

Oceanography

Merit Badge Workbook

Merit badges are earned by doing: reading the pamphlet, practicing the skills, and showing your counselor what you have learned.
This workbook gives you a place to organize your notes and track your progress along the way.
Merit badge counselors may not require the use of this or any similar workbook.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
Use the space under each requirement to note what you have done and what you want to talk about, not to write out full answers.
When a requirement says discuss, show, tell, explain, or demonstrate, that is what you must do.
No one may add to or subtract from the official requirements found on scouting.org (Guide to Advancement 7.0.4.8).
Scouting America last updated this badge's requirements page on December 31, 2025.
Requirements change from time to time. Double-check scouting.org before you start.

Scout's name: _____ Unit: _____ Date started: _____

Counselor's name: _____ Phone no.: _____ Email: _____

Links marked "Scouting America resources" are the ones Scouting America shares on its official badge page.
Links marked "ScoutSmarts" open the matching part of Cole's guide. This workbook is unofficial and not endorsed by Scouting America.

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1. Name four branches of oceanography. Describe at least five reasons why it is important for people to learn about the oceans.

Scouting America resources: What is Oceanography (video) · **ScoutSmarts:** Requirement 1 explained

Four branches of oceanography

Branch	What it studies

Five reasons people should learn about the oceans

Reason	Why it matters

Requirement 1 completed on _____ counselor initials _____

2. Explain the following terms: salinity, temperature, and density. Describe how these important properties of seawater are measured by an oceanographer. Discuss the circulation and currents of the ocean. Describe the effects of the oceans on weather and climate.

Scouting America resources: Temperature and Salinity (video) · An Ocean in Motion (video) · Oceans and Climate (video) How Do Ocean Currents Affect the Weather Pattern? (video) · **ScoutSmarts:** Requirement 2 explained

Properties of seawater

Term	What it means	How an oceanographer measures it
salinity		
temperature		
density		

Circulation and currents of the ocean

How the oceans affect weather and climate

Requirement 2 completed on _____ counselor initials _____

3. Describe the characteristics of ocean waves and do the following:

Scouting America resources: How Do Ocean Waves Work? (video) · **ScoutSmarts:** Requirement 3 explained

Characteristics of ocean waves

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

Scouting America resources: Tsunami vs Tidal Wave: What's the Difference? (video) · What is Storm Surge? (video)

Storm surge, tsunami, tidal wave, and tidal bore

Wave	How it is different from the others
storm surge	
tsunami	
tidal wave	
tidal bore	

(b) Explain the difference between sea, swell, and surf.

Scouting America resources: Weather Explained: What's the Difference Between Seas and Swell? (video)
Difference Between Swell and Surf (website) · The Difference Between SWELL and SURF (video)

Sea, swell, and surf

Term	What it is, and how it differs
sea	
swell	
surf	

(c) Explain how breakers are formed.

Scouting America resources: How Do Waves Break? (video)

How breakers are formed

(d) Explain what a rip current is, how to avoid them, and what to do if you are caught in one.

Scouting America resources: New Guide to Spot and Escape a Rip Current (video) · Rip Current Survival Guide (website w/ video)

Rip currents

Question	My answer
What a rip current is	
How to avoid them	
What to do if I'm caught in one	

Requirement 3 completed on _____ counselor initials _____

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:

Scouting America resources: Diagram of Sea Floor (website) · How Deep Does the Ocean Go? (video)
How Deep the Ocean REALLY Is (video) · **ScoutSmarts:** Requirement 4 explained

My cross-section of underwater topography (draw here or attach)

- ☐ Seamount
- ☐ Guyot
- ☐ Rift valley
- ☐ Canyon
- ☐ Trench
- ☐ Oceanic ridge

How ocean depths compare with the heights of mountains on land

(a) Continental shelf

What it means

(b) Continental slope

What it means

(c) Abyssal plain

What it means

Requirement 4 completed on _____ counselor initials _____

5. List the main salts, gases, and nutrients in seawater. Describe some important properties of water. 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.

Scouting America resources: Seawater Composition (website) · Why is the Sea Salty? (video)

What's in seawater

Group	The main ones
Salts	
Gases	
Nutrients	

Some important properties of water

How ocean animals and plants affect the chemistry of seawater

How evaporation and precipitation change the salt content of the oceans

Requirement 5 completed on _____ counselor initials _____

6. Describe some of the biologically important properties of seawater. Define benthos, nekton, and plankton. Name some of the plants and animals that make up each of these groups. Describe the place and importance of phytoplankton in the oceanic food chain.

Scouting America resources: Nekton, Benthos, and Plankton (video) · Feeding the Sea: Phytoplankton Fuel Ocean Life (video) NASA | Earth Science Week: The Ocean's Green Machines (video) · Open Ocean Food Chain (website)

Biologically important properties of seawater

Benthos, nekton, and plankton

Group	What it means	Some plants and animals in this group
benthos		
nekton		
plankton		

Phytoplankton: its place and importance in the oceanic food chain

Requirement 6 completed on _____ counselor initials _____

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. Note: May be done in lakes or streams.

