



Scoutmaster Bucky

ENVIRONMENTAL SCIENCE

Merit Badge Workbook

This Workbook has been developed to help aid in organizing notes and references while working on the Environmental Science Merit Badge Requirements.

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SCOUT'S INFORMATION	MERIT BADGE COUNSELOR INFORMATION
Name _____	Name _____
Phone _____	Address _____
Organization _____	City State Zip _____
WORKBOOK INFORMATION	Phone _____
Scoutmaster Bucky Workbook based off of <i>Boy Scout Requirements – 2011 Edition</i>	Mobile _____
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WORKBOOK STARTS ON NEXT PAGE



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REQUIREMENT 1: MAKE A TIMELINE OF THE HISTORY OF ENVIRONMENTAL SCIENCE IN AMERICA. IDENTIFY THE CONTRIBUTIONS MADE BY THE BOY SCOUTS OF AMERICA TO ENVIRONMENTAL SCIENCE. INCLUDE DATES, NAMES OF PEOPLE OR ORGANIZATIONS, AND IMPORTANT EVENTS.

	Date	Name	Event
1800	_____	_____	_____
1810	_____	_____	_____
1820	_____	_____	_____
1830	_____	_____	_____
1840	_____	_____	_____
1850	_____	_____	_____
1860	_____	_____	_____
1870	_____	_____	_____
1880	_____	_____	_____
1890	_____	_____	_____
1900	_____	_____	_____
1910	_____	_____	_____
1920	_____	_____	_____
1930	_____	_____	_____
1940	_____	_____	_____
1950	_____	_____	_____
1960	_____	_____	_____
1970	_____	_____	_____
1980	_____	_____	_____
1990	_____	_____	_____
2000	_____	_____	_____
2010	_____	_____	_____



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REQUIREMENT 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:

Community:

Ecosystem:

Biosphere:

Symbiosis:



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Niche:

Habitat:

Conservation:

Threatened Species:

Endangered Species:

Extinction:



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Pollution Prevention:

Brownfield:

Ozone:

Watershed:

Airshed:

Nonpoint Source:



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Hybrid Vehicle:

Fuel Cell:

DO ONE ACTIVITY FROM EACH OF THE FOLLOWING CATEGORIES (USING THE ACTIVITIES IN THIS [THE MERIT BADGE PAMPHLET] PAMPHLET AS THE BASIS FOR PLANNING AND PROJECTS):



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DO ONE OF THE FOLLOWING (3A1, 3A2, OR 3A3) IN REQUIREMENT 3A - ECOLOGY

REQUIREMENT 3A1: CONDUCT AN EXPERIMENT TO FIND OUT HOW LIVING THINGS RESPOND TO CHANGES IN THEIR ENVIRONMENTS. DISCUSS YOUR OBSERVATIONS WITH YOUR COUNSELOR.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:



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REQUIREMENT 3A2: CONDUCT AN EXPERIMENT ILLUSTRATING THE GREENHOUSE EFFECT. KEEP A JOURNAL OF YOUR DATA AND OBSERVATIONS. DISCUSS YOUR CONCLUSIONS WITH YOUR COUNSELOR.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:



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REQUIREMENT 3A3: DISCUSS WHAT IS AN ECOSYSTEM. TELL HOW IT IS MAINTAINED IN NATURE AND HOW IT SURVIVES.

What is an ecosystem

Notes:

How an Ecosystem is maintained and how it survives

Notes:



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DO ONE OF THE FOLLOWING (3B1, 3B2, OR 3B3) IN REQUIREMENT 3B - AIR POLLUTION

REQUIREMENT 3B1: PERFORM AN EXPERIMENT TO TEST FOR PARTICULATES THAT CONTRIBUTE TO AIR POLLUTION. DISCUSS YOUR FINDINGS WITH YOUR COUNSELOR.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:



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REQUIREMENT 3B2: 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.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Trip 1 Total miles	_____	_____	_____	_____	_____	_____	_____
Total gallons used	_____	_____	_____	_____	_____	_____	_____
Trip 2 Total miles	_____	_____	_____	_____	_____	_____	_____
Total gallons used	_____	_____	_____	_____	_____	_____	_____
Trip 3 Total miles	_____	_____	_____	_____	_____	_____	_____
Total gallons used	_____	_____	_____	_____	_____	_____	_____
Trip 4 Total miles	_____	_____	_____	_____	_____	_____	_____
Total gallons used	_____	_____	_____	_____	_____	_____	_____
Trip 5 Total miles	_____	_____	_____	_____	_____	_____	_____
Total gallons used	_____	_____	_____	_____	_____	_____	_____
Trip 6 Total miles	_____	_____	_____	_____	_____	_____	_____
Total gallons used	_____	_____	_____	_____	_____	_____	_____
Trip 7 Total miles	_____	_____	_____	_____	_____	_____	_____
Total gallons used	_____	_____	_____	_____	_____	_____	_____
Miles per gallon	_____	_____	_____	_____	_____	_____	_____



