Merit Badge Workbook

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

This Workbook can help you organize your thoughts as you prepare to meet with your merit badge counselor. You still 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.

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

	he current requirements were issued (revised) in 2020 • This workbook was updated in <u>December 2020.</u> me:
	s Name: Counselor's Phone No.:
	http://www.USScouts.Org • http://www.MeritBadge.Org Please submit errors, omissions, comments or suggestions about this workbook to: Workbooks@USScouts.Org ments or suggestions for changes to the requirements for the merit badge should be sent to: Merit.Badge@Scouting.Org
1. Make a 1500s	timeline of the history of environmental science in America.
1600s	
1700s	
1800s	
1900s	

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vironmentar	Science	Scouts maine:
2000s		
Identify the	contribution made by the Boy Sons, and important events.	couts of America to environmental science. Include dates, names of people or
Date	People/Organizations	Event
Define the species, er vehicle, fue	ndangered species, extinction, po	munity, ecosystem, biosphere, symbiosis, niche, habitat, conservation, threatened Illution prevention, brownfield, ozone, watershed, airshed, nonpoint source, hybrid
Populatio	n:	
Commun	ity:	
Ecosyste	m:	
Biospher	e:	
	l l	

Symbiosis:	
Niche:	
Habitat:	
Conservation:	
Threatened species:	
Endangered species:	
Extinction	
Pollution prevention:	
Brownfield:	
Ozone:	
Watershed:	

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Airshed:								
	N	onpo	int source:					
	Н	lybrid	vehicle:					
	F	uel c	ell:					
3.				H of the following categories (using the activities in this pamphlet as the bases for planning and				
		rying	out your project					
	a.		ology					
	С	1.	Conduct and experiment to find out how living things respond to changes in their environments. Discuss your observations with your counselor.					
	С	2.	Conduct an exp your conclusion	ment illustrating the greenhouse effect. Keep a journal of your data and observations. Discuss vith your counselor.				
	С	3.	Discuss what is	s an ecosystem. Tell how it is maintained in nature and how it survives.				

b.	Air	Pollution					
С	1.	Perform an experiment to test for particulates that contribute to air pollution. Discuss your findings with your counselor.					
С	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.					
С	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.	Wa	Water Pollution					
С	1.	Conduct an experiment to show how living things react to thermal pollution. Discuss your observations with your counselor.					
С	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.					
С	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.					
	pointaint affected aduatio me, what the effect was, and whether the effect is mixed to bioling initeation.						

d.	Lar	d Pollution			
С	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".)			
С	2.	Perform an experiment to determine the effect of an oil spill on land. Discuss your conclusions with your counselor.			
С	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.	End	langered Species			
С	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.			
С	2.	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.			
С	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 on of these projects and report on what you saw.			

I.	Poli	ution Prevention, Resource Recovery, and Conservation
С	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.
С	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.
С	3.	Perform an experiment on packaging materials to find out which ones are biodegradable. Discuss your conclusions with your counselor.
g.		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.

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С	2.	Present to your counselor a one-page report on how and report, discuss the problems faced by the bee population pollinators. Share your report with your troop or patrol, you counselor.	
С 3	3.	Hive a swarm OR divide at least one colony of honey be	es. Explain how a hive is constructed
			find out whether you are allergic to bee stings. Visit an
all with be	ergis thin ekee es. I	st or your family physician to find out. If you are aller requirement 3. In completing requirement 3g(3), your	gic to bee stings, you should choose another option counselor can help you find an established ou can help hive a swarm or divide a colony of honey bee stings. For help with locating a beekeeper in
		two outdoor study areas that are very different from one ares. dry land). For BOTH study areas, do ONE of the follow	
a.	Mar spa	k off a plot of 4 square yards in each study area, and cou ce is occupied by each plant species and the type and nu	nt the number of species found there. Estimate how much imber of non-plant species you find.
	Stud	ly Plot Location 1:	_ Number of Species:
		Plant Species	Space each occupies
		Non-Plant Species	Number found
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onmental Science	Scout's Name:
Study Plot Location 2:	Number of Species: Space each occupies
Plant Species	Space each occupies
Non-Plant Species	Number found

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ne, to observe the living and nonliving pa	arts of the ecosystem. Space e	each visit far enough apart that there are readily		
udy Area 1:				
sit 1 Date:	Time Started:	Time Ended		
servations of living parts:			7	
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			-	
			-	
			-	
			-	
			-	
servations of nonliving parts:			٦	
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	ake at least three visits to each of the two le, to observe the living and nonliving paparent differences in the observations. I ludy Area 1: sit 1 Date: eservations of living parts:	ake at least three visits to each of the two study areas (for a total of size, to observe the living and nonliving parts of the ecosystem. Space of parent differences in the observations. Keep a journal that includes the udy Area 1: sit 1 Date:Time Started: pservations of living parts: servations of nonliving parts:	ake at least three visits to each of the two study areas (for a total of six visits), staying for at least 20 minutes each ne, to observe the living and nonliving parts of the ecosystem. Space each visit far enough apart that there are readily parent differences in the observations. Keep a journal that includes the differences you observe udy Area 1: Six	

Scout's Name: ____ ____ **Environmental Science** Visit 2 Date: ______ Time Started: _____ Time Ended_____ Observations of living parts: **Observations of nonliving parts:** Differences noted:

Scout's Name: ____ ____ **Environmental Science** Visit 3 Date: _____ Time Started: _____ Time Ended_____ Observations of living parts: **Observations of nonliving parts:** Differences noted:

ientai Science		Scoul's Name:			
Study Area 2:					
Visit 1 Date:	Time Started:	Time Ended			
3 7 1 1 1 1 1 1 1 1 1 1					
Observations of nonliving parts	:				
Differences noted:					
Dillerences noteu.					

Scout's Name: ____ ____ **Environmental Science** Visit 2 Date: ______ Time Started: _____ Time Ended_____ Observations of living parts: **Observations of nonliving parts:** Differences noted:

Scout's Name: ____ ____ **Environmental Science** Visit 3 Date: _____ Time Started: _____ Time Ended_____ Observations of living parts: **Observations of nonliving parts:** Differences noted:

mental Science	Scout's Name:				
Then, write a short report that adequately address might relate to the differences noted, and discuss	ort that adequately addresses your observations, including how the differences of the studences noted, and discuss this with your counselor.				
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ing the construction project provided or a plan you o	create on your own, identify the items that would need to be incl				
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	three career opportui	nities in environme	ental science.			
one and ex	plain how to prepare	for such a career.				
ss with your Education	counselor what educ	cation and training	are required, a	nd explain why t	his profession m	ight interest you
 Training						
vny tnis prot	ession might interest	you.				

Scout's Name: _____

When working on merit badges, Scouts and Scouters should be aware of some vital information in the current edition of the *Guide to Advancement* (BSA publication 33088). Important excerpts from that publication can be downloaded from http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf.

You can download a complete copy of the Guide to Advancement from http://www.scouting.org/filestore/pdf/33088.pdf.

Environmental Science