

Environmental Science

Merit Badge

Camp Activities Workbook

Camp Somers....Winnebago S.R.....Sabattis

scout

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Counselor notes:

This workbook is designed to help Scouts successfully complete the requirements for

Environmental Science Merit Badge at Scout camp. The activities in the workbook are designed to provide knowledge and experiences leading to completion of the merit badge in one week if the scouts have completed the suggested at-home activities included in the on-line Environmental Science Merit Badge Workbook developed by the camp staff and the PPC Conservation Committee.

***Prepared by the camp staff and the PPC Conservation Committee**

Requirement #3D : Land Pollution

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***it is suggested that this requirement be completed at camp with the following activities under the guidance of the ecology camp staff.**

(1) Conduct an experiment to illustrate soil erosion by water. (page 64 in ESMB book).

Describe Box #1:

Describe Box #2:

Describe Box #3:

The same amount of water was sprinkled through each box and collected Describe the results.....

Box 1: bare soil- water collected _____ color of water _____

Explain:

Box 2: newspaper or leaf mixture in soil- water collected _____ color of water _____

Explain:

Box 3: soil covered by growing grass- water collected _____ color of water _____

Explain:

1.How can the observations made in this experiment be useful in preventing soil erosion at private homes or at construction sites?

Counselor: _____

2. Soil erosion is the largest and perhaps most destructive type of water pollution in the United States. Why is soil erosion so disruptive to aquatic ecosystems?

- a. adds nutrients, causing growth of destructive algae
- b. covers water habitats with silt (sediments)
- c. growth of destructive algae kills fish and other aquatic organisms such as clams and oysters
- d. reduces quality of ecosystem from which it comes
- e. carries other pollutants into streams and lakes (manure, fertilizers, etc.)

***your counselor will have some demonstrations relating to this topic**

Counselor: _____

(2) On a hike around your camp, find examples of the types of erosion common where human activities often cause them. **2**

1. Sheet erosion: often occurs on heavily trafficked foot or vehicle paths. Describe.....

Prevention or reduction?

2. Gully erosion: associated with steep hillsides where rapidly flowing water creates gullies....

Prevention or reduction?

3. Splash erosion: the impact of falling water removing soil in a small area.....sometimes by a building gutter or roof drainage.

Prevention or reduction?

(3) While observing a river or stream, what evidence of upstream soil erosion might be observed?

(3) On a worldwide scale, why is soil erosion so important a topic of concern?

Counselor: _____

Requirement 3 F:Resource Recovery and Conservation

*** Your counselors will have several demonstrations relating to this topic**

Counselor: _____

Requirement #4: Choose two outdoor study areas that are very different from one another (e.g. hilltop vs. bottom of hill, field vs. forest; swamp vs. dry land).

***suggested activity provided at camp. Instruction , scientific measuring supplies, and training will be provided.**

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 . 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.

***use the observations workbook pages to complete this requirement.**

***try to "Leave No Trace" that you observed this study area**

4B. Comparing Two Different Ecosystems: Upland Forest and Swamp or Lake Edge

***the upland forest study will be made with a counselor in a group.**

***visits 2 and three will be made individually or in co-operative groups**

***the study kits may be checked out for use from counselors.**

Visit 1: Forest- Date _____ Time:_____ Humidity: on ground _____%, at about 6 ft. _____%

Temperatures: _____ 6 ft., _____ 3 ft., _____ on ground, _____ soil temp.

Light: estimate the amount of light reaching the forest floor: _____ 25%, _____ 50%, _____ 75%

Weather : _____ **Slope:** _____ **Erosion:** _____

Forest Floor: _____ relatively covered with green plants, _____ bare soil , _____ ferns, _____ moss , _____ small herbs , _____ vines , _____ grass, _____ mostly litter (dead leaves, twigs)

Ground litter: Use a hand trowel to slowly push aside the soil litter. As you go deeper how does the litter change? Are there any organisms?

Water present: _____ puddles from rain, _____ open water nearby, _____ wet spongy soil present

Sounds:

What are the dominant plants of the forest floor in your observation area? _____

1. Are any of the plants obvious food sources for birds and animals?

What tree species are present? _____

1. What tree species was in greatest numbers?

2. What was the circumference (_____ inches) and diameter (inches _____) of the largest tree within 20 paces of the study area?

3. Are tree seedlings present? _____ What kinds? _____

What decomposers are present? _____

(bacteria, fungus)

Record any observations of wildlife or signs of wildlife. ...use checklist and notes.

