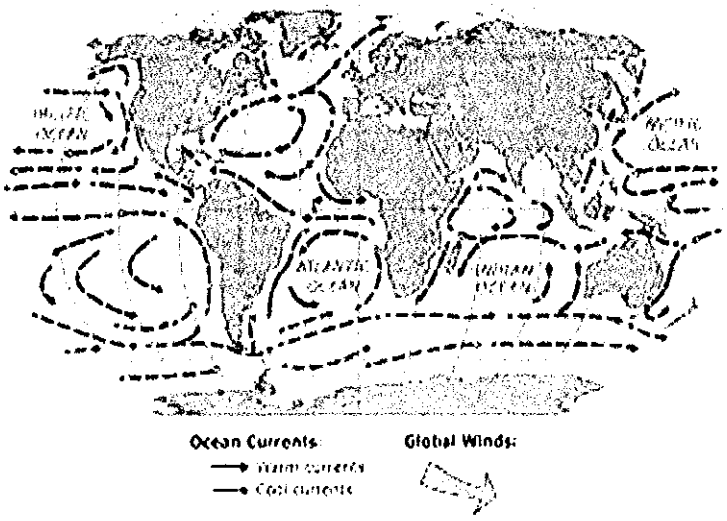
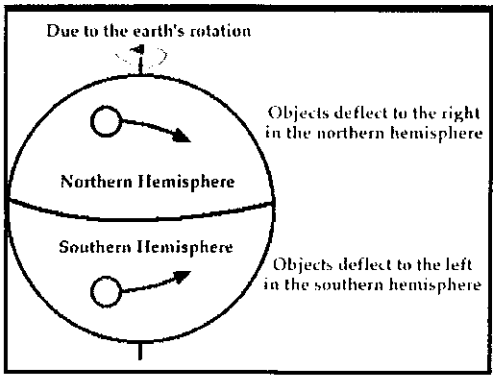
8.E.1.2.

Currents and Climate

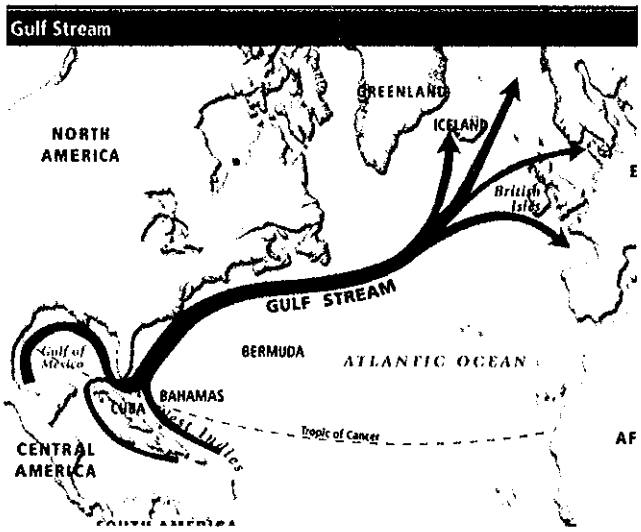


Currents are large streams of **moving water** that flow through the oceans. *Unlike waves*, currents carry water great distances, while waves only have ***energy*** moving through them. Some currents move water at the surface of the ocean up to 100 meters deep. Other currents move water from the surface down deep below the surface.

Surface currents moving horizontally across the ocean, which affect water to a depth of several hundred meters, are driven mainly by **winds.** Therefore, surface currents follow the major wind patterns of the globe, moving in a circular pattern in the five major ocean basins. The **Coriolis Effect**, which is the effect of Earth's rotation on the direction of winds and currents, is the reason for this circular pattern. The Coriolis Effect causes currents to curve to the *right* in the Northern Hemisphere and to the *left* in the Southern Hemisphere. The largest, most powerful surface current in the North Atlantic Ocean is the **Gulf Stream**. It can carry more water than the Mississippi River.

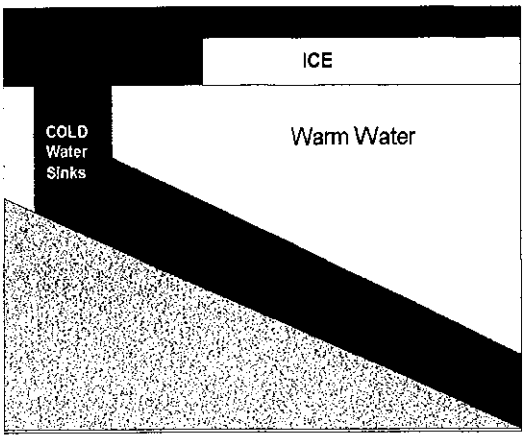


Currents affect climate by moving cold and warm water around the globe. ***A surface current warms or cools the air above it***, influencing the climate of the land near the coast. Surface currents can be either warm or cool based on the place they *originate* from. For example, the ***Labrador Current*** comes down from the North Pole and is a cold water current that goes near the California coast. This is the reason why San Francisco has cool temperatures. The ***Gulf Stream*** originates at the equator and is a warm water current. Because the Gulf Stream goes near England's coast, England has warmer weather than North Dakota which is on the same latitude line but is inland away from the coast.

