



# Environmental Science

## Merit Badge Workbook

This workbook is not required but is designed to help you with this merit badge. No one can add or subtract from the Boy Scout Requirements #33215. Use page backs & add pages as needed. Please send comments to: [craig@craiglincoln.com](mailto:craig@craiglincoln.com). Requirements revised: 2006, Workbook updated: January 2006.

Scout's Name: \_\_\_\_\_ Unit: \_\_\_\_\_

Counselor's Name: \_\_\_\_\_ Counselor's Ph #: \_\_\_\_\_

### 1) Make a timeline of the history of environmental science in America.

1500	1600	1700	1800	1900	2000

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

**Date**      **Person or Organization**      **Event**

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

### 2) 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.** \_\_\_\_\_

**3) Do ONE activity in EACH of the following categories (using the activities in this pamphlet as the bases for planning and carrying out your projects):**

**A) Ecology**

1) Conduct an experiment to find out how living things respond to changes in their environments. Discuss your observations with your counselor. **-OR-**

2) Conduct an experiment illustrating the greenhouse effect. Keep a journal of your data and observations. Discuss your conclusions with your counselor. **-OR-**

3) Discuss what is an ecosystem. Tell how it is maintained in nature and how it survives.

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**B) Air Pollution**

1) Perform an experiment to test for particulates that contribute to air pollution. Discuss your findings with your counselor. **-OR-**

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

3) Explain what is acid rain. In your explanation, tell how it affects plants and the environment and the steps society can take to help reduce its effects.

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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



3) With your parent's and counselor's approval, 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. Visit the site of one of these projects and report on what you saw.

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**F) Pollution Prevention, Resource Recovery, and Conservation**

- 1) Look around your home and determine 10 ways your family can help reduce pollution. Practice at least two of these methods for seven days and discuss with your counselor what you have learned. **-OR-**
- 2) Determine 10 ways to conserve resources or use resources more efficiently in your home, at school, or at camp. Practice at least two of these methods for seven days and discuss with your counselor what you have learned. **-OR-**
- 3) Perform an experiment on packaging materials to find out which ones are biodegradable. Discuss your conclusions with your counselor.

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4) 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:

a. Mark off a plot of 4 square yards in each study area, and count the number of species found there. Estimate how much space is occupied by each plant species and the type and number of non-plant species you find.

**Study Plot** Location: \_\_\_\_\_ Number of Species: \_\_\_\_\_

Species	# Found	Space each occupies


Non-plant species type    Number

Non-plant species type    Number

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**-OR-**

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. Then, write a short report that adequately addresses your observations, including how the differences of the study areas might relate to the differences noted, and discuss this with your counselor.

**Visit 1 Date:** \_\_\_\_\_ **Time Started:** \_\_\_\_\_ **Time Ended:** \_\_\_\_\_

Observations of living parts: \_\_\_\_\_  
\_\_\_\_\_

Observations of nonliving parts: \_\_\_\_\_  
\_\_\_\_\_

Differences noted: \_\_\_\_\_  
\_\_\_\_\_

**Visit 2 Date:** \_\_\_\_\_ **Time Started:** \_\_\_\_\_ **Time Ended:** \_\_\_\_\_

Observations of living parts: \_\_\_\_\_  
\_\_\_\_\_

Observations of nonliving parts: \_\_\_\_\_  
\_\_\_\_\_

Differences noted: \_\_\_\_\_  
\_\_\_\_\_

**Visit 3 Date:** \_\_\_\_\_ **Time Started:** \_\_\_\_\_ **Time Ended:** \_\_\_\_\_

Observations of living parts: \_\_\_\_\_  
\_\_\_\_\_

Observations of nonliving parts: \_\_\_\_\_  
\_\_\_\_\_

Differences noted: \_\_\_\_\_  
\_\_\_\_\_

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Then, write a short report that adequately addresses your observations, including how the differences of the study areas might relate to the differences noted, and discuss this with your counselor. \_\_\_\_\_

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**5)** 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.

**6)** Find out about three career opportunities in environmental science.

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Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you. \_\_\_\_\_

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