Oceanography

Merit Badge Workbook

This workbook can help you but you still need to read the merit badge pamphlet.

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.

No one may add or subtract from the official requirements found in Boy Scout Requirements (Pub. 33216 – SKU 637685).

The requirements were last issued or revised in 2013 • This workbook was updated in June 2017.

Scout's Name:_____ Unit: _____

Counselor'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
Comments or suggestions for changes to the **requirements** for the **merit badge** should be sent to: Merit.Badge@Scouting.Org

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1. Name four branches of oceanography.

1.	
2.	
3.	
4.	

Describe at least five reasons why it is important for people to learn about the oceans.

1.	
2.	
3.	
4.	

5.

2. Define salinity, temperature, and density, and describe how these important properties of seawater are measured by the physical oceanographer.

Salinity

Temperature

Density

Describe how these important properties of seawater are measured by the physical oceanographer.

Discuss the circulation and currents of the ocean.

Describe the effects of the oceans on weather and climate.

3. Describe the characteristics of ocean waves.

Point out the differences among the storm surge, tsunami, tidal wave, and tidal bore.

Storm surge

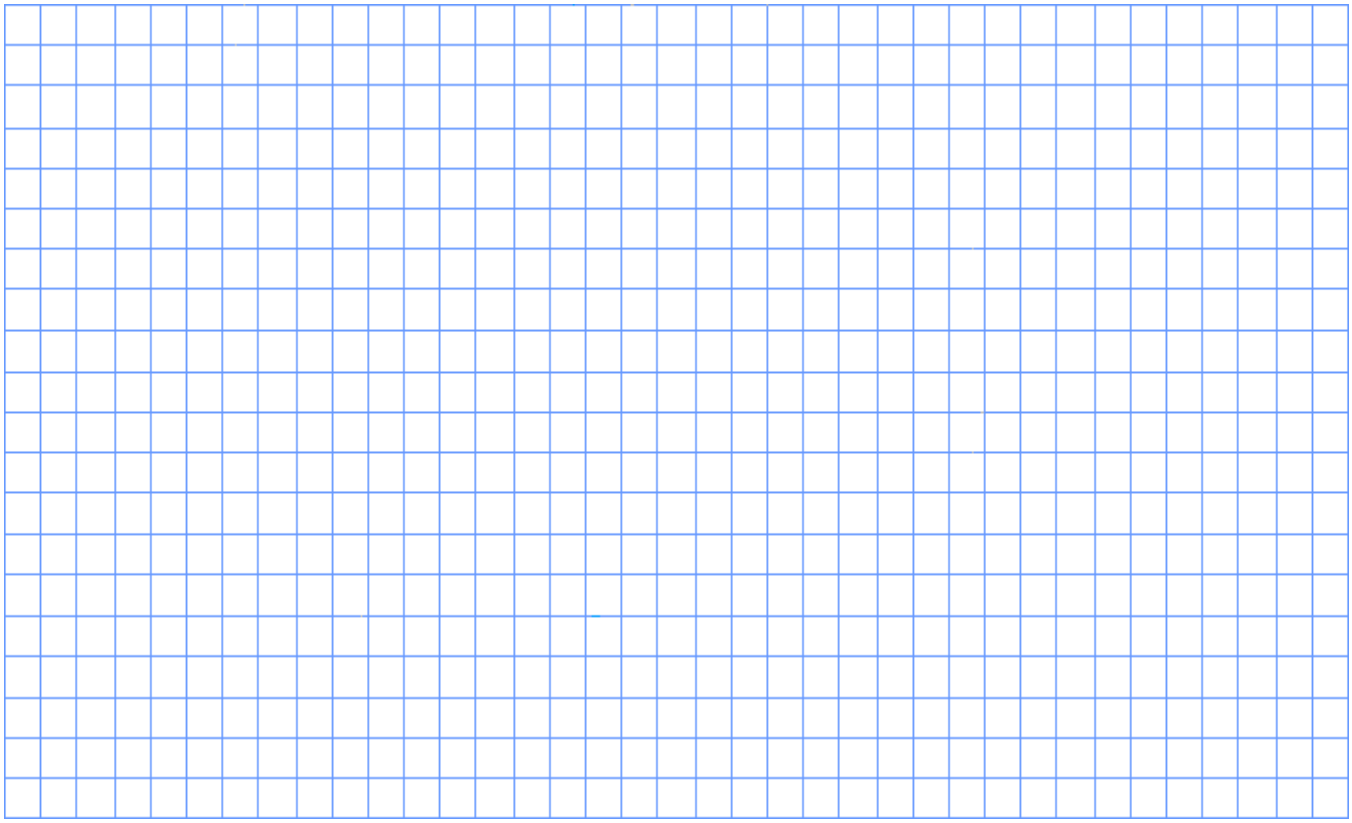
Tsunami	
Tidal wave	
Tidal bore	

Explain the difference between sea, swell, and surf.

