

OUR WONDROUS OCEANS PLANET WATER

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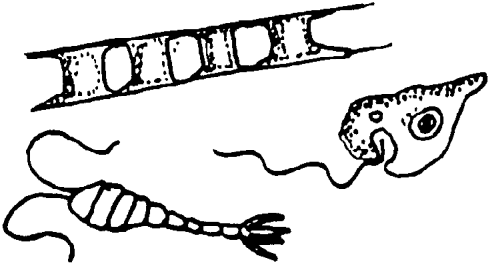
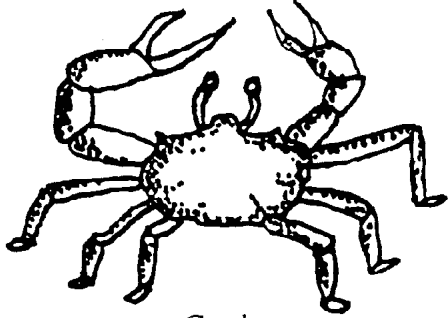
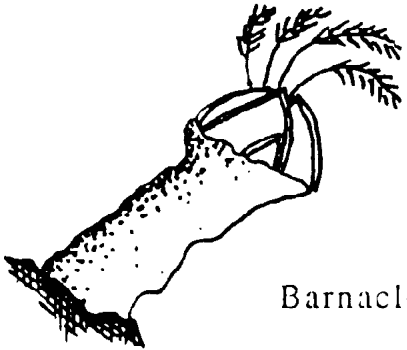
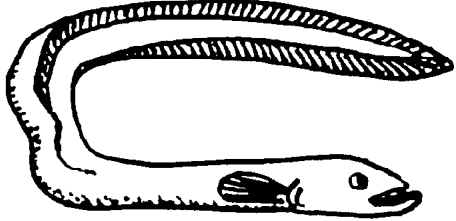
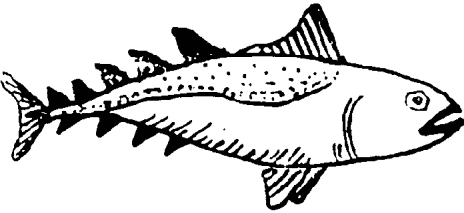
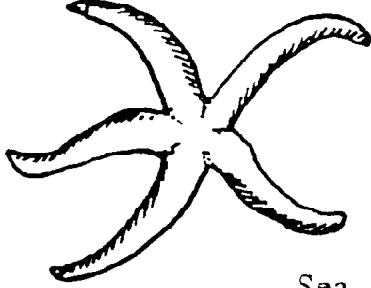
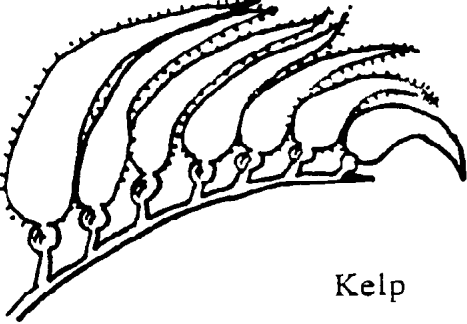
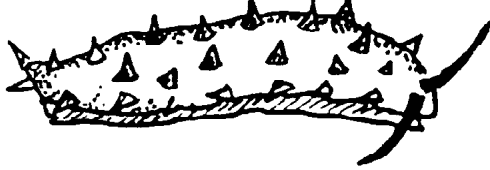
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**OUR WONDROUS OCEANS
PLANET WATER**

OCEAN LIFE CARDS

 <p>Plankton</p>	 <p>Crab</p>
 <p>Barnacle</p>	 <p>Eel</p>
 <p>Tuna Fish</p>	 <p>Sea Star</p>
 <p>Kelp</p>	 <p>Sea Cucumber</p>

**OUR WONDROUS OCEANS
PLANET WATER
KNOW, NEED, LEARN**

Your teacher will instruct you in the use of this activity.

