Oceanography

Merit Badge Workbook

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

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in ***Boy Scout Requirements*** (Pub. 33216 – SKU 616334).

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

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. _____

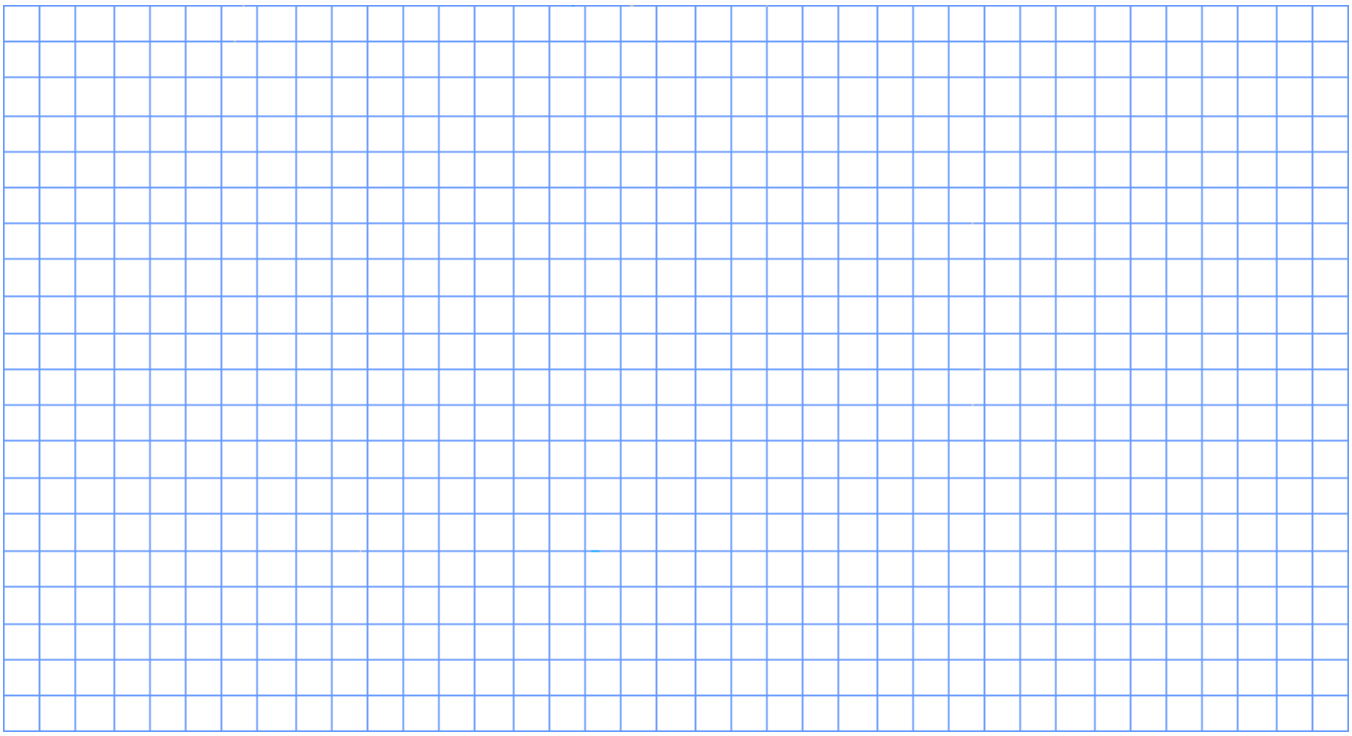
Point out the differences among the storm surge, tsunami, tidal wave, and tidal bore.

Explain the difference between sea, swell, and surf. _____

Explain how breakers are formed. _____

4. Draw a cross-section of underwater topography. Show what is meant by:
   a. Continental shelf; _____
   _____
   _____
   b. Continental slope; _____
   _____
   _____
   c. Abyssal plain _____
   _____
   _____

   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.



5. List the main salts, gases, and nutrients in sea water.
   Salts _____
   _____
   Gases _____
   _____
   Nutrients _____
   _____

Describe some important properties of water. _____

_____

_____

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

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

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

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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._____

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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.*

☐ 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 requirements)*

☐ 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.

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8) Do ONE of the following:

☐ 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.)

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

Requirement resources can be found here:
http://www.meritbadge.org/wiki/index.php/Oceanography#Requirement resources

Table of temperature readings for item 7c.

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

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

Attachment – (NOTE: It is not necessary to print this page.)

Important excerpts from the *'Guide To Advancement'*, No. 33088:

Effective January 1, 2012, the *'Guide to Advancement'* (which replaced the publication *'Advancement Committee Policies and Procedures'*) is now the *official* Boy Scouts of America source on advancement policies and procedures.

- **[Inside front cover, and 5.0.1.4] — Unauthorized Changes to Advancement Program**
  No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements.
  (There are limited exceptions relating only to youth members with disabilities. For details see section 10, "Advancement for Members With Special Needs".)

- **[Inside front cover, and 7.0.1.1] — The *'Guide to Safe Scouting'* Applies**
  Policies and procedures outlined in the *'Guide to Safe Scouting'*, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects. [Note: Always reference the online version, which is updated quarterly.]

- **[7.0.3.1] — The Buddy System and Certifying Completion**
  Youth members must not meet one-on-one with adults. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative —or better yet, another Scout working on the same badge— along with him attending the session. When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult certification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.

- **[7.0.3.2] — Group Instruction**
  It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways or similar events. Interactive group discussions can support learning. The method can also be attractive to "guest experts" assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

  There must be attention to each individual's projects and his fulfillment of *all* requirements. We must know that every Scout — actually and *personally*— completed them. If, for example, a requirement uses words like "show," "demonstrate," or "discuss," then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions. Because of the importance of individual attention in the merit badge plan, group instruction should be limited to those scenarios where the benefits are compelling.

- **[7.0.3.3] — Partial Completions**
  Scouts need not pass all requirements with one counselor. The Application for Merit Badge has a place to record what has been finished — a "partial." In the center section on the reverse of the blue card, the counselor initials for each requirement passed. In the case of a partial completion, he or she does not retain the counselor's portion of the card. A subsequent counselor may choose not to accept partial work, but this should be rare. A Scout, if he believes he is being treated unfairly, may work with his Scoutmaster to find another counselor. An example for the use of a signed partial would be to take it to camp as proof of prerequisites. Partials have no expiration except the 18th birthday.