girl scouts of eastern massachusetts
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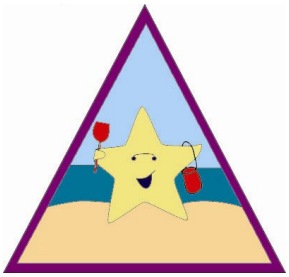
Our Council's Own:
Oceanography Brownie Badge

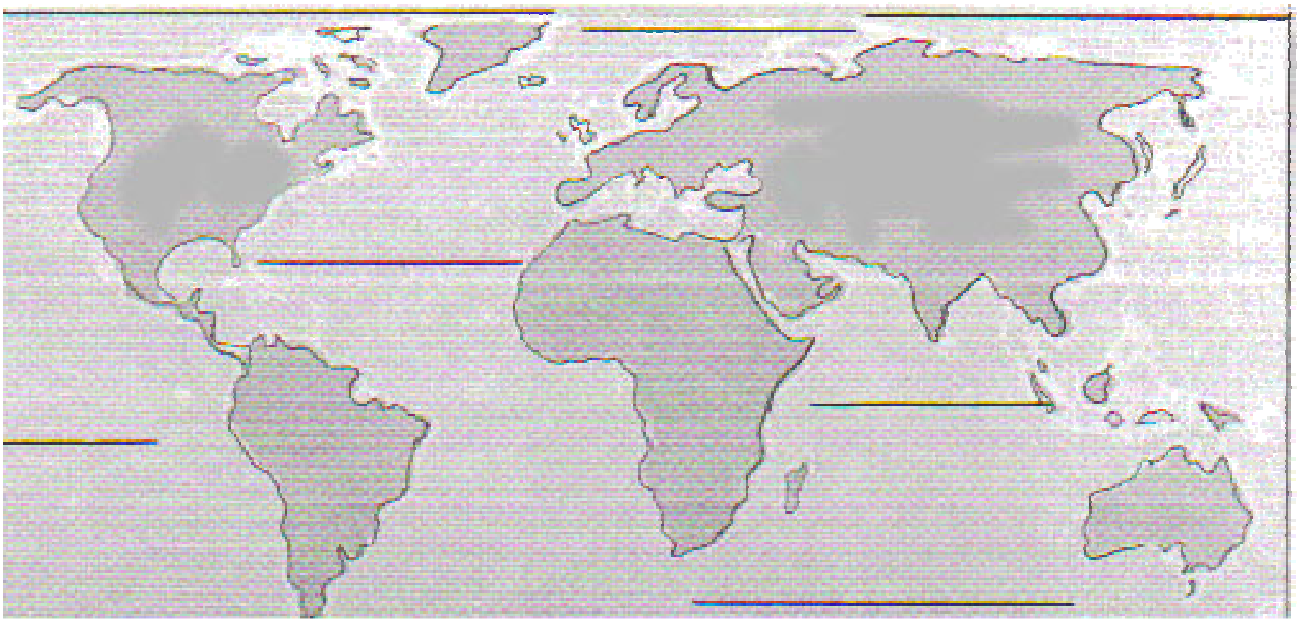


Oceanography: The science that deals with oceans, what makes up the ocean water, the marine biology, and the uses of the ocean's resources. Why is the ocean blue? The ocean appears blue because it reflects the blue color of the sky. On a grey day, the ocean appears grey.

Massachusetts has a State Sea Shell, the New England Neptune and a State Marine Mammal, the Right Whale. Find out about them.

1. As of Spring 2000, there are five oceans on earth. Learn their names and complete the map.
   Artic Ocean*: Borders the North Pole. It is the smallest ocean.*
   Atlantic Ocean*: Borders the Eastern coasts of North and South America and Western Europe and Africa.*
   Indian Ocean: *Borders eastern Africa, southern Asia, and Western Australia.*
   Pacific Ocean*: Borders western coasts of North and South America, eastern Asia and northeastern Australia. It is the largest ocean.*
   Southern Ocean*: Borders Antarctica and extends to 60 degrees latitude.*

Label the Oceans



How much of the earth's surface is covered by water? Estimate the answer by playing catch with an inflatable globe. Record how often the catcher's left thumb lands on water then divide the answer by the number of times the ball was caught. (Approximately 70% of the Earth's surface is covered by water and the oceans contain roughly 97% of the Earth's water.)

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2. Start a sand or sea shell collection. To collect sand, use small containers like clear film canisters or make sand cards. Be sure and record the location and the date. Remember that if you have sand from the same beach on different dates they are not always the same.

Sand Cards Take a 3X5 or 4X6 index card and fold it in half. Cut a small triangle out of the folded side of the card. Unfold the card and put one piece of clear *not invisible* tape over the hole. Pour a small amount of sand onto the tape, shake off the excess and cover it with another piece of tape. Label the card with the location and date.

Shell collection Try and collect shells without chips, holes or missing pieces. Group like shells together and find out the names of the different shells. Shells collected on New England beaches may be different from shells collected from other areas. Try and collect shells from the following groups: clams, mussels, oysters and snails.

Shells you might find in New England include: periwinkles, razor clams, whelk or conch, soft shell clams, quahog shells, jingle shells, Northern Horse mussels, and Eastern oysters.

Native Americans made wampum from shells. What kind of shell was used? Why did they make it? How did they use it?