WHAT I KNOW	WHAT I NEED TO KNOW	WHAT I LEARNED

OUR WONDROUS OCEANS PLANET WATER

WATER'S WAY

INTRODUCTION

Understanding the connection between precipitation on land and the water in the ocean is one way to study the water cycle. Rainfall is one form of precipitation. Once it hits land, it either moves vertically downward into soil and rock to recharge groundwater reservoirs or horizontally as surface runoff into lakes, rivers, streams and sewers. Pavement, like on your school grounds, can reduce the amount of water which moves downward into the soil, and increases the amount of runoff. Runoff is the primary way that precipitation flows back into the ocean. It is also the primary way that land pollution enters the ocean environments. For example, runoff over streets picks up oil and lead contamination.

MATERIALS

- 11 x 17 inch piece of drawing paper
- pencils and colored markers or stickers
- map of your city, state and country (showing rivers leading to the ocean)
- references on ocean pollutant effects

PROCEDURE

1. In this activity, you will trace the path of water from rainfall to the ocean. You will also investigate the path of a pollutant from the land to the ocean, and predict its effects on an ocean life form.
2. Draw a small picture of the school grounds leaving enough room on the paper to add nearby creeks and rivers and the path of the water to the ocean. Use local city maps, state and country maps, and label all waterways and important landmarks.
3. Next, investigate the different surfaces on the school grounds. List these surfaces in order of those causing the most runoff, like cement, to those causing the least runoff, like lawn.
4. Using your maps and library references (books, magazines or newspapers) investigate a land-originating water pollutant. Mark the specific place where this pollutant originates and use a brightly colored marker or stickers to indicate the path of this pollutant to the ocean.
5. Next, investigate the effects of this pollutant on your life form, using library references. If little information is available, see if you can predict the effects of the pollutant on your life form and on your own life.

OUR WONDROUS OCEANS PLANET WATER

CORIOLIS AND CAUSES OF CURRENTS

INTRODUCTION

Ocean currents have been studied and used by humans for centuries. Ancient Polynesians used their knowledge of the oceans to navigate between the Hawaiian Islands. More recently, Spanish explorers observed the Gulf Stream around the West Indies in the 16th century. All 300 million cubic miles of ocean water are moving about, and today we are still charting the ocean currents. One of the main causes of ocean currents is wind. Surface ocean currents are created by the constant movement of local and global winds. The main global winds are the prevailing westerlies and the trade winds. Another major influence on ocean currents is the rotation of the earth on its axis. This affects both the direction of deep ocean currents and is the cause of the Coriolis effect. The Coriolis effect describes the reason why ocean currents generally flow clockwise (to the right) in the northern hemisphere and counterclockwise (to the left) in the southern hemisphere. Some of the major ocean currents are the Gulf Stream, the Japan Current and the Equatorial Currents. These are all warm-water currents, flowing from the equator toward the poles. The major cold-water currents, mostly flowing from the poles towards the equator, are the Labrador, the Antarctic Circumpolar Current, the Peru, the California and the Benguela.

MATERIALS

- large, round, flat glass bowl
- rotating tray (like a Lazy Susan)
- black pepper
- small electric fan
- blue food coloring
- round piece of paper (or paper plate) and pencil

PROCEDURE

1. You will be watching a demonstration on how wind causes surface ocean currents by using the fan and the blue water in the bowl. The black pepper will make it easier to see the movements of the water.

