable "pass-and-share" activity. Stound a blank sheet of paper, and each student writes or draws one e learned from the research. They should pass the paper two or the pture as many concepts as possible.	thing he or
Essential Skills	 Apply writing rules and conventions (grammar, usage, particles sentence structure, and spelling). Organize supporting detail in logical and convincing patterns on audience and purpose. 	•
	Research information from a variety of sources and dra organized, accurate, and informative report or essay that audience and addresses its needs.	
	Participate in (sometimes leading) one-on-one or group disc asking questions, asking for clarification, taking turns speaking and/or disagreeing courteously, making informed judgments, a toward a common goal.	ng, agreeing
	Examine how humans, through technology, cause environme by disrupting the equilibrium or balance of nature. Critiquimprove environmental protection through education, research conservation and judge the effectiveness of conservation propreservation techniques on environmental quality.	ue ways to h, laws, and
	Understand and compare energy transformations in livin geological systems, and artificial systems constructed by huma	
	21A Compare and investigate various types of energy (e.g., electromagnetic, nuclear, internal, wave, potential vs. kinetic) transfer and know how to apply measurements of energy.	heat, light,
	30 Know and apply the components and properties of the coordinate system: x-y axis, origin, quadrants, abscissa (x-and ordinate (y-coordinate), and general representation of a po	-coordinate)

Scoring Guide

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Written report: 25 points	Score /25	
20–25 points: All six informational points are addressed completely and clearly. Graphs and illustrations are of high quality and accuracy. Student shows sound reasoning and support for point #6.	e present and	
10–20 points: Student addresses all six points, but some points are incomplete and/or unclear. Graphs do no degree of accuracy and illustrations are of poor quality. Student shows good reasoning skills for point #6 bu one example for support.		
0–10 points: Student does not address all six informational points. Graphs and illustrations are missing, or o Student shows poor reasoning skills and no supporting examples for info point #6.	of poor quality.	
Power Point Organization, Quality, Individual Contribution: 25 points		
20–25 points: Presentation moves smoothly and efficiently through the information. High degree of organiz clearly produced slide frames that contain zero spelling or grammatical errors. Individual was an active part		
10–20 points: Presentation contains slides that lack of clarity and do not move smoothly through the information. Some spelling or grammatical errors are present. Individual had a somewhat limited role in the creation of the presentation.		
0–10 points: Presentation is highly disorganized with several spelling and grammatical errors. Individual ha creating the presentation.	d no role in	
Sales Team Participation and Quality of Oral Responses: 25 points		
20–25 points: Actively participates in presentation and gives well-prepared, clear responses to questions. De "expert" knowledge of information that he/she is responsible for.	emonstrates	
10–20 points: Limited participation. Responses are somewhat incomplete and not completely clear. Demonstrates moderate working knowledge of information.		
0–10 points: Very limited to no participation. Responses are confused and very incomplete. Demonstrates n knowledge of information.	ninimal	
Unit Test: 25 points		
15 multiple-choice questions worth 1 point =/15 pts Extended response question worth 10 points:/10 2 points ranking 1–6 2 points for correct advantage 2 points for correct disadvantage 2 points for analysis 2 points for spelling and grammar	Score/25	
Total Score	/100	