



ENVIRONMENTAL SCIENCE

BYU Merit Badge PowWow

Official Merit Badge Worksheet

Scout's Name

Instructor's Name

Scout's Address

City

State

ZIP

Instructions

- 1) The Scout is to review the merit badge book before the first week of PowWow.
- 2) Bring this work sheet, paper, and pencil or pen each week.
- 3) **Bring a Merit Badge blue card with you on the second week.**

Requirement Instructions*

- 1) Requirements 1, 2, 3a, and 3b will be passed off during the first session of PowWow.
- 2) Requirements 3d, 3f, and 4 should be completed as **homework** between the sessions. Please share your poster with your troop.
- 3) Requirements 3c, 3e, 5, and 6 will be passed off during the second session of PowWow.

*** Due to possible time constraints at the PowWow, certain requirements that were originally planned to be completed in class may need to be completed as homework. Please LISTEN to ALL INSTRUCTIONS in class to be aware of any changes.**

Requirement 1

Initial

Use this area to make a timeline of the history of environmental science in America from the 1500's to 2000's.

Identify the contribution made by the Boy Scouts of America to environmental science. Include dates, names of people or organizations, and important events.

Requirement 2

Initial

Define the following terms:

Population:

Community:

Ecosystem:

Biosphere:

Symbiosis:

Niche:

Habitat:

Conservation:

Threatened Species:

Endangered Species:

Extinction:

Pollution Prevention:

Brownfield:

Ozone:

Watershed:

Airshed:

Nonpoint Source:

Hybrid Vehicle:

Fuel Cell:

Requirement 3

Initial

There are six categories in this requirement (A through F). You are required to choose *one* option for each category. We have recommended specific options that we feel can be accomplished within the time frame of the Merit Badge PowWow. Some of these options will be completed in the sessions on campus. Others will be demonstrated on campus, but you will be required to construct and complete them at home. Some requirements ask you to submit written reports to your counselor.

A. Ecology

Option 1:

Conduct an experiment to find out how living things respond to changes in their environments. Discuss your observations with your counselor and write a summary of what you learned on another sheet of paper.

Option 2:

Conduct an experiment illustrating the greenhouse effect. Keep a journal of your data and describe your conclusions below.

Option 3:

What is an ecosystem?

Tell how it is maintained in nature and how it survives.

B. Air Pollution

Option 1:

Perform an experiment to test for particulates that contribute to air pollution. Write a summary of your findings and discuss them with your counselor.

Option 2:

Record the trips taken, mileage, and fuel consumption of a family car for seven days, and calculate how many miles per gallon the car gets. Attach your findings to this sheet.

How many miles per gallon does the car get?

Determine whether any trips could have been combined (“chained”) rather than taken out and back. Using the idea of trip planning, determine how many miles and gallons of gas could have been saved in those seven days.

Miles:

Gallons of Gas:

Option 3:

Explain what acid rain is.

Tell how it affects plants and the environment and the steps society can take to help reduce its effects.

C. Water Pollution

Option 1:

Conduct an experiment to show how living things react to thermal pollution. Write a written summary of your findings and discuss it with your counselor.

Option 2:

Conduct an experiment to identify the methods that could be used to mediate (reduce) the effects of an oil spill on waterfowl. Make your observations while running the experiment. Discuss your results with your counselor.

Option 3:

Describe the impact of a waterborne pollutant on an aquatic community. Write a 100-word report on how the pollutant affected aquatic life, what the effect was, and whether the effect was linked to biomagnifications. Attach the report to this work sheet.

D. Land Pollution

Option 1:

Conduct an experiment to illustrate soil erosion by water. Take photographs or make a drawing of the soil before, during, and after your experiment, and make a poster showing your results with your drawings and appropriate labels. Show the poster to your counselor.

Option 2:

Perform an experiment to determine the effect of an oil spill on land. Share your journal and discuss your conclusions with your counselor.

Write a summary of what you learned on another sheet of paper.

Option 3:

Photograph an area affected by erosion. Share your photographs with your counselor.

Describe why the area has eroded and what might be done to help alleviate erosion.

E. Endangered Species

Option 1:

Do research on one endangered species found in your state. You may find a list of endangered species in Utah by accessing this Web site (with your parent's permission): <http://www.endangeredspecies.com/states/ut.htm>.

What endangered species did you select?

What is its natural habitat?

Why is it endangered?

What is being done to preserve it?

How many of these individual organisms are left in the wild?

On a separate sheet of paper, prepare a 100-word report about the organism, including a drawing. Show your report to your counselor for approval and report to your patrol, troop, or class.

Option 2:

Do research on one species that was endangered or threatened but which has now recovered.

What species did you select?

How did this species recover from being endangered?

What is the new status of this organism?

On a separate sheet of paper, prepare a 100-word report about the organism. Show your report to your counselor for approval and report to your patrol, troop, or class.

Option 3:

Work with a natural resource professional to identify two projects that have been approved to improve the habitat for a threatened or endangered species in your area.

Project 1:

Project 2:

Visit the site of one of these projects and report on what you saw.

Which project did you visit?

What did you see?

F. Pollution Prevention, Resource Recovery, and Conservation

Option 1:

Look around your home and determine 10 ways your family can help reduce pollution:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Practice at least two of these methods for seven days and describe what you learned.

Option 2:

Determine ten ways to conserve resources or use resources more efficiently in your home, at school, or at camp.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Practice at least two of these methods for seven days and discuss with your counselor what you have learned.

Option 3:

Perform an experiment on packaging materials to find out which ones are biodegradable. Explain your conclusions.

Requirement 4

Initial

Choose two outdoor study areas that are very different from one another (e.g., hilltop vs. bottom of a hill; field vs. forest; swamp vs. dry land). For BOTH study areas, do ONE of the following:

Study Area 1:

Study Area 2:

a) Mark off a plot of four square yards in each study area, and count the number of species found there.

Number of species for Area 1:

Number of species for Area 2:

Estimate how much space is occupied by each plant species for Area 1.

Estimate how much space is occupied by each plant species for Area 2.

List the type and number of nonplant species you find for Area 1.

List the type and number of nonplant species you find for Area 2.

Write a report that adequately discusses the biodiversity and population density of these study areas. Discuss your report with your counselor.

b) Make at least three visits to each of the two study areas for a total of six visits, staying for at least 20 minutes each time, to observe the living and nonliving parts of the ecosystem. Space each visit far enough apart that there are readily apparent differences in the observations. Keep a journal that includes the differences you observe. Show your journal to your counselor.

Write a short report that adequately addresses your observations, including how the differences of the study areas might relate to the differences noted, and show your report to your counselor.

Requirement 5

Initial

Using the construction project provided or a plan you create on your own, identify the items that would need to be included in an environmental impact statement for the project planned.

Requirement 6

Initial

Identify three possible careers in the field of environmental science. Give a brief description of each.

Career: Description:

Career: Description:

Career: Description:

Pick one and find out the education, training, and experience required for this profession.

Career:

Education/skills needed:

Explain why this profession might interest you.

Merit badge work sheets will not be accepted at the Council Office in place of the official Merit Badge Application Card. Those who do not complete all the requirements should take their partially completed merit badge work sheet and their official application card to their local merit badge counselors for completion.