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REQUIREMENT 3B2: DETERMINE WHETHER ANY TRIPS COULD HAVE BEEN COMBINED ("CHAINED") RATHER THAN TAKEN OUT AND BACK.

Notes:

REQUIREMENT 3B2: USING THE IDEA OF TRIP CHAINING, DETERMINE HOW MANY MILES AND GALLONS OF GAS COULD HAVE BEEN SAVED IN THOSE SEVEN DAYS

Notes:



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REQUIREMENT 3B3:

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.

Notes:



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DO ONE OF THE FOLLOWING (3C1, 3C2, OR 3C3) IN REQUIREMENT 3C - WATER POLLUTION

REQUIREMENT 3C1: CONDUCT AN EXPERIMENT TO SHOW HOW LIVING THINGS REACT TO THERMAL POLLUTION. DISCUSS YOUR OBSERVATIONS WITH YOUR COUNSELOR.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:



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REQUIREMENT 3C2: 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.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:



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REQUIREMENT 3C3:

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.

Notes:



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DO ONE OF THE FOLLOWING (3D1, 3D2, OR 3D3) IN REQUIREMENT 3D - LAND POLLUTION

REQUIREMENT 3D1: 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.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:

Make a poster showing your results.



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REQUIREMENT 3D2: PERFORM AN EXPERIMENT TO DETERMINE THE EFFECT OF AN OIL SPILL ON LAND. DISCUSS YOUR CONCLUSIONS WITH YOUR COUNSELOR.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:



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REQUIREMENT 3D3: PHOTOGRAPH AND 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.

Notes:



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DO ONE OF THE FOLLOWING (3E1, 3E2, OR 3E3) IN REQUIREMENT 3E - ENDANGERED SPECIES

REQUIREMENT 3E1: 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

Endangered Species:

Species' Natural Habitat:

Why is it Endangered?:



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What is being done to preserve it?:

How many still exist in the wild?:



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100-word report on the Endangered Species (include a drawing):

Patrol or Troop
Presentation _____

Presentation Date: _____



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REQUIREMENT 3E2: DO RESEARCH ON ONE SPECIES THAT WAS ENDANGERED OR THREATENED BUT WHICH 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.

Endangered or Threatened Species:

How the organism recovered:

What is its new status?:



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100-word report on the Endangered or Threatened Species:



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REQUIREMENT 3E3: 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.

_____	_____
Parent's or Guardian's Name	Phone
_____	_____ <input type="checkbox"/> Approved
Parent's or Guardian's Signature	Date
_____	_____
Counselor's Name	Phone
_____	_____ <input type="checkbox"/> approved
Counselor's Signature	Date

Natural Resource Professional's Name _____

Association: _____

Meeting Date and Place: _____

Project #1: _____

Location: _____

Notes:



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Project #2:

Location:

Notes:

Visited Project:

Location:

Date Visited:

What you saw Notes:



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DO ONE OF THE FOLLOWING (3F1, 3F2, OR 3F3) IN REQUIREMENT 3F
– POLLUTION PREVENTION, RESOURCE RECOVERY AND CONSERVATION

REQUIREMENT 3F1: LOOK AROUND YOUR HOME AND DETERMINE 10 WAYS YOUR FAMILY CAN HELP REDUCE POLLUTION.

Pollution Reduction Method 1:
Pollution Reduction Method 2:
Pollution Reduction Method 3:
Pollution Reduction Method 4:
Pollution Reduction Method 5:
Pollution Reduction Method 6:
Pollution Reduction Method 7:
Pollution Reduction Method 8:
Pollution Reduction Method 9:
Pollution Reduction Method 10:



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REQUIREMENT 3F1: PRACTICE AT LEAST TWO OF THESE METHODS FOR SEVEN DAYS AND DISCUSS WITH YOUR COUNSELOR WHAT YOU HAVE LEARNED.