Sea	
Swell	
Surf	

Explain how breakers are formed.

4. Draw a cross-section of underwater topography. Name and put on your drawing the following: seamount, guyot, rift valley, canyon, trench, and oceanic ridge. Compare the depths in the oceans with the heights of mountains on land.



Show what is meant by:

a. Continental shelf;

b. Continental slope;

c. Abyssal plain

5. List the main salts, gases, and nutrients in sea water.

Salts

Gases	
Nutrients	

Describe some important properties of water.

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Tell how the animals and plants of the ocean affect the chemical composition of seawater.

Explain how differences in evaporation and precipitation affect the salt content of the oceans.

6. Describe some of the biologically important properties of seawater.

Define benthos, nekton, and plankton.

Benthos,	
Nekton,	
Plankton.	

Name some of the plants and animals that make up each of these groups.

Benthos	
Nekton	
Plankton	

Describe the place and importance of phytoplankton in the oceanic food chain.

7. Do ONE of the following:

☐ a. Make a plankton net. Tow the net by a dock, wade with it, hold it in a current, or tow it from a rowboat.* Do this for about 20 minutes. Save the sample. Examine it under a microscope or high-power glass. Identify the three most common types of plankton in the sample. **May be done in lakes or streams.*

1.	
2.	
3.	

☐ b. Make a series of models (clay or plaster and wood) of a volcanic island. Show the growth of an atoll from a fringing reef through a barrier reef. Describe the Darwinian theory of coral reef formation.

☐ c. Measure the water temperature at the surface, midwater, and bottom of a body of water four times daily for five consecutive days. You may measure depth with a rock tied to a line. Make a Secchi disk to measure turbidity (how much suspended sedimentation is in the water). Measure the air temperature. Note the cloud cover and roughness of the water. Show your findings (air and water temperature, turbidity) on a graph. Tell how the water temperature changes with air temperature. (*You can record your findings in the table at the end of the workbook)*

☐ d. Make a model showing the inshore sediment movement by littoral currents, tidal movement, and wave action. Include such formations as high and low waterlines, low-tide terrace, berm, and coastal cliffs. Show how offshore bars are built up and torn down.

☐ e. Make a wave generator. Show reflection and refraction of waves. Show how groins, jetties, and breakwaters affect these patterns.

☐ f. Track and monitor satellite images available on the Internet for a specific location for three weeks. Describe what you have learned to your counselor.

8) Do ONE of the following: *(Use a blank sheet of paper for your report or speech outline)*

☐ a. Write a 500-word report on a book about oceanography approved by your counselor.

☐ b. Visit one of the following: (1) an oceanographic research ship or (2) an oceanographic institute, marine laboratory, or marine aquarium. Write a 500-word report about your visit.

☐ c. Explain to your troop in a five-minute prepared speech "Why Oceanography Is Important" or describe "Career Opportunities in Oceanography." (Before making your speech, show your speech outline to your counselor for approval.)

9. Describe four methods that marine scientists use to investigate the ocean, underlying geology, and organisms living in the water.

1.

2.

3.

4.

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.

Scout's Name: _____

Table of temperature readings for item 7c.

		Day 1	Day 2	Day 3	Day 4	Day 5
1	Time					
	Air(˚F)					
	S(˚F)					
	M(˚F)					
	B(˚F)					
	Notes:					
2	Time					
	Air(˚F)					
	S(˚F)					
	M(˚F)					
	B(˚F)					
	Notes:					
3	Time					
	Air(˚F)					
	S(˚F)					
	M(˚F)					
	B(˚F)					
	Notes:					
4	Time					
	Air(˚F)					
	S(˚F)					
	M(˚F)					
	B(˚F)					
	Notes:					

S=Surface water M=Mid-water B=Bottom