

Unit 6

How Can Communication of Scientific Knowledge Influence Others?

Introduction

Unit 6 is an opportunity to extend the knowledge gained through the completion of Units 1-5 in the Nature of Water Power. The student has an opportunity to explore, research and share new knowledge. As importantly, students have an opportunity to use their knowledge to share their beliefs and influence peers; in doing so, science literacy activities are stressed. Instructions, resources and scoring rubrics for the literacy activities are included.

This unit provides activities for the student to individually write about hydropower or prepare a document written by a team. Teachers can also choose for students to present individually and/or as a team.

Scientific Learning Goals and Objectives in this Activity:

(Goals from Washington State Commission on Student Learning — Essential Learning Requirements for Science)

Goals

- Students will understand the nature and contexts of science and technology
- Students will demonstrate scientific literacy skills as they share the acquisition of scientific ideas and knowledge.

Objectives

- Students will apply science knowledge and skills to communicate effectively about hydropower as an energy resource.
- Students will use technology as a tool for inquiry, analysis and sharing of information about hydropower.

Teacher Preparation

Preparation Time:
5 minutes

Materials

Prepare for the Entire Class:
Access To Reference Materials and (if possible) the Internet

Student Involvement

Activity Time:
50 minutes

Activity Processes:

? What should your parents, friends and the community know about hydropower?

1. Each student chooses one activity from the previous units and writes an article demonstrating the acquisition and sharing of information.
2. Each student chooses one activity to develop a multi-media presentation that demonstrates the use of technology to acquire, organize, share and reference information. This activity should contribute deeper understanding of the science concepts illustrated by the chosen activity.
3. Each student chooses one activity to research the science concepts in order to develop a deeper understanding. With this in depth understanding the student should propose a new model to test a hypothesis related to science concept(s) researched. The student should share the information, references, model, and the results (data) of the tests performed.
4. Each student chooses a question from one of the activities of the previous units to develop an on-line list of web pages that will provide supporting information to the question. In a report to be presented the student should clearly state the questions and the related science concept(s), along with a list of web page addresses with shared information footnoted.
5. Teams of three will prepare and give a 10 minute presentation about one of the activities studied in the previous units. Three resources are required to be referenced during the report.

A Student Self-Guide to Problem Solving

| | | | |
|----------------------------|---|--|--|
| The Problem | I rephrase the problem clearly | I understand the problem | I do not understand the problem |
| The Research | I gather, analyze and organize a variety of ideas, options and resources | I gather ideas and resources related to the problem | I gather unrelated information or gather none |
| The Plan | I develop a clear detailed plan matching the problem and show originality | I develop a plan matching the problem | My plan lacks clarity and resources. I execute a plan without considering outside options |
| The Solution | I identify solutions and show it relates to the problem. Records are well organized, clear and support the conclusion. I can communicate a concise conclusion | I identify the solution and show how it relates to the problem. Records are well organized. I can communicate a conclusion | I do not identify the solution or relate it to the problem. Records lack organization and do not sort the solution. My conclusion is unclear |
| The Evaluation | I analyze the process and evaluate how it might be improved | I evaluate the process and note how it might be improved | My evaluation of the process is lacking reflection of what changes I can make to improve my work |
| The Quality of Performance | My work shows thoughtful progress in my learning and use of literacy tools | My work shows continued development in my learning goals | My work needs improvement and my learning goals need revisiting |

Scoring Rubric for Problem Solving

Level 4:

1. Analyzed and readily understood the task
2. Developed an efficient and workable strategy
3. Strategy implemented effectively
4. Strategy supports a qualified solution
5. Appropriate application of critical knowledge

Level 3:

1. Understood the task
2. Developed a workable strategy
3. Strategy inferred (some evidence) but not always clear
4. Strategy supports appropriate solution
5. Evidence of application of critical knowledge

Level 2:

1. Partially understood the task
2. Appropriate strategy some of the time
3. Possible evidence of a plan, but not clear
4. Partial connection to appropriate solution
5. Partial evidence of application of critical knowledge

Level 1:

1. Misunderstood the task
2. Inappropriate, unworkable strategy
3. No evidence of carrying out a plan
4. No connections to solution
5. No evidence of critical knowledge
6. Blank

Scoring Rubric for Communications

Level 4:

1. A mechanism or system to display information or data. The display is appropriate, organized and effective.
2. Information or data is accurate and complete.
3. Opinions and conclusions are logical and communicated effectively.

Level 3:

1. Appropriate and organized system to display information or data.
2. Most information or data is accurate and complete.
3. Opinions and conclusions are logical and mostly understandable.

Level 2:

1. System to display information may not be clear or effective.
2. Display of information is somewhat accurate and complete.
3. Opinions and conclusions are somewhat understandable.

Level 1:

1. System to display information is disorganized.
2. Information or data is not accurate and complete.
3. Opinions and conclusions are not understandable.

Scoring Rubric for an Oral Report (use as a student guide and scoring rubric)

Expert/Proficient

- I considered my audience's interests in my introduction
- I used expression in my voice
- My content knowledge was apparent
- I used several sources accurately
- I used clear sentences with good transitions
- I was organized and presented information in sequential manner
- I used several visuals to support my content
- I learned new facts that I may use after the oral report
- I selected information that I thought was important for others to know
- I felt well-prepared to give this oral report

Competent

- I used an introduction that was interesting to me
- At times I used expression in my voice
- My content knowledge lacked detail
- I used a few sources accurately
- I used clear sentences
- I occasionally presented information out of sequence
- I used visuals without connecting the content
- I learned new facts for my oral report
- I selected information which interested me
- I felt somewhat prepared to give this oral report

Beginner

- My introduction lacked interest
- I spoke in a monotone most of the time
- I used little content knowledge
- I used one source of information
- My sentences seemed choppy
- Much of my report was out of sequence
- I used no visuals to support my information
- I learned little new information for my report
- I selected my sources and information randomly
- I felt I should have prepared more to give this report

* Holistic Rubric (G. Taggart and M. Wood)

Scoring Rubric for Written Report

Goals of Writing Presentation

- Writes an introduction paragraph which includes a statement of the main idea or theme and writes a summarizing paragraph.
- Develops the main idea or theme with appropriate and accurate examples and other supportive resources.
- Well-organized, logical paragraphs with clear transition sentences between each new supporting thought.
- Research and other supporting resources understood and clearly stated in author's own words.

Level 4:

1. Precise standard words, sentences.
2. All necessary detail for reader to make sense of written paper.
3. Effective organization.
4. Writing is clear, accurate, and interesting.
5. Includes multiple research sources.
6. Edited for spelling and other grammar usage.
7. The content is accurate.

Level 3:

1. Clear standard words, sentences.
2. Easily grasped information.
3. Clear and to the point in message.
4. Central point first and in logical order.
5. Organized.
6. Contains several references.
7. Edited but still contains some errors.
8. Most of the content is accurate.

Level 2:

1. Writing is understandable, organized and makes sense.
2. Writing represents an acceptable form.
3. Edited but contains some errors.
4. Contains repetitive information.
5. Somewhat difficult to follow.
6. Some of the content is accurate, but much of it is questionable.

Level 1:

1. General, vague topic.
2. Hard to follow and awkward.
3. Does not have complete thoughts.
4. Is in an illogical order.
5. Is missing a central point.
6. Is missing reference sources.
7. Is lacking any editing.
8. There are many inaccuracies in the content.