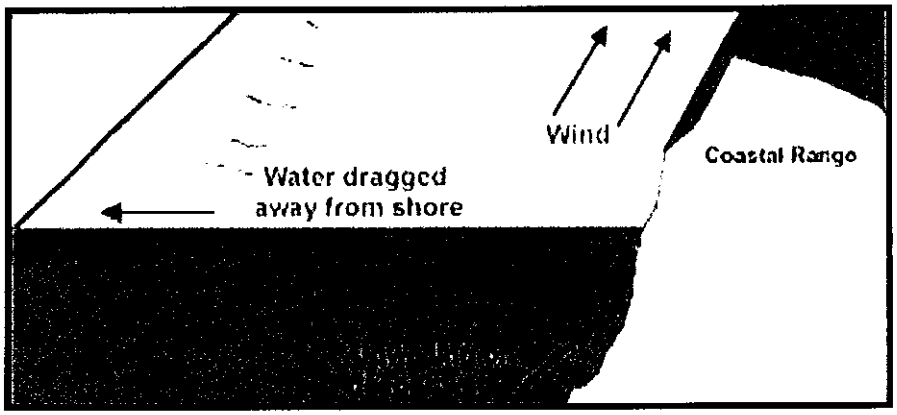


Deep currents are also known as **density currents** because they are caused by differences in density of ocean water. Density, in turn, depends on **temperature**

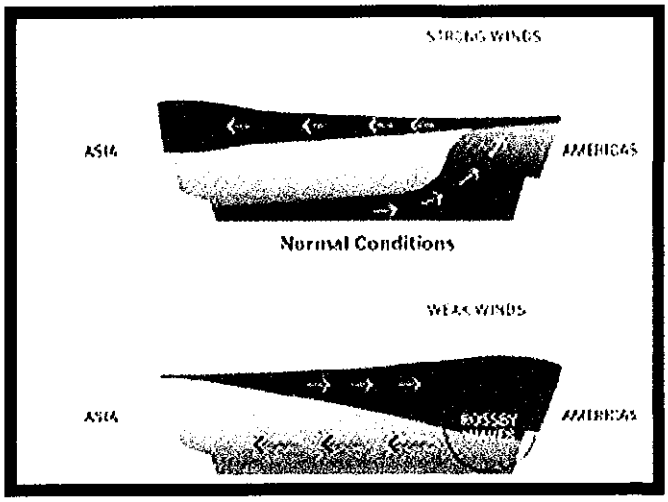
and **salinity**. ***Salinity*** is the *amount* of salt in water. When ice forms near the poles, the salt remains behind so the salinity of the remaining liquid water increases. This cold, salty water now is more **dense** and sinks, flowing along the ocean floor as a deep current. **Deep currents move and mix water around the world.** They carry cold water from the poles toward the equator. They flow much more slowly than surface currents. This downward movement is called a **downwelling** and is an important process to ocean life. Downwelling brings dissolved oxygen from the surface to greater depths for the organisms living there.



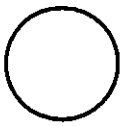
Another important type of water movement is **upwelling**. This is the upward movement of cold water from the ocean depths to replace warm surface water moved away by winds. Upwelling brings up tiny ocean organisms, minerals, and other nutrients from the deeper layers of the water. Without this motion, the surface waters of the open ocean would be very scarce in nutrients. Areas of upwelling usually attract huge schools of fish that feed on these nutrients. This is particularly true off the coast of western South America in Peru.



The *winds blow the warm waters away from the coast of Peru* toward Indonesia where they are waiting for the warm winds and waters to bring rain. Every 2 to 7 years in the Pacific Ocean an unusual pattern of winds pushes a strong surface current the opposite direction - eastward toward the South American coast. This prevents upwelling off the western coast of South America. This abnormal climate occurrence is known as **El Nino.** El Nino can cause rainstorms, floods, and mudslides in some areas and droughts in others.



Name_____



Currents and Climate.

1. A large stream of moving water that flows through the oceans is a(n) _____

2. True or False? Currents carry water great distances.

3. Circle the letter of each sentence that is true about surface currents.

a. They affect water down to 1 kilometer.
b. They are driven mainly by winds.
c. They move in circular patterns.
d. They occur only in the Pacific Ocean.

4. The effect of Earth's rotation on the direction of winds and currents is called the _____.

5. True or False? In the Northern Hemisphere, surface currents curve to the left.

6. The largest and most powerful surface current in the North Atlantic Ocean is the _____

7. Circle the letter of the sentence that is true about the Gulf Stream.

a. It is caused by strong winds from the north.
b. It is a cold-water current.
c. It carries more water than the Mississippi River.
d. It curves westward due to the Coriolis Effect.

8. True or False? In the Southern Hemisphere, surface currents curve to the left.

9. What determines whether a surface current will be either warm or cold?

_____

Give an example.

_____

10. What is another name for a deep current? _____ _____

11. Deep currents are caused by differences in _____.

12. What is salinity? _____

13. Since only pure H2O freezes, what happens to the salt that was in it?

_____

14. The density of water depends on its _____and its _____.

15. **Would water at the poles be <u>more</u> or <u>less</u> dense than water at the equator?** _____

Why? _____

16. True or false? Deep ocean currents move and mix water around the world.

17. The upward movement of cold water from the ocean depths is referred to as_____.

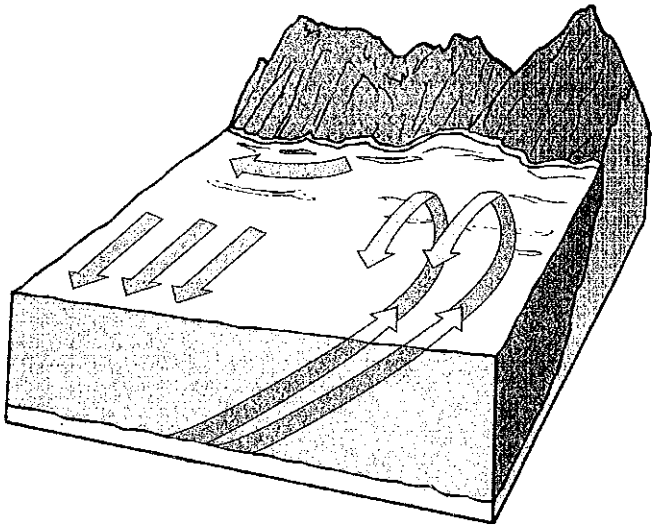
18. True or false? Upwelling is caused by tides.