(Continued on Activity Sheet 5)

OUR WONDROUS OCEANS PLANET WATER

CORIOLIS AND CAUSES OF CURRENTS (continued)

2. Currents observed in the bowl are mimicking those ocean currents caused by global winds. When the tray is spun in a counterclockwise direction, the currents in the bowl are mimicking currents in the Northern Hemisphere. When the tray is spun in a clockwise direction, the currents mimic those found in the Southern Hemisphere.
3. Observe how the wind from the fan makes the water in the bowl move in currents. Look closely at the way the water currents in the bowl bend away from the edges of the bowl just as ocean currents bend away from the continental land masses that they encounter.
4. Next you will observe the Coriolis effect. Place a sheet of paper on the tray and slowly rotate the tray counterclockwise. Try to draw a straight line in toward the center of the paper while the tray is rotating. The line you draw will curve to the right, just as ocean currents and air currents do in the Northern Hemisphere. The curve is called the Coriolis effect. Now try again, rotating the tray clockwise. This time the line you draw veers to the left, as moving objects, including water and air, do in the Southern Hemisphere. The Coriolis effect can also be seen when you fill up a bathtub or sink and then let it drain. If you live in the Northern Hemisphere, the water should swirl down the drain to the right. If you live in the Southern Hemisphere, the water should swirl down the drain to the left. It's amazing to think the rotation of the earth can even have an effect inside our own home or classroom!
5. Write a short answer to these questions:
 - a) What are the causes of ocean currents?
 - b) How does knowledge of these currents affect humans?
 - c) Are there ocean currents that are found in predictable patterns?
 - d) Can ocean currents affect climate? If so, how?

OUR WONDROUS OCEANS PLANET WATER

SLIME TO SUSHI

INTRODUCTION

Oceans and ocean resources have been important to humans for thousands of years. Even today, countries throughout the world harvest and live off many ocean products, like fish, clams, oysters, crabs, sea urchins and seaweed. Some Far Eastern countries depend on seaweed for over one-fifth, or 20% of their daily diet. Seaweed is a common food item in Japanese households, providing many vitamins and minerals for the Japanese people. One Japanese dish that uses seaweed is called Sushi. Sushi is made mostly of seaweed and rice and often contains raw fish, another ocean product.

MATERIALS

- white rice
- rice steamer (or hot plate and covered saucepan)
- seaweed sheets (called “Sushi Nori”)
- grated vegetables (carrots, cucumber, cabbage)
- soy sauce
- sharp knife, bowls
- Sushi mat or plastic wrap
- hot water

PROCEDURE

1. In this activity, you will have a chance to taste a Japanese delicacy, one which relies heavily on an ocean resource, seaweed. The country of Japan is an island surrounded by ocean on all sides and contains hundreds of much smaller islands. In other words, the country of Japan has an enormous amount of coastline. It is no wonder that one of their cultural dishes is made from an ocean life form—seaweed!
2. To prepare the Sushi, you will form groups of four and complete the following tasks:
 - a) **Group 1:** Measure two cups of white rice and combine this with four cups of water (one part rice/two parts water mixture). This mixture is then heated to a boil, heat reduced to low, covered and cooked for 10 minutes. At the end of this time, remove the rice from heat and let it sit another 10-15 minutes. If you use a rice steamer, just add the rice water mix to the steamer and switch it on. The steamer will automatically turn itself off when the rice is done.
 - b) **Group 2:** Remove the Nori from the package and lay out the seaweed sheets. Cut the ragged ends off.
 - c) **Group 3:** Grate the vegetables and place in a small bowl.
 - d) **Group 4:** Prepare four small dishes of soy sauce for dipping the Sushi.

(Continued on Activity Sheet 7)

OUR WONDROUS OCEANS PLANET WATER

SLIME TO SUSHI (continued)

3. When all Groups are done with their preparations, the Sushi assembly can begin. First, place the Nori on top of the Sushi mat or plastic wrap square (Figure 1). Spread a layer of rice, about 1/2 inch thick, on top of the Nori, using a spoon. Clean the spoon often in hot water to keep the rice from sticking. At one end of the Nori, place a line of vegetables parallel to the edge of the Nori or the sticks in the Sushi Mat. Roll the Sushi and seal the end with a bit of warm water (Figure 2). Remove the rolled Sushi from the mat and cut the Sushi into bite-size disks (Figure 3).