3. Whales are one of the largest mammals on earth. There are toothed and baleen whales. Find out about the different kinds of whales by doing **one** of the following:

a. Go on a whale watch to observe the whales and learn about them from the crew. OR
b. Go to an aquarium or museum of natural history to learn about whales. Ask what the different kinds of whales eat.
c. Research whales in books or on the internet.

Do the "Eat Like A Baleen Whale Activity"
Supplies: toothbrushes, tweezers, tea leaves or dried herbs, large pan of water. Baleen whales have "brushes" in their mouths like brooms. They use their baleen to filter sea water and trap the plankton they eat. Sprinkle the "plankton" (herbs) in the water. Now try and see how much you "can eat" by using the tweezers to collect plankton. They try the toothbrushes to collect the floating "plankton". Which way would a large whale prefer to collect his or her lunch?

OR, make a "Blubber Glove"

Supplies: large can of vegetable shortening and two plastic bags with press seals (not zippers). Place the shortening into one bag. Turn the second bag inside out and put your hand into the bag. Insert it into the first bag and seal the outer and inner bags together sandwiching the shortening between the two bags to create the glove. Spread the shortening so it will insulate your hand when in the glove.

Whales and other marine mammals use blubber to keep warm in the ocean. Place one hand inside a plastic bag and the other inside the glove. Put both hand into ice water. Which hand is warmer?

4. How do sea creatures communicate? The ocean is actually a noisy place. You may have heard about whale songs or heard dolphins speaking. Do the "Fishy Love or How not to be Lunch" Activity.

Supplies: small wooden blocks or film canisters half filled with rice, beans, or other items to make noise, two blindfolds, and two canisters with items that make a distinctive noise like washers or paper clips. (You could also use party noise makers.)

Have the girls stand in a circle to represent the ocean. Blindfold one scout and give the other scout one of the special noise makers. Have the blindfolded scout try and find "lunch", which is the scout with the noise maker. For the next round, give the scouts in the circle noise makers. Blindfold both scouts in the circle and give them both special noise makers. The ocean is actually quite noisy. Now have all the scouts use their noise makers while the two "lovers" in the center look for love in all the wrong places before finding each other.

Light does not penetrate very far into the ocean, so sound is how the males and females find each other since they often live quite far apart.

5. Observe waves in motion. What causes waves? The winds cause waves on the surface of the ocean and on lakes. The wind transfers some of its energy to the water through friction between the air molecules and water molecules. Stronger winds (like storm surges) cause larger waves. You can make your own miniature waves by blowing across the surface of a pan of water.

Waves of water do not move horizontally, they only move up and down
(a wave does not represent a flow of water). You can observe a demonstration of this by watching a floating buoy bob up and down with a wave. It does not move horizontally with the wave. OR: suspend corks at different levels in an aquarium or large plastic container. Use your hand to make waves at the surface and observe which ones are moved by waves and which stay still. See what happens if you make larger waves.

Tsunamis (sometimes called tidal waves) are different from surface waves. Find out what causes tsunamis.

6. What causes the tides? Tides are periodic rises and falls of large bodies of water. Tides are causes by the gravitational interaction between the earth and the moon. This gravitational attraction of the moon causes the ocean to bulge out in the direction of the moon. Another bulge occurs on the opposite side since the earth is also being pulled toward the moon and away from the water on the far side. Since the earth is rotating while this is happening, two tides occur each day.

   Learn how to read a tide chart for a beach near you. When is high tide? When will the tide be at its lowest? How much do the times change each day? Will the high tide be earlier or later tomorrow? You can also research spring and neap tides.

7. Explore the Shore: Visit the ocean shore! Look closely along the shoreline for debris such as shells, pebbles, plants, bottles, beach glass (pieces of glass that have been polished smooth by the sea), and decaying matter. Where did these things come from? How did they get there and what is likely to happen to them?

Horseshoe Crabs are often found along the North Atlantic shore. Don't hurt them, they may still be alive and will return to the ocean with the next tide. They are one of the oldest living animals on earth and are called living fossils because their appearance has not changed in 360 million years.

Try to find both living and not living things along the shore or in tidal pools. You'll need a pencil. When you find an item, check it off. Do your best not to harm, move, or take any of these things. Animals or plants may depend upon them. Small non-living items may be kept as mementos of your shore visit.

____ sea glass
____ drift wood
____ buoy
____ lighthouse
____ tern
____ sea gull
____ sand piper
____ sand fleas
____ "green heads"
____ barnacles
____ crabs
____ minnows
____ starfish or sea star

____ jelly fish
____ surf clam
____ razor clam
____ mussel shell
____ oyster shell
____ sand dollar
____ perwinkle shells
____ cockle shell
(slipper or boat shell)
____ jingle shell
____ algae (sea weed)
____ "mermaid's purse"
(skate egg case)

Some Resources and Web Sites:

EnchantedLearning.com. Information, coloring books and connect- the-dots pages.
Sea Education Association, www.sea.edu
Ripley's, www.ripleysaquariumofthesmokies.com (Site of Mr. Potato Fish)
NOAA. www.nccos.noaa.gov/education.
Seaworld & Busch Gardens have educational materials, including a collection of books for grades K-3 and 4-8.
The Marine Mammal Center, www.tmmc.org/learning/education

Woods Hole on Cape Cod has an aquarium, and is home to the Woods Hole Oceanographic Institute (WHOI) which has an exhibit center with information about deep sea explorations and short videos about the sea.

The National Sea Shore on Cape Cod has a visitor's center with exhibits; self guided tours and videos about the sea and geologic history of Cape Cod.