



Environmental Science MB (Eagle-Required) Candidate **Prep** List

NOTE: This MB requires Scout to have **written (TYPED preferred)** materials prepared & submitted ***in advance*** of the first online session

NUMBERS = Requirements (revised 2020) *are not in order*, but are as numbered as in MB book
ITEMS IN RED = *>Counselor's comments*

- BEFORE you begin this MB ... READ & understand the entire **MB BOOK**

NOTE: ALL six (6) requirements will be COMPLETED IN WRITING and SUBMITTED via Google Classroom the **DAY BEFORE the first session**. During each of the online sessions, each Scout will be required to *explain, describe, discuss, etc.* his/her written submissions. Each Scout must participate in the online discussion **each session** to receive credit for the requirements covered in that session.

Requirements 4 & 3 will each be discussed separately in Sessions 1, 2 & 3 respectively.

Requirements 1, 2, 5 & 6 will be discussed as time allows during any of the 3 online sessions.

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Requirements (rev. 2020) >>> Read ALL the req. before beginning this MB. Note that some are weather-dependent (#4) and others involve 7-day experiments (#3). Be sure to plan enough time to do the projects and write & submit the reports in advance.

SESSION #1 ~ discussion based on written submissions for #s 1 & 2;
directions will be provided for #s 4, 5 & 6

1. Make a time line 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. *>Submit your time line in writing. Be ready to explain your time line during the session.*

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. *>Submit your definitions in writing. Be prepared to correctly use each term during the session.*

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. **Report** to your counselor orally or **in writing** the biodiversity and population density of these study areas.
- (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 non- living 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. Discuss your observations with your counselor. *>Submit your journal in writing.*

*Get started on this requirement **AS SOON AS YOU REGISTER** for this MB. Once there is a hard frost, most insects and animals will disappear ... leaving you no data to report.*

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. *>Look online or in newspaper for local project.*

6. Find out about **three career opportunities** in environmental science. **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. *>Submit your research in writing. Be prepared to discuss your career choice during the session.*

All SESSIONS ~ discussion based on written submissions

3. Do **ONE** activity from **seven** of the **eight** following categories (using the activities in this pamphlet as the basis for planning and projects): *> TOTAL of 7 projects. Submit your 7 projects in writing. Be ready to discuss any of your 7 during these sessions.*

(a) **Ecology**

- (1) Conduct an **experiment** to find out how living things **respond to changes in their environments**. Discuss your observations with your counselor.
- (2) Conduct an **experiment** illustrating the **greenhouse effect**. **Keep a journal** of your data and observations. Discuss your conclusions with your counselor.
- (3) Discuss what is an ecosystem. Tell how it is maintained in nature and how it survives.

(b) **Air Pollution**

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

(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.

(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 counselor.
- (2) Perform an **experiment** to determine the effect of an oil spill on land. Discuss your conclusions with your counselor.
- (3) **Photograph** an area affected by erosion. Share your photographs with your counselor and discuss why the area has eroded and what might be done to help alleviate the erosion.

(e) **Endangered Species**

- (1) Do **research** on one endangered species found in your state. Find out what its natural habitat is, why it is endangered, what is being done to preserve it, and how many individual organisms are left in the wild. Prepare a **100-word report** about the organism, including a drawing. **Present your report** to your patrol or troop.
- (2) Do **research** on one species that was endangered or threatened but that has now recovered. Find out how the organism recovered, and what its new status is. Write a **100-word** report on the species and discuss it with your counselor.
- (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.

(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.
- (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.
- (3) Perform an **experiment** on packaging materials to find out which ones are biodegradable. Discuss your conclusion with your counselor.

(g) **Pollination**

(1) Using **photographs or illustrations**, point out the **differences** between a drone and a worker bee. Discuss the **stages of bee development** (eggs, larvae, pupae). Explain the pollination process, and what propolis is and how it is used by honey bees. Tell how bees make honey and beeswax, and how both are harvested. Explain the part played in the life of the hive by the queen, the drones, and the workers.

(2) Present to your counselor a **one-page report** on how and why honey bees are used in pollinating food crops. In your report, discuss the problems faced by the bee population today, and the impact to humanity if there were no pollinators. **Share your report** with your troop or patrol, your class at school, or **another group approved by your counselor**.

(3) **Hive a swarm OR divide at least one colony** of honey bees. Explain how a hive is constructed.

(h) **Invasive Species**

(1) Learn to **identify** the major invasive plant species in your community or camp and explain to your counselor what can be done to either eradicate or control their spread.

(2) Do **research** on two invasive plant or animal species in your community or camp. Find out where the species originated, how they were transported to the United States, their life history, how they are spread, and the recommended means to eradicate or control their spread. **Report your research** orally or in writing to your counselor.

(3) Take part in a **project of at least one hour** to eradicate or control the spread of an invasive plant species in your community or camp.

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NOTE: Scouts must participate verbally during each online session to receive credit for the requirements discussed. If a Scout has not submitted the written material in advance, he/she will need to post a lengthy report for each item to substitute for the *EXPLAIN/DISCUSS* portion of each requirement.