___ birds/ sounds ___ animal burrow ___ insects/ sounds ___ nuts open and eaten

___ nests in trees ___ woodpecker holes ___ bones/carcasses ___ insect damage

Notes:

Counselor: _____

Visit 2: Forest Date: _____ Time: _____ Counselor: _____ Humidity on ground _____% , at about 6 ft. _____%

Temperatures: _____ F; 6ft., _____ F; 3 ft., _____ F; on ground: _____ F : soil temperature _____ F

Weather: _____

Sounds:

Animal organisms observed:

Visit 3: Forest Date: _____ Time: _____ Counselor: _____ Humidity on ground _____% at about 6 ft. _____%

Temperatures: _____ F; 6ft., _____ F; 3 ft., _____ F; on ground: _____ F : soil temperature _____ F

Weather: _____

Sounds:

Animal organisms observed:

(Second study area) : Describe the ecosystem _____

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***the second study may be made with a counselor in a group or made individually or in co-operative groups.**

Visit 1: _____ - Date _____ Time: _____ Humidity: on ground _____%, at about 6 ft. _____%

Temperatures: _____ 6 ft., _____ 3 ft., _____ on ground, _____ soil temp

Light: estimate the amount of light reaching the ecosystem floor: _____ 25%, _____ 50%, _____ 75% _____ 100%

Weather ?: _____ **Slope:** _____ **Erosion?:** _____

Water present: _____ puddles from rain, _____ open water nearby, _____ wet spongy soil present

On ground : _____ relatively covered with green plants , _____ mostly bare soil , _____ ferns present, _____ moss , _____ small herbs, _____ vines, _____ grass, _____ mostly litter (dead leaves,twigs)

Ground litter: Use a hand trowel to slowly push aside the soil litter. As you go deeper how does the litter change? Are there any organisms?

Record any observations of wildlife or signs of wildlife. . .use checklist and notes.

____ birds/ sounds _____ animal burrow _____ insects/ sounds _____ nuts open and eaten

____ nests in trees _____ woodpecker holes _____ bones/carcasses _____ insect damage

Sounds:

Notes:

What are the dominant plants of the ground in your observation area? _____

1. Are any of the plants obvious food sources for birds and animals?

What tree species are present? _____

1. What tree species was in greatest numbers?

2. What was the circumference (_____ inches) and diameter (inches _____) 7

of the largest tree within 20 paces of the study area?

3. Are tree seedlings present? _____ What kinds? _____

What decomposers are present? _____

Counselor: _____

Visit 2: _____ Date: ___ Time: ___ Counselor: ___ Humidity on ground _____% at about 6 ft. _____%

Temperatures: ___ F; 6ft., ___ F; 3 ft., ___ F; on ground: ___ F : soil temperature _____ F

Weather: _____

Sounds:

Animal organisms observed:

Visit 3: _____ Date: ___ Time: ___ Counselor: ___ Humidity on ground _____% at about 6 ft. _____%

Temperatures: ___ F; 6ft., ___ F; 3 ft., ___ F; on ground: ___ F : soil temperature _____ F

Weather: _____

Sounds:

Animal organisms observed:

Analysis of Observations: Compare the two study sites.....

1. How were the non-living components of the two observed areas different?

Temperature ranges:

Humidity ranges:

Sunlight:

Slope, rocks, soil, ????

Other.....

2. Were the plants present different in the two study areas? If so, how might you explain this?
3. Was animal life observed different in the two study areas? If so, might non-living conditions be responsible?
(types, numbers)
4. Why is humidity important to some organisms?
5. Describe three ways forest litter is important to the ecosystem?
 - 1.
 - 2.
 - 3.
6. Did the time of day make a difference in any organisms observed?
7. How might slope affect the ecosystem?
8. Leave no trace means leaving a natural area the same way you found it or better.
*Did you observe any signs of previous scouts or others using your study areas? Describe...

Requirement #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.

Suggested projects for examination at camps....

Allamuchy/ Camp Somers.....new shower house facility, or new dam.

Winnebago S.R.....new dining hall extension, enlarged parking lot.

Sabattis.....

Environmental Impact Assessment

a. What type of ecosystem is at the site or nearby enough to be affected?

b. What types of plants dominate the area?

What kinds of animals would be expected to be present over a period of time?

c. Has the project site been previously disturbed by human activity? Describe.

d. Is the site a habitat for threatened or endangered species? How would you know?

e. Are there streams, wetlands, lakes present or nearby that could be affected? Explain....

f. Is the land sloped? Could soil erosion occur affecting nearby waters

g. Is the site of historical or natural significance? How would you find out?

h. Would nearby buildings , roads, or other activities be affected?

i. Are there alternatives to the planned project? Have they been evaluated?

j. Is the site or the project subject to local zoning restrictions, or to state or federal regulations relating to water quality, wildlife protection, or other environmental considerations? **10`**

k. What local and state permits must be obtained to go forward with the project?

Township?

NJDEP?

EPA?