
LESSON PLAN HIGHLIGHTS

Purpose:

To inspire students to question environmental impacts through case studies and the scientific method.

Duration:

50 minutes

Setting:

Classroom visit by a Ranger

Materials Needed:

1. Pencils and paper
2. Laminated visual aids
3. Gold pan
4. Gold poke
5. Clear water bottles
6. Alka Seltzer
7. Large gravel
8. Ice cubes
9. Sugar cubes
10. Colored tic tacs
11. Small gravel
12. White shampoo
13. Small water pitchers

Washington State Science

Standards:

EALR 1: Systems

6-8 SYSF: The *natural* and *designed* world is complex; it is too large and complicated to *investigate* and comprehend all at once. Scientists and students learn to define small portions for the convenience of *investigation*. The units of *investigation* can be referred to as "*systems*."

EALR 2: Inquiry

6-8 INQA Question: Scientific *inquiry* involves asking and answering *questions* and comparing the answer with what scientists already know about the world.

Lesson Plan #2: Taming a River

Ranger Facilitated Classroom Visit

Objectives:

1. Students will gain background information on the Klondike Gold Rush and its role in changing the Yukon River.
2. Students will be able to describe how humans impact the environment and give specific examples.

Introduction:

For centuries, humans have been motivated to alter the environment. One of the major "pushes" to change the world we live in is the utilization of natural resources. But what results do these ventures have on the environment?

The National Park Service was created in 1916 not only to protect the nation's most treasured places, but to share the stories behind these resources. The National Park Service maintains almost 400 units. They go by a variety of names including, national parks, national monuments and national historical parks.

The Seattle Unit of the Klondike Gold Rush National Historical Park is one these protected sites. (A sister unit is located in Skagway, Alaska). The Klondike Gold Rush of 1897 and 1898 inspired 100,000 people to migrate to the Yukon Territory of Canada. This mass of people swarmed into the untouched wilds of the Yukon and immediately began impacting the environment around them. Only 15,000 people mined, but those "stampedeers" set the stage for decades of mining operation, the effects of which are still evident today.

This curriculum spans time and crosses borders while analyzing how mining operations affect on the environment. From fish to plants, water routes to soil composition, mining operations affect all the components that make up a healthy watershed.

LESSON PLAN HIGHLIGHTS CONT.

6-8 INQB Investigate: Different kinds of *questions* suggest different kind of scientific *investigations*.

EALR4: Life Science

6-8 LS2D: *Ecosystems* are continuously changing. Causes of these changes include nonliving *factors* such as the amount of light, range of temperatures, and availability of water, as well as living *factors* such as the disappearance of different *species* through disease, *predation*, *habitat* destruction and overuse of resources or the introduction of new *species*.

6-8 LS2E: *Investigations* of *environmental* issues should uncover factors causing the problem and relevant scientific *concepts* and the findings that may inform an *analysis* of different ways to address the issue.

Activity Outline: This Lesson Plan will be facilitated by a Ranger visiting your classroom.

Part One:

1. Ranger will introduce himself/herself, the National Park Service, and Klondike Gold Rush National Historical Park. Will also give an overview of the lesson and what students can expect.
2. Using visual aids, Rangers will discuss the composition of a watershed and the different components that make up that resource (wildlife, water quality, vegetation, permafrost). Ranger should make the connection that the watershed is a *system*.
3. Rangers will discuss mining techniques, both historical and current. Make sure to share how what different techniques miners use/used (dredges, bulldozers, chemicals). This section will not be in depth, the purpose is to give the students a sense of some of the human impacts on a watershed.
4. Tell students they will be using the scientific method to conduct their own watershed experiment.

Part Two

In the second part of this lesson, Rangers will review the upcoming experiment and use of the scientific method.

1. Give a brief introduction about the scientific method. Use an example.

Ask a question

Do the research

Develop a hypothesis

Conduct an experiment

Observe and record data

Draw your conclusion

Communicate the results

Part Three

In the third part of the lesson students will perform their experiment using the scientific method. Divide students into groups of four. Have the groups designate two “observers” and two “data recorders.” Pass out experiment materials evenly between the groups.

1. Describe the process of “altering” their watersheds. Emphasize that this is a step by step process.

2. Begin the experiment by addressing the first two SM steps.

Ask a question: You have already addressed this during the lecture.

- What impacts do mining operations have on rivers?

Do the research: You have already addressed this during the lecture.

- Gained background information through lectures and visual aids.

3. Students should now be able to complete the rest of the following SM steps while conducting the experiment.

Develop a hypothesis: Each group should develop a predication about what will happen to their river (changes course, river banks will become unstable). Rangers should make sure that the students predict what will happen to the balloon.

Conduct an experiment: Walk students through the process step by step.

Step 1: Put CO₂ (represented by Alka Seltzer) into the containers.

Step 2: Put in Permafrost (represented by ice cubes)

Step 3: Put in Frozen Muck (represented by big gravel)

Step 4: Put in Disturbed Soil (represented by sugar cubes)

Step 5: Put in Hard Metals, Cadmium (represented by colored tic tacs)

Step 6: Put in Loosened Riverbed (represented by smaller gravel)

Step 7: Put in Mercury (represented by shampoo)

Step 8: Put balloon on mouth of the water bottle

Step 9: Put in the River Water (represented by warm water)

Step 10: Put lid onto the bottle

Observe and record data: Make sure the two “recorders” and the two “observes” are doing their jobs.

Draw your conclusion: Have students collaborate within their groups to complete this step.

Communicate the results: Have groups select a presenter to share their findings/conclusion.

4. Conclude the lesson by asking the students why this information is significant. What is the “So What?” aspect. Reiterate the theme that our actions impact the world around us. Lead a short brainstorming session about how we can promote healthy rivers and watersheds in our communities.