19. An abnormal climate event that occurs every 2 to 7 years in the Pacific Ocean is called _____

20. Circle the letter of each sentence that is true about El Nino.

a. It can prevent upwelling.
b. It can affect weather worldwide.
c. It is fully understood.
d. Its impact can be reduced

21. Label the **wind-A, warm surface water-B**, and the **area of upwelling-C** in the diagram below.



22. Why are upwelling zones usually home to enormous schools of fish?

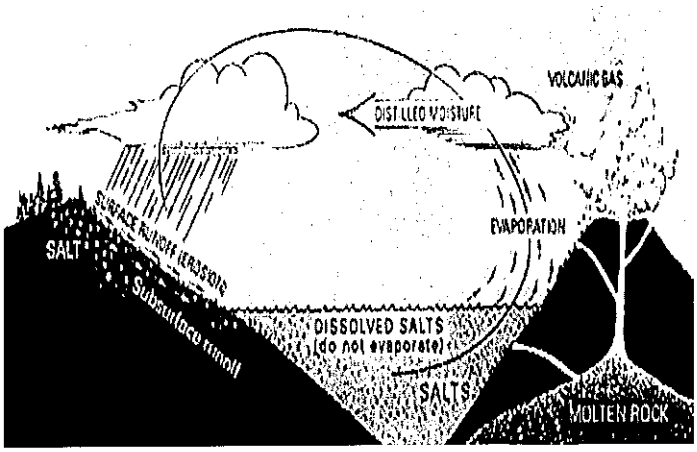
_____

_____

Summary

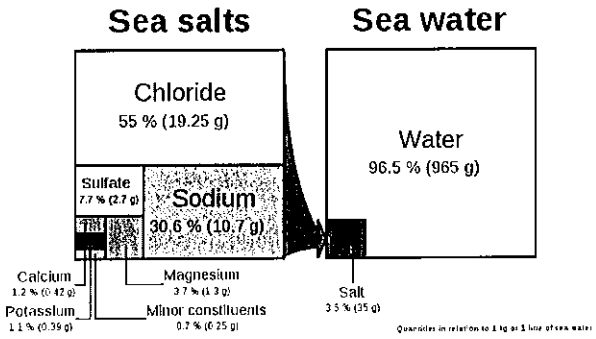
Type of Current	**Caused by**	**Possible Temperatures (cold, warm, or both)**
23.	Wind	26.
24.	25.	27.

Ocean Water Chemistry

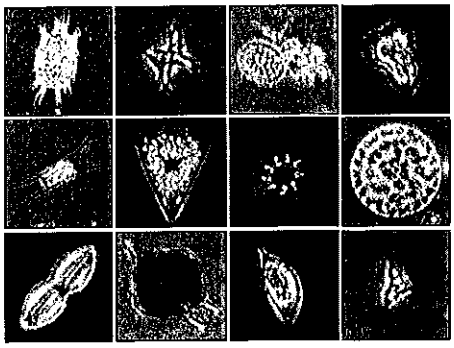


Ocean water contains **dissolved salts**. The salt that is most common in ocean water is **sodium chloride**, also known as table salt. Ocean water also contains smaller amounts of magnesium, calcium, potassium, and several other substances. These salts and minerals comes from erosion of rocks as flowing water passes over them, as well as gases from **volcanoes** on land and beneath the sea.

The total amount of dissolved salts in a sample of water is the **salinity** of that sample. On average, <u>one kilogram of ocean water contains about 35 grams of salts-that is, 35 parts per thousand.</u> **Salinity is lower** near the surface, where precipitation and melting ice add fresh water to the ocean. It is also lower near the mouths of large rivers that empty large amounts of fresh water into the ocean. **Salinity is higher** where evaporation is high, such as in hot, dry climates. Or it is also higher near the poles, where surface water freezes into ice and leaves the salt behind.



The dissolved salts in ocean water give it different properties from those of fresh water. One thing that is different is density. Remember, **density is the amount of mass in a substance in a given volume.** Ocean water is more dense than fresh water. Because of its greater density, ocean water has more **buoyancy** than fresh water. This means that it lifts or holds up, or ***buoys*** up, less dense objects floating in it.