4. Dip in soy sauce to taste and enjoy!

5. Fill out Activity Sheet 8, Food-Chain Bubbles, showing any number of possible food chain linkages that exist between a tuna, an ocean fish whose meat is often used in Sushi, and seaweed. In the spaces provided between the life form bubbles, write in anything that might happen to disrupt this linkage in the food chain. Examples of disruptions include pollution, fishing, and disease.

FIGURE 1

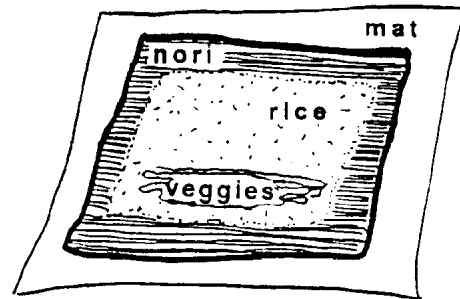


FIGURE 2

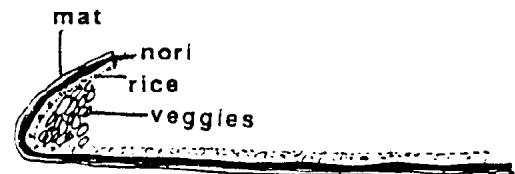
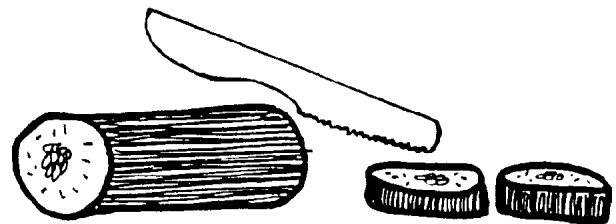


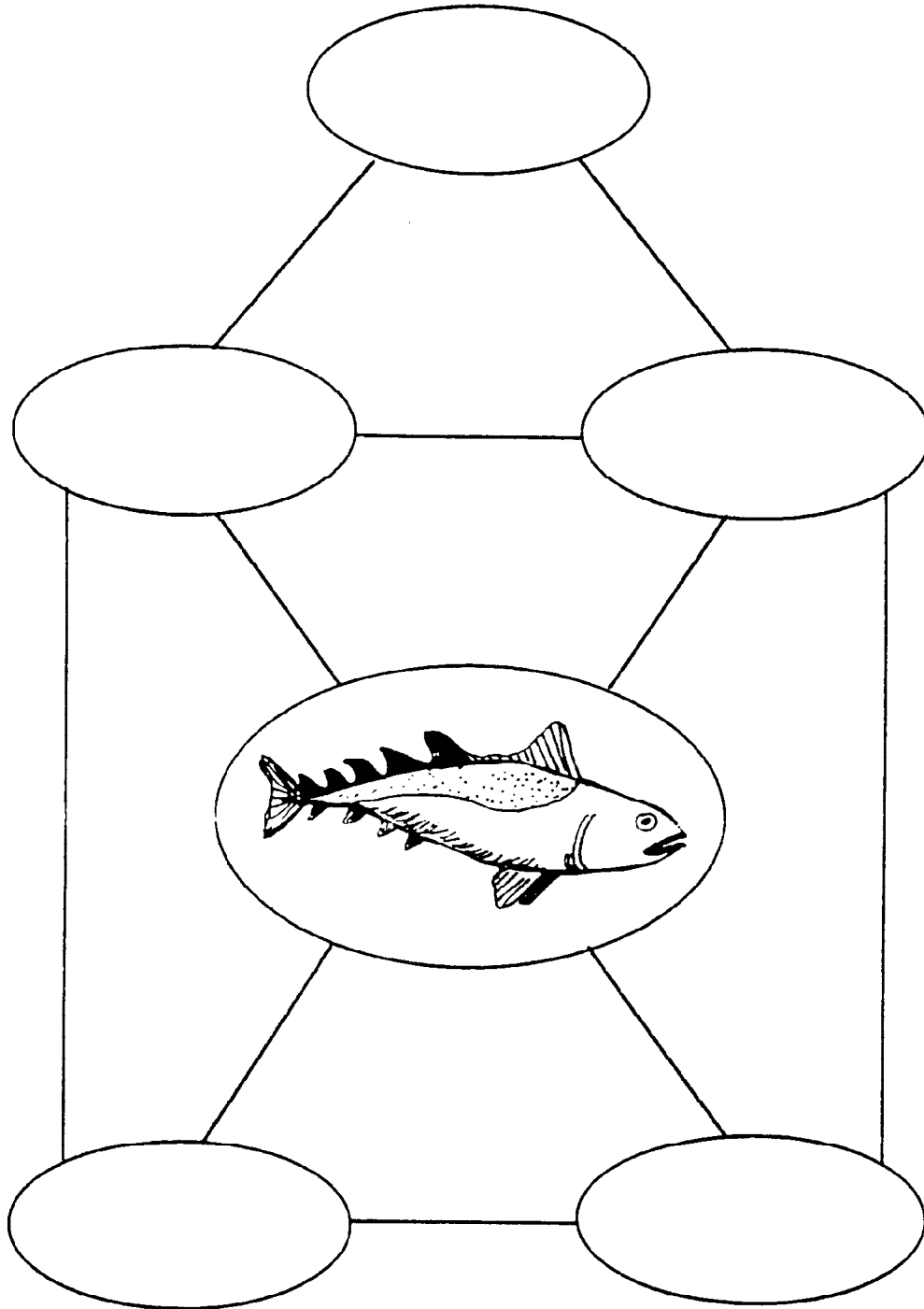
FIGURE 3



OUR WONDROUS OCEANS PLANET WATER

FOOD CHAIN BUBBLES

Directions for this activity are given in #5 on Activity Sheet 7.



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VIDEO QUIZ

Fill in the blanks and answer the questions in the spaces provided.

1. Almost 75 percent, or three-quarters, of the earth's surface is covered by water, found mostly in depressions called _____.
2. Water is the only substance on earth that exists naturally as a _____, _____ and _____.
3. This process, where water evaporates, condenses, and precipitates, is called the water _____.
4. Ocean waters move during the tides from the influence of the moon and from the force of _____.
5. The Gulf Stream is a warm _____ that flows from the Caribbean Sea and the Gulf of Mexico up through the Atlantic towards England.
6. By learning more about the ocean, we may also begin to protect its precious resources, upon which humans and _____ depend.
7. Plankton provide food for small _____.
8. Some Far Eastern countries depend on seaweed for over one-fifth, or _____ percent, of their daily diet.
9. Some marine plants, like red seaweeds, have yielded important disease-fighting medicines called _____.
10. Some _____ found in the deep ocean are essential to the production of steel and electrical wiring.

OUR WONDROUS OCEANS**UNIT TEST****Fill in the blanks:**

1. The study of the oceans is called _____.
2. The five oceans are:

3. Some scientists believe that _____ and _____ were released from the earth's crust to form the water in the oceans.
4. Water is found in three states of matter: solid, _____, and _____.
5. Ocean currents are caused mostly by _____.

Short Answer Questions:

Write your answers in the space provided. Use the back of this sheet if necessary.

1. Describe the ocean environment called the "splash zone."

2. What is the purpose of a bladder on kelp?

(Continued on Activity Sheet 11)

**OUR WONDROUS OCEANS
PLANET WATER****UNIT TEST
(continued)**

9. What is the weather like in tropical regions of the world?

10. What is the cause of ocean oil spills?

TRUE OR FALSE:

Answer by writing True or False on the line.

1. Oceans are partially landlocked bodies of water. _____
2. Deep ocean currents are caused partly by global winds. _____
3. Oceans are only important to ocean life forms, like fishes. _____
4. Some human foods come from the oceans. _____
5. Over 90% of planet earth is covered by the oceans. _____