Scouting America resources: How to Make a Soda Bottle Plankton Net (video) · Make Your Own Plankton Net! (video)

Where I used my net _____ Date _____ How long _____

The three most common types of plankton in my sample

Type of plankton	What I saw under the microscope or glass

☐ **(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.

Scouting America resources: Coral Reefs: Types and Formation (video) · How Coral Reefs are Formed (video)

What I made my models from _____ Date shown _____

☐ Volcanic island
☐ Barrier reef
☐ Fringing reef
☐ Atoll

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.

Scouting America resources: How to Make and Use a Secchi Disk (video)

Body of water _____ Dates (five days in a row) _____

☐ Made my Secchi disk

My five-day water and weather log

Day	Time	Air temp	Surface temp	Midwater temp	Bottom temp	Turbidity	Cloud cover	Roughness
Day 1								
Day 1								
Day 1								
Day 1								
Day 2								
Day 2								
Day 2								
Day 2								
Day 3								
Day 3								
Day 3								
Day 3								
Day 4								
Day 4								
Day 4								
Day 4								
Day 5								
Day 5								

My five-day water and weather log (continued)

Day	Time	Air temp	Surface temp	Midwater temp	Bottom temp	Turbidity	Cloud cover	Roughness
Day 5								
Day 5								

My graph of air temperature, water temperature, and turbidity (draw here or attach)

How the water temperature changes with air temperature

☐ **(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.

Scouting America resources: Longshore Drift Model Demo (video)

What I made my model from _____ Date shown _____

- ☐ Littoral currents
- ☐ Tidal movement
- ☐ Wave action
- ☐ High and low waterlines
- ☐ Low-tide terrace
- ☐ Berm
- ☐ Coastal cliffs
- ☐ Offshore bars 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.

Scouting America resources: DIY Ripple Tank (video) · Reflecting Waves in a Ripple Tank (video) Refraction of Waves in a Ripple Tank (video) · Coastal Erosion and the Methods Used to Reduce It (video) Wave Tank Demonstration (video)

What I made my wave generator from _____ Date shown _____

- ☐ Reflection
- ☐ Refraction

How these affect the wave patterns

Structure	What happened to the waves
Groins	
Jetties	
Breakwaters	

☐ **(f)** With your counselor's and parent or guardian's approval and permission, track and monitor satellite images available on the internet for a specific location for three weeks. Describe what you have learned to your counselor.
Scouting America resources: Weather Satellite Images (website)

☐ My counselor approved
☐ My parent or guardian approved

Location I tracked _____ Website I used _____

My three-week satellite image log

Week	Dates	What I saw in the images
Week 1		
Week 2		
Week 3		

What I learned, to describe to my counselor

Requirement 7 completed on _____ counselor initials _____

8. Do ONE of the following:

☐ **(a)** Write a 500-word report on a book about oceanography approved by your counselor.
Book title _____ Author _____ Approved on _____

Notes and outline for my 500-word report

☐ **(b)** Visit one of the following and write a 500-word report about your visit.
Place I visited _____ Date _____

Notes and outline for my 500-word report

☐ **(1)** Oceanographic research ship
Scouting America resources: Tour of a Research Vessel (video)

☐ **(2)** Oceanographic institute, marine laboratory, or marine aquarium
Scouting America resources: A Virtual Tour of Bodega Marine Laboratory (video)
A Visit to Mote Marine Laboratory & Aquarium (video)

☐ **(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.)

Scouting America resources: Oceanography Careers (video) · How To Work with the Ocean (video)

☐ "Why Oceanography Is Important"

☐ "Career Opportunities in Oceanography"

Outline approved on _____ Speech given on _____

My speech outline

Requirement 8 completed on _____ counselor initials _____

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

Scouting America resources: Studying the Ocean EXPLAINED (video) · How do Scientists Explore the Deep Sea? (video)

Four methods marine scientists use

Method	What it investigates (ocean, geology, or living things)	How it works

Requirement 9 completed on _____ counselor initials _____

Counselor sign-off

Your counselor signs your blue card or approves the badge in Scoutbook, and your unit records it. This line is for your own records.

Counselor's signature _____ Date completed _____

Official Scouting America resources

Scouting America resources: Oceanography merit badge page (requirements and resources)
Oceanography merit badge pamphlet (free PDF) · All merit badges · **ScoutSmarts:** Oceanography Merit Badge Guide

Made by Cole at ScoutSmarts.com, an Eagle Scout who loves helping Scouts.
Spot an error or a requirement change? Tell me at scoutsmarts.com/contact.
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