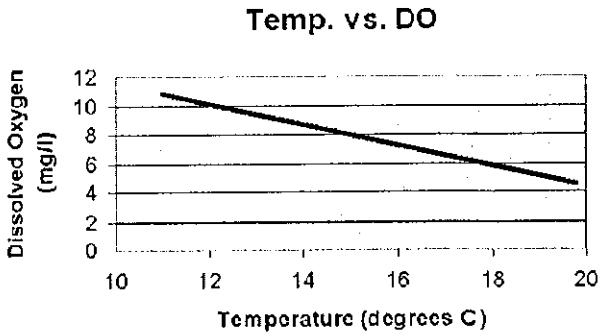


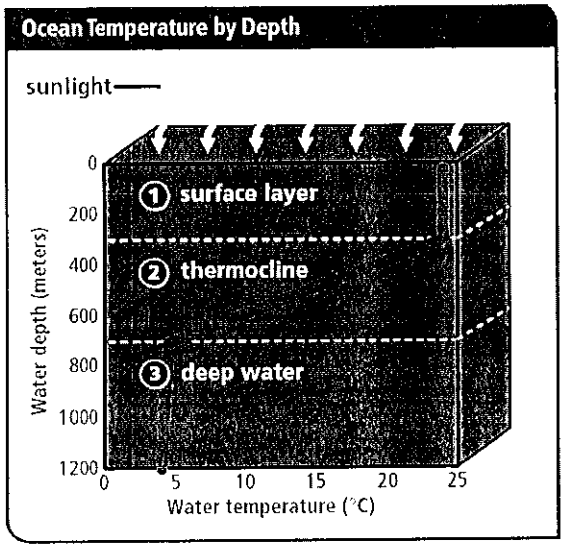
<u>Gases</u> in ocean water vary as well. Two gases found in ocean water that are necessary for living things are <u>**oxygen and carbon dioxide**</u>. These two gases are also necessary for life in freshwater as well as on land. The first gas, **carbon dioxide** (CO_2), is needed in the process of *photosynthesis.* (See formula). This gas is released by living organisms that use **oxygen** (O_2) to breathe and to break down food for energy. Oxygen is most plentiful in seawater near the surface where it comes from the air. But oxygen also comes from algae, known as ***phytoplankton***- who are mostly at the surface. They produce oxygen as a by-product of photosynthesis which is used by living organisms, including us humans.

Formulas for Life!

$6CO_2 + 6H_2O + \text{Energy} \longrightarrow C_6H_{12}O_6 + 6O_2$	$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Energy}$

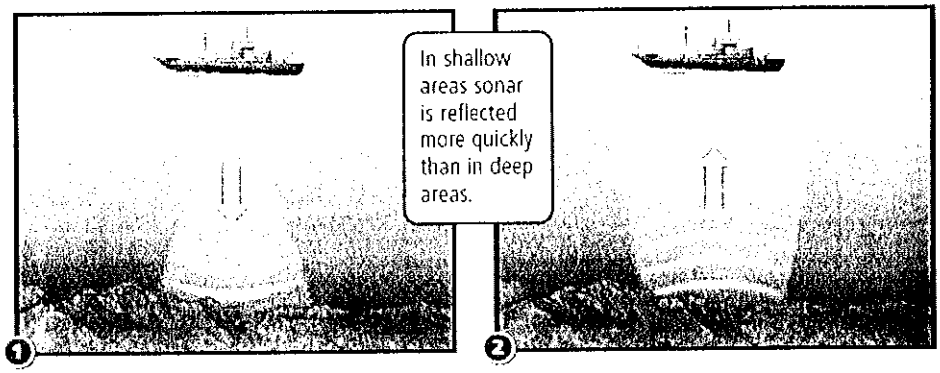
Like temperatures on land, temperatures at the surface of the ocean vary with location and the seasons The surface of the ocean absorbs energy from the sun and heats up. Because ***warm water is less dense than cold water***, the warm water stays on the surface. Surface water is warmest near the equator and becomes colder as you travel away from the equator. Since **cold water can hold more dissolved oxygen than warm water**, there is more oxygen in polar waters than in tropical waters.





If you could travel from the surface of the ocean to the ocean floor, you would pass through a vertical section of the ocean called the **water column**. Conditions change greatly as you travel down through the water column. Temperature decreases as you descend through the ocean. From the **surface zone** to about 200 meters, the temperature is about 10°C-17.5°C. At the **transition zone (thermocline)** from 200 meters to about 1 kilometer, it drops to about 4°C. The **deep zone** is from 1kilometer to the ocean floor, the temperature stays at about 3.5°C throughout most of the ocean. Pressure increases continuously with depth in the ocean. This is an obstacle to underwater exploration. A diver can descend safely to only about 40 meters. To go deeper, scientists must use a **submersible**, an underwater vehicle built of strong materials that resist water pressure.

By using **sonar**, a system of sound waves to measure distances and locate objects, oceanographers have been able to map the ocean floor. Satellite imaging, however, is more efficient at to map larger areas. **Satellites** are able to detect tiny bumps and dips in the ocean's height.



To measure sea-floor depth, ships aim sound waves at the ocean floor.