Method #1:

Method #2:

Notes:



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REQUIREMENT 3F2: DETERMINE 10 WAYS TO CONSERVE RESOURCES OR USE RESOURCES MORE EFFICIENTLY IN YOUR HOME, AT SCHOOL, OR AT CAMP.

Resource Conservation Method 1:

Resource Conservation Method 2:

Resource Conservation Method 3:

Resource Conservation Method 4:

Resource Conservation Method 5:

Resource Conservation Method 6:

Resource Conservation Method 7:

Resource Conservation Method 8:

Resource Conservation Method 9:

Resource Conservation Method 10:



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REQUIREMENT 3F2: PRACTICE AT LEAST TWO OF THESE METHODS FOR SEVEN DAYS AND DISCUSS WITH YOUR COUNSELOR WHAT YOU HAVE LEARNED.

Method #1:

Method #2:

Notes:



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REQUIREMENT 3F3: PERFORM AN EXPERIMENT ON PACKAGING MATERIALS TO FIND OUT WHICH ONES ARE BIODEGRADABLE. DISCUSS YOUR CONCLUSIONS WITH YOUR COUNSELOR.

Experiment Title:

State the Problem:

Gather Information (list sources):

Form a Hypothesis:



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Do an Experiment (explain):

Analyze the Data:

Conclusions:



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Notes or Report for Study Plot #1:



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Notes or Report for Study Plot #2:



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REQUIREMENT 4B:

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.

Study Area Location #1: _____

Description of Location #1: _____

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

Observations of living parts of the ecosystem:

Observations of the nonliving parts of the ecosystem:



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Visit Date 2: _____ Time Started: _____ Time Ended: _____

Observations of living parts of the ecosystem:

Observations of the nonliving parts of the ecosystem:

Differences noted since last visit:



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Visit Date 3: _____ Time Started: _____ Time Ended: _____

Observations of living parts of the ecosystem:

Observations of the nonliving parts of the ecosystem:

Differences noted since last visit:



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Study Area Location #2: _____

Description of Location #2: _____

Visit Date 1: _____

Time Started: _____

Time Ended: _____

Observations of living parts of the ecosystem:

Observations of the nonliving parts of the ecosystem:



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Visit Date 2: _____ Time Started: _____ Time Ended: _____

Observations of living parts of the ecosystem:

Observations of the nonliving parts of the ecosystem:

Differences noted since last visit:



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Visit Date 3: _____ Time Started: _____ Time Ended: _____

Observations of living parts of the ecosystem:

Observations of the nonliving parts of the ecosystem:

Differences noted since last visit:



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Notes or Report for 4B:



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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. (A SAMPLE HAS BEEN PROVIDED AS A GUIDE BELOW)

An environmental impact study is usually required before any major project can be started. The study tries to be objective (*not for or against the project*) and tries to list all the **benefits** along with all the **disadvantages**. It considers the effect upon **living** and **non-living** parts of the environment.

Your statement should look something like the following:

An Environmental Impact Statement
for the
(Proposed Projects Name) Prepared by
(Individual's, Patrols, or Troop's Name)
(Date statement is finished)

Project: Site:

:

Historical Impact: List information about what has happened previously in this area. What types of people (if any) have lived there? What other construction has gone on before.

Geological Impact: What type of land will be affected (desert, grassland, mountain slope, intercity, etc.)? What is the ground like (sand, clay, rocky, etc.)? Is it located near an earthquake fault line?

Water Impact: Will the community's water supply support the extra water needed during and after the project is finished? Is there underwater streams or water tables that will be affected?

Wildlife Impact: Will the building of the project affect the natural habitat of natural wildlife? Does it restrict or substantially reduce wildlife habitat? Will wildlife still be able to have proper food, water, and shelter? Will the introduction of man into this area force some wildlife to leave the area?

Economic Impact: How will this project affect the community's economy? Will it increase, decrease, or be of little affect? Will it affect property values. Will in provide more jobs for the community?

Visual Impact: How does the project affect the scenic beauty of the area? Will the structures impact the view for the surrounding homes?

Transportation Impact: Will the existing infrastructure (roads, traffic lights, high-way access, etc.) be sufficient for the added traffic or will new roads be needed. Who will pay for the cost of any improvement?

Community Impact: Does the project fit into the theme of the community? Does it prescribe to the ideals and morals of the community?



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Your Environmental Impact Statement:



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REQUIREMENT 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.

Career Opportunity #1:

Career Opportunity #2:

Career Opportunity #3:

Selected Career Opportunity:

Education:

Training:

Experience:

Notes: