



THE EDUCATION PROGRAM AT THE
NEW JERSEY SEA GRANT CONSORTIUM
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NJ Sea Grant Consortium NJSEAGRANT.ORG

BOY SCOUT ENVIRONMENTAL SCIENCE BADGE PRE-TRIP WORKSHEET

Troop Number & Town _____

Scout Name _____

Environmental Science Merit Badge Program at New Jersey Sea Grant Consortium (NJSGC)

To earn this merit badge, boy scouts will participate in a variety of activities and discussions about ecology and the many scientific disciplines that constitute environmental science.

During the Environmental Science Badge Program at NJSGC we hope to provide scouts with:

1. Knowledge of basic environmental science and marine science concepts, including ecology and biodiversity.
2. Identification of potential pollution sources, with analysis of cleanup techniques and options.
3. An understanding of endangered species and their habitats.
4. An evaluation of biodegradation as applied to everyday activities and materials.
5. An appreciation of how human actions can affect the environment, including coastal erosion.
6. The opportunity to experience field exploration and hands-on scientific activities, in order to more fully understand basic scientific concepts.

Getting Started on your Environmental Science Merit Badge:

This worksheet will introduce scouts to the various aspects of Environmental Science. and written responses satisfy BSA requirements 1, 2, 6, and part of 5. **Scouts must complete this packet before attending the Environmental Science badge program at NJSGC.** They may work on the packet together with their troop or work independently. All scouts must hand the completed packet to their merit badge counselor at the beginning of the program. The remaining BSA requirements will be covered in the NJSGC class at Sandy Hook.

To complete this Worksheet, first read the Boy Scouts of America Merit Badge Series: Environmental Science. *This is where the answers are!* You may also wish to visit your local library or the internet.

Some environmental science websites that may also help you learn more about these topics are:

Oil Spill Impacts: <http://oceanservice.noaa.gov/facts/oilimpacts.html>

Careers: <http://www.epa.gov/careers/>

Biodegradable packaging: http://www.epa.gov/wastes/conservation/foodwaste/docs/reducing_wasted_food_pkg_tool.pdf. See also <http://marinedebrisolutions.com/Main-Menu/Sources-of-Marine-Debris/What-NOAA-Says.html>

Acid Rain: <http://www.epa.gov/acidrain/>

Biodiversity: <http://www.nwf.org/Wildlife/Wildlife-Conservation/Biodiversity.aspx>

Environmental Impact Statements: <http://www.epa.gov/compliance/basics/nepa.html> . See also www.nature.nps.gov/protectingrestoring/do12site/04_EISs/045_EISformat.htm

All BSA Environmental Science Badge requirements will be completed during this program at NJSGC **EXCEPT** Requirement 4A, the Ecosystem Report analyzing comparative plant species. Details about this Report will be provided at the program. Scouts should complete this Report, using NJSGC data, at home *after* the program, and submit their written Report to Jody Sackett, NJSGC Merit Badge Counselor. When all badge requirements have been met, the scout's signed BSA Blue Card will be mailed to them. **Please contact Jody Sackett, Scout Program Coordinator at the NJSGC 732-872-1300 x 20 or JSackett@njseagrant.org with any questions.**

The Earth from space.



1. **Environmental History Timeline**. Make a timeline graph of the history of environmental science in America. Identify the contribution made by the Boy Scouts of America to environmental science. Include dates, names of people or organizations, and important events.

Draw the Environmental History Timeline ON THE BACK of this page.

Use the Boy Scouts of America Merit Badge Series: Environmental Science book for reference.

2. Definitions. Environmental Science uses a lot of unique scientific terms. **Define the following terms:**

Population: _____

Community: _____

Ecosystem: _____

Biosphere: _____

Symbiosis: _____

Niche: _____

Habitat: _____

Conservation: _____

Threatened Species: _____

Endangered Species: _____

Extinction: _____

Pollutants: _____

Pollution Prevention: _____

Brownfield: _____

Ozone: _____

Watershed: _____

Airshed: _____

Nonpoint source: _____

Hybrid Vehicle: _____

Acid Rain: _____

3. Oil Spills.

Oil spills result from damage to petroleum cargo ships, deep-sea oil rigs, or oil pipeline breaks in the ocean; and on land, oil spills result from petroleum transport truck damage, accidents at petroleum processing plants, pipeline leaks, and other similar events. Wildlife and their habitats can be affected in many ways, depending upon the type and amount of oil spilled, the environment where the oil spill occurred, and ; the season and weather. In the ocean, the extent of oil spill damage also depends upon the type of shoreline and ocean bottom; the tides; and the type of waves in the area. Large oil spills can take decades to recover from.

Name five things that would be affected by an oil spill in the *ocean*.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

Name five things that would be affected by an oil spill on *land*.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

What are five ways to clean up an oil spill?

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

4. **Air Pollution.** Air pollution is when contaminants enter the atmosphere. While some contaminants are natural, such as volcanic ash, often human actions from manufacturing or automobiles can cause pollution as well.

Name three specific kinds of Air Pollution.

- 1. _____
- 2. _____
- 3. _____

What is the Greenhouse Effect? Describe.

5. **Water Pollution.** Water is essential to life on earth. However, water may be contaminated through direct pollution sources, such as a factory wastewater discharge into a river, or indirectly, such as rainwater runoff from a barnyard. Toxic pollution can cause immediate damage, while increased nutrients from farm or lawn fertilizers may result in long-term damage due to insufficient oxygen for supporting aquatic life.

Name five kinds of water pollution.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

6. Environmental Impact Statements (EIS): An EIS is a report that analyzes the positive and negative effects of a proposed project to help in decision-making. This includes such factors as whether any endangered species will be affected; if there could there be impacts to air or water quality; would there be any historic, cultural, or native American impacts; would wetlands be damaged; and are there any social or economic effects on local communities. This analysis ensures that the *environmental* costs of a new project will be considered *before* the project is built, along with typical project costs such as construction , planning, and maintenance expenses. If the EIS concludes there are too many damaging environmental impacts, the project will either be changed or won't be built.

At our NJSGC program, we will be analyzing EIS factors for a small walking bridge at Horseshoe Cove. This is a real-life situation. The old bridge connected the Sandy Hook “mainland” with a small Cove peninsula. Visitors walked over the bridge for additional swimming areas or to explore the beach. Drainage pipes underneath allowed the bay water to flow in and out of the tidal pool located in the adjacent salt marsh, an environmentally-sensitive area with endangered species. Superstorm Sandy washed the bridge away. The Park Service has proposed to replace this bridge with a similar structure. The bridge is about 75’ long, 8’ wide, and is made of boards over a concrete culvert and stone rip-rap.



Name some factors that we should address in this EIS, when considering whether or not to build the new bridge.

What impacts do you think could prevent this bridge from being built?

What are the potential benefits of this bridge? These are reasons why the new bridge should be built.

Can you think of any alternatives? An EIS requires analysis of alternatives.

Note: We will see this actual site during the Environmental Science class at NJSGC.

7. Environmental Career Opportunities:

Find out about 3 career opportunities in environmental science. *List 3 careers, and give a brief description of each.*

1. _____
2. _____
3. _____

Pick one environmental career and learn about the education, training, and experience required for this profession. Why do you like this one?

Please make sure you give this completed worksheet (and your Blue Card) to your NJSGC Merit Badge Counselor when you arrive at Sandy Hook for the Environmental Science program.