



Environmental Science

Merit Badge Workbook



The requirements shown in this workbook were issued in 2016 and were in effect until changes were made in 2020 and should be used only by Scouts who started work on the merit badge during that period. The current requirements were issued (revised) in 2020.

.Merit Badge Counselors may not require the use of this or any similar workbooks.

You must satisfy your counselor that you can demonstrate each skill and have learned the information. You should use the work space provided for each requirement to keep track of which requirements have been completed, and to make notes for discussing the item with your counselor, not for providing full and complete answers.

If a requirement says that you must take an action using words such as "discuss", "show", "tell", "explain", "demonstrate", "identify", etc, that is what you must do.

No one may add or subtract from the official requirements found in Scouts BSA Requirements (Pub. 33216) and/or on Scouting.org

Scout's Name: _____ Unit: _____

Counselor's Name: _____ Counselor's Phone No.: _____

Please submit errors, omissions, comments or suggestions about this **workbook** to: Workbooks@USScouts.Org
Comments or suggestions for changes to the **requirements** for the **merit badge** should be sent to: Merit.Badge@Scouting.Org

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

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| 1500s | |
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| 1600s | |
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2000s

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

| Date | People/Organizations | Event |
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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.

Population:

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Community:

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Ecosystem:

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Biosphere:

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Habitat:

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Conservation:

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Threatened species:

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Endangered species:

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Extinction

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Pollution prevention:

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Brownfield:

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Ozone:

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Watershed:

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Airshed:

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Nonpoint source:

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- 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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c. Water Pollution

- 1. Conduct an experiment to show how living things react to thermal pollution. Discuss your observations with your counselor.
- 2. Conduct an experiment to identify the methods that could be used to mediate (reduce) the effects of an oil spill on waterfowl. Discuss your results with your counselor.
- 3. Describe the impact of a waterborne pollutant on an aquatic community. Write a 100-word report on how that pollutant affected aquatic life, what the effect was, and whether the effect is linked to biomagnification.

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d. Land Pollution

- 1. Conduct an experiment to illustrate soil erosion by water. Take photographs or make a drawing of the soil before and after your experiment, and make a poster showing your results. Present your poster to your patrol or troop. (Per National, "troop" means "unit".)

| Non-Plant Species | Number found |
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Study Plot Location 2: _____ Number of Species: _____

| Plant Species | Space each occupies |
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| Non-Plant Species | Number found |
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- 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

Study Area 1:

Visit 1 Date: _____ **Time Started:** _____ **Time Ended** _____

Observations of living parts:

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Observations of nonliving parts:

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Differences noted:

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

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Pick one and explain how to prepare for such a career.

Discuss with your counselor what education and training are required, and explain why this profession might interest you.

Education

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Training

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Why this profession might interest you.

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| <p>Requirement resources can be found here: http://www.meritbadge.org/wiki/index.php/Environmental_Science#Requirement_resources</p> |
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Important excerpts from the [Guide To Advancement - 2013](#), No. 33088 (SKU-618673)

[1.0.0.0] — Introduction

The current edition of the *Guide to Advancement* is the official source for administering advancement in all Boy Scouts of America programs: Cub Scouting, Boy Scouting, Varsity Scouting, Venturing, and Sea Scouts. It replaces any previous BSA advancement manuals, including *Advancement Committee Policies and Procedures*, *Advancement and Recognition Policies and Procedures*, and previous editions of the *Guide to Advancement*.

[Page 2, and 5.0.1.4] — Policy on Unauthorized Changes to Advancement Program

No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements. There are limited exceptions relating only to youth members with special needs. For details see section 10, "Advancement for Members With Special Needs".

[Page 2] — The "Guide to Safe Scouting" Applies

Policies and procedures outlined in the *Guide to Safe Scouting*, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects.

[7.0.3.1] — The Buddy System and Certifying Completion

A youth member must not meet one-on-one with an adult. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative—or better yet, another Scout working on the same badge—along with him attending the session.

When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult verification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.

Note that from time to time, it may be appropriate for a requirement that has been met for one badge to also count for another. See "Fulfilling More Than One Requirement With a Single Activity," 4.2.3.6.

[7.0.3.2] — Group Instruction

It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways or similar events. Interactive group discussions can support learning. The method can also be attractive to "guest experts" assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

There must be attention to each individual's projects and his fulfillment of *all* requirements. We must know that every Scout—actually and *personally*—completed them. If, for example, a requirement uses words like "show," "demonstrate," or "discuss," then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions.

It is sometimes reported that Scouts who have received merit badges through group instructional settings have not fulfilled all the requirements. To offer a quality merit badge program, council and district advancement committees should ensure the following are in place for all group instructional events.

- Merit badge counselors are known to be registered and approved.
- Any guest experts or guest speakers, or others assisting who are not registered and approved as merit badge counselors, do not accept the responsibilities of, or behave as, merit badge counselors, either at a group instructional event or at any other time. Their service is temporary, not ongoing.
- Counselors agree not to assume prerequisites have been completed without some level of evidence that the work has been done. Pictures and letters from other merit badge counselors or unit leaders are the best form of prerequisite documentation when the actual work done cannot be brought to the camp or site of the merit badge event.
- There is a mechanism for unit leaders or others to report concerns to a council advancement committee on summer camp merit badge programs, group instructional events, and any other merit badge counseling issues—especially in instances where it is believed BSA procedures are not followed. See "Reporting Merit Badge Counseling Concerns," 11.1.0.0.
- There must be attention to each individual's projects and his fulfillment of all requirements. We must know that every Scout—actually and *personally*—completed them.

[7.0.3.3] — Partial Completions

A Scout need not pass all the requirements of one merit badge with the same counselor. It may be that due to timing or location issues, etc., he must meet with a different counselor to finish the badge. The Application for Merit Badge has a place to record what has been finished—a "partial." In the center section on the reverse of the blue card, the counselor initials for each requirement passed. In the case of a partial completion, the counselor does not retain his or her portion of the card. A subsequent counselor may choose not to accept partial work, but this should be rare. A Scout, if he believes he is being treated unfairly, may work with his unit leader to find another counselor. An example for the use of a signed partial would be to take it to camp as proof of prerequisites. Partials have no expiration except the Scout's 18th birthday. Units, districts, or councils shall not establish other expiration dates for partial merit badges.

[7.0.4.8] — Unofficial Worksheets and Learning Aids

Worksheets and other materials that may be of assistance in earning merit badges are available from a variety of places including unofficial sources on the Internet and even troop libraries. Use of these aids is permissible as long as the materials can be correlated with the current requirements that Scouts must fulfill. Completing "worksheets" may suffice where a requirement calls for something in writing, but this would not work for a requirement where the Scout must discuss, tell, show, or demonstrate, etc. Note that Scouts shall not be required to use these learning aids in order to complete a merit badge.