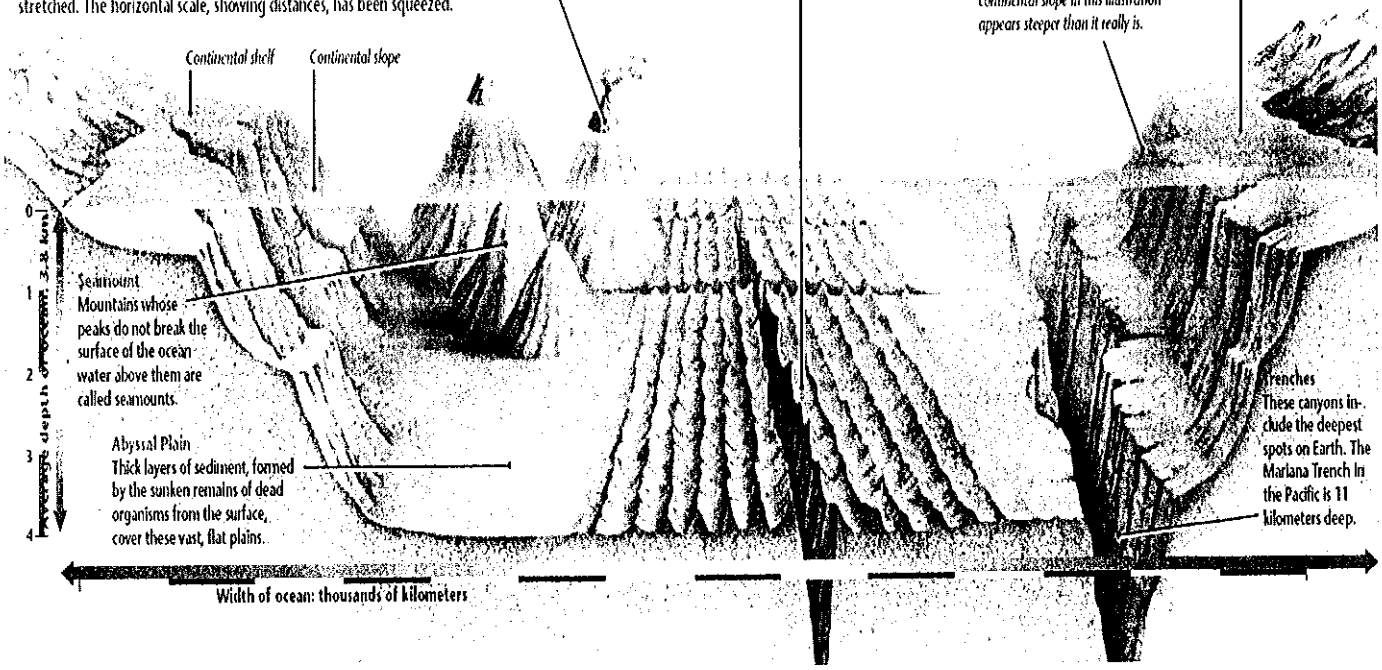
The time it takes for the echo to return depends on the depth of the ocean floor.

List 7 Features of the ocean floor.

5._____

EXPLORING the Ocean Floor

Earth's oceans are thousands of kilometers wide. To show the width of the ocean floor in this illustration, the vertical and horizontal scales are not the same. The vertical scale, showing depth, has been stretched. The horizontal scale, showing distances, has been squeezed.



Volcanic Island
When volcanoes on the ocean floor erupt, they can create mountains so high that their peaks break the surface of the ocean. As the lava cools and hardens, an island forms.

Mid Ocean Ridge
The mid-ocean ridge consists of many peaks along both sides of a central valley. This chain of undersea mountains runs all around the world.

Continental Slope
A steady incline marks the continental slope. Continental slopes in the Pacific Ocean are steeper than those in the Atlantic Ocean. *Note: Because the vertical scale is exaggerated, the continental slope in this illustration appears steeper than it really is.*

Continental Shelf
This gradually sloping area borders each continent. Its width varies from just a few kilometers to as much as 1,300 kilometers from shore.

Trenches
These canyons include the deepest spots on Earth. The Mariana Trench in the Pacific is 11 kilometers deep.

1. _____
2. _____
3. _____
4 _____

6._____

7._____

Name_____

Ocean Chemistry

1. The total amount of dissolved salts in water is called_____

2. What is the most abundant salt in seawater? _____

3. What is the average salinity of ocean water? From where does the ocean get its saltiness?

_____

_____

4. Name four factors that affect how salty the ocean is. (lower or higher salinity)

_____

_____

5. Which is more dense, ocean water or fresh water? Why?

_____

6. What is buoyancy? _____

Which is more buoyant, fresh or salt water? _____

Why? _____

_____

7. Why is there more oxygen at the surface of the ocean than in deeper layers?

_____

_____

7. Both saltwater and freshwater contain dissolved gases. Name two important dissolved gases and describe the life processes for which these gases are needed.

_____

_____

_____

8. What type of water can hold more dissolved oxygen? _____

Where would you find more oxygen in water? _____

9. Describe the temperature of ocean water as you travel from the surface down.

_____

10. What is a vertical section of ocean from the surface to the ocean floor referred to as?

_____

11. What prevents scuba divers from going deeper than about 40 meters below the surface?

_____

12. What is an underwater vehicle built of strong materials to resist pressure? _____

13. What are two ways that scientists have learned about the ocean floor?

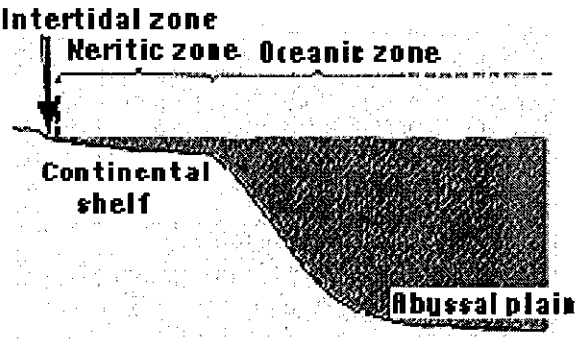
_____

14- 19. Fill in the spaces in the table describing the depth and temperature of ocean water.

Depth Zone	Depth Range	Average Temperature (°C)
Surface	4._____	5._____
6. _____OR _____	7._____	4°C-10°C
8. _____	1 km to the ocean floor	19._____

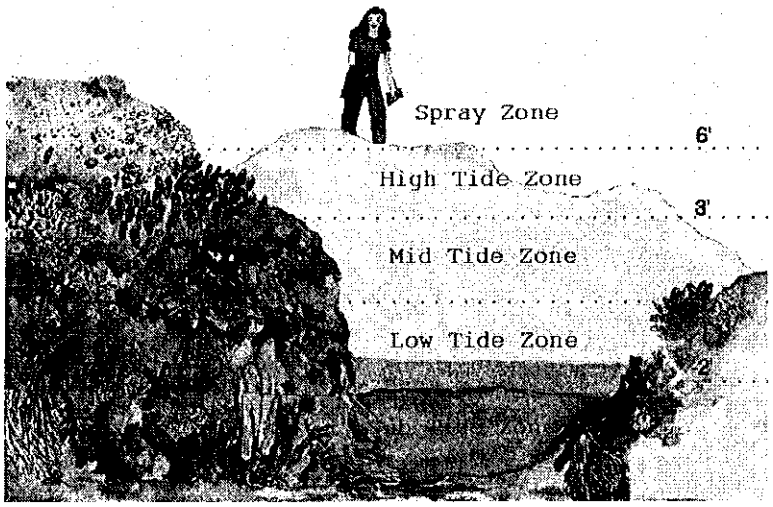
20. Draw and label a picture of the ocean floor.

Ocean Habitats



Think of the ocean as a huge community that includes living and nonliving things. The ocean is divided into several zones. Ocean zones include the **intertidal zone, the neritic zone or near shore, and the open-ocean zone.** At the highest high tide line on land, the intertidal zone begins. From there, the zone stretches out to the point on the continental shelf exposed by the lowest low tide. The neritic zone extends from the low-tide line out to the edge of the continental shelf. Beyond the edge of the continental shelf lies the open ocean zone. This zone includes the surface zone, the transition zone or thermocline and the deep ocean zone which is the deepest, darkest part of the ocean. Here the temperature is very cold and the water pressure is very high.

Intertidal Zone



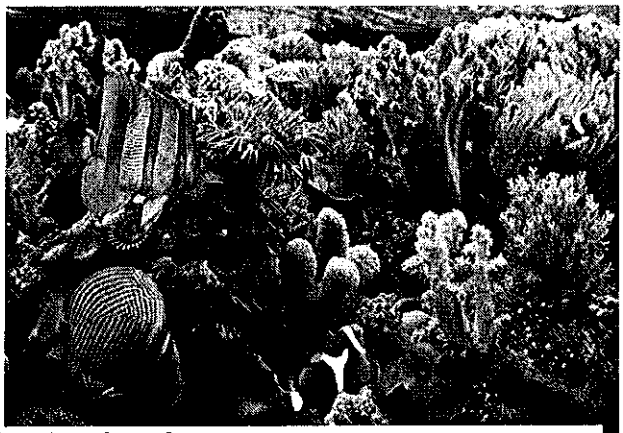
The **intertidal zone** is the shoreline area that falls between the high tidemark and the low tide mark. The shore may be either a rocky or a sandy shore. The area right above the high tide mark is also called the **spray zone**, where pounding waves spray the organisms attached to the sides of rocks. It can become flooded during storms. Both areas require the organisms living there to be able to adapt to extremes in their environment regarding changes in salinity, water temperature, light, dissolved gases, nutrients, wave action, and exposure to air. Organisms that live in the rocky intertidal zone must be able to tolerate the pounding of the waves and withstand periods of being underwater and periods of being *exposed to the air.* Animals in this zone have structures that enable them to hold onto rocks and that keep their bodies from drying out. They must also now have to hide from predators. Some examples of are starfish with suction cups, barnacles which hold on to rocks and close tight with water inside, sea urchin which buries itself.

Included in this zone are **tide pools**-which are depressions in the rock where water remains during a low tide. Here the water can become warm and saltier by evaporation, or it can be diluted by rain. Organisms, such as sea stars, mussels, barnacles, and sea urchins, must be able to withstand the returning waves.

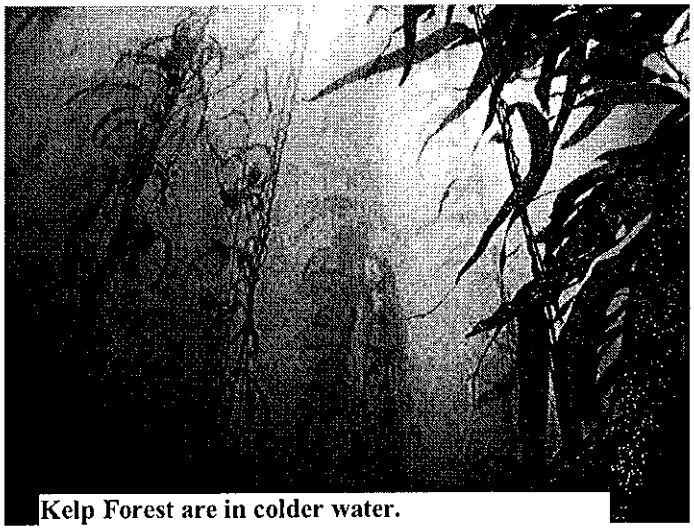
The Neritic Zone and Open Ocean

The **neritic zone** is the part of the ocean that extends from the low-tide line out to the edge of the continental shelf. The shallow water over the continental shelf receives sunlight and a steady supply of nutrients washed from the land into the ocean. The light and nutrients enable large, plantlike algae to grow. Also, upwelling currents in many parts of the neritic zone bring more nutrients from the ocean floor to the surface. Two habitats found in the neritic zone are coral reefs and kelp forests.

Coral reefs can form only in shallow, tropical ocean waters. The reefs are formed by groups of tiny coral animals that produce a hard material around their soft bodies. When the animals die, the hard material is left behind. Over time, the animals' remains create a coral reef. Coral reefs can be damaged easily and do not recover quickly.



Coral reefs prefer warm waters.



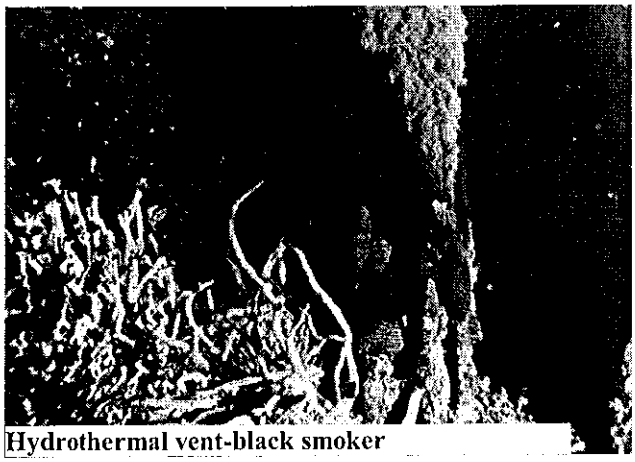
Kelp Forest are in colder water.

Kelp forests grow up to 30 centimeters per day in cold neritic waters where the ocean has a rocky floor. They are located in colder waters like the California coast. Kelp are large brown seaweed that attach to the sea floor on the continental shelf and extend to the surface. Sea urchins and their main predator, sea otters, are abundant in kelp forests. A variety of fish, sea cucumbers, turtles, sea stars sea anemones, and abalones, also live in kelp forests.

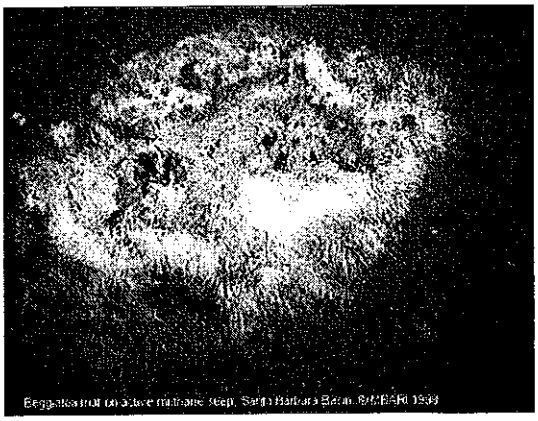
The **open ocean,** or **oceanic** zone, begins where the neritic zone ends, at the edge of the continental shelf. The open ocean differs from the neritic zone in two important ways. First, only a small part of the open ocean receives sunlight. Second, the water has fewer nutrients. As a result, the open ocean supports *fewer organisms*.
The surface zone is the only part of the open ocean that receives enough sunlight to support the growth of algae. Microscopic algae (*phytoplankton*) are the base of food webs in the open ocean. The algae are eaten by animal plankton (*zooplankton*) which in turn are eaten by many other animals.

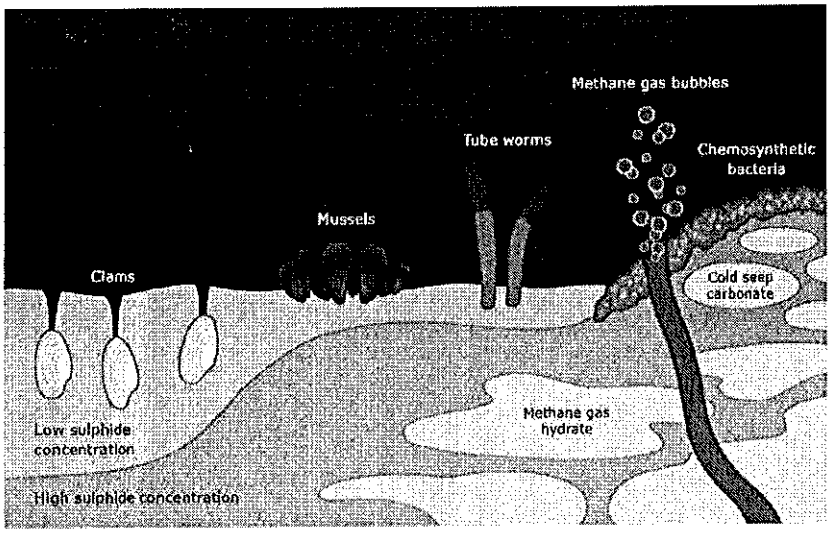
The open ocean's deep zone is dark and cold, and fewer organisms live there.

Many deep-sea fishes produce their own light to help them find food. The production of light by living things is called **bioluminescence**. Located in the deep zone are unusual habitats called hydrothermal vents. A **hydrothermal vent** is an area in which heated ocean water rises through cracks in the ocean floor. The chemical nutrients in the heated water support the unique group of organisms that are found around hydrothermal vents. Here bacteria use the chemicals and the heated water to produce food for themselves. They, in turn are eaten by consumers like tube worms which are eaten by other heterotrophs, like giant clams, and so on. Thus, the autotrophs in the deep ocean use the process of **chemosynthesis** since there is no light for photosynthesis and the autotrophs of the surface zone are algae, or phytoplankton.


Hydrothermal vent-black smoker

Besides hydrothermal vents, bacteria are also able to perform photosynthesis at cold seeps. Cold seeps are places on the seafloor where cold hydrocarbon-rich water escapes. The base of this community is *chemosynthetic* bacteria that use the methane and hydrogen sulfide present in the seep water as an energy source in the same way they do at hydrothermal vents..





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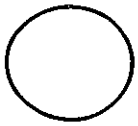


Ocean Habitats

1. The part of the ocean that extends from the high-tide line to the low-tide line is called the _____.
2. The part of the ocean that extends from the low-tide line to the edge of the continental shelf is called the _____ .
3. The part of the ocean that extends beyond the edge of the continental shelf is called the _____.
4. The open-ocean zone is divided into the surface zone, the transition zone, and the _____zone.
5. True or False? Physical conditions are the same in each zone of the ocean.
6. Where do organisms that need light for photosynthesis live? _____
7. What must organisms that live deep in the ocean withstand?

_____

8. True or False? Organisms inhabit every depth of the ocean.
9. Scientists classify marine organisms according to

a. where they live and how they move.
b. size and where they live.
c. where they live and how long they live.
d. how they move and what they eat

10. Describe plankton. _____
11. Name three examples of plankton. _____
12. Free-swimming animals that can move throughout the water column are called _____.
13. Name some examples of nekton._____.
14. What are benthos? _____
15. Give some examples of benthos. _____
16. Algae that use sunlight to produce their own food through photosynthesis are called _____
17. What are all nekton?
    a. producers b. consumers c. decomposers d. benthos
18. What do decomposers eat? _____
19. Explain what a food web is. _____
20. Which of the following may eat plankton? _____

a. sea ducks b. blue whales c. other plankton d. all of the above

21. **Think about it.** Name at least three ways in which the ocean's zones differ from one another?

_____

Name_____

The Neritic Zone and the Open Ocean Zone

The part of the ocean that extends from the low-tide line out to the edge of the continental shelf is called the_____.

2. The part of the ocean that extends beyond the edge of the continental shelf is called the _____.

3. Circle the letter of each sentence that helps explain why there is so much life in the neritic zone.

a. The water is shallow.
b. Large, plantlike algae grow there.
c. The water is high in nutrients.
d. Upwelling never occurs there.

4. True or False? A coral reef is made of living organisms.

5. In what kind of climate would you find a coral reef? _____

6. True or False? Reefs protect coastlines during violent storms.

7. Circle the letter of each sentence that is true about kelp.

a. They are algae.
b. They produce their own food.
c. They provide food for sea otters
d. They are found in warm climates.

8. True or False? The open ocean supports fewer organisms than the neritic zone.

9. True or False? The surface zone is the only part of the open ocean that receives enough sunlight to support the growth of algae.

10. What are some deep ocean sea animals able to do to help them find food?

_____

11. The production of light by living things is called _____

12. An area in which heated ocean water rises through cracks in the ocean floor is a(n) _____.

13. Circle the letter of each sentence that is true about organisms around hydrothermal vents.

a. Bacteria produce food from chemicals in the hot water.
b. Tubeworms get their food from the bacteria inside them.
c. The process of making food with heated water and chemicals is called photosynthesis.
d. Giant clams feed on the algae.

14. Bacteria are _____, that is, they are the producers in the food web of the deep ocean.

15. What is the process by which bacteria can produce food in the deep ocean? _____

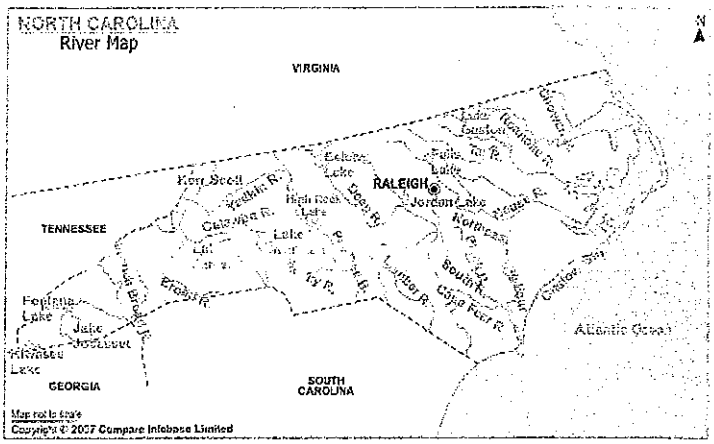
16. What is the chemical that is mostly used in chemosynthesis? _____

17. In photosynthesis, producers get their energy from the sun. Where do the producers using chemosynthesis get their energy? _____.

Name: _____ **The Importance of Estuaries**

You have read that rivers flow to the sea. What happens when they get there? The fresh water from rivers mixes with salt water from the ocean in shoreline areas called estuaries. The water in estuaries is not as salty as ocean water, nor as fresh as river water. This type of water is called brackish. On the map, circle where you would expect to find an estuary.

- Why did you circle these locations?



Estuaries: Plant & Animal Life

Estuaries are bursting with nutrients and life. Estuaries trap nutrients that are carried from the land by rivers and from the ocean by tides. Plants and animals thrive on these nutrients. Worms and many shellfish live along the bottom. Plants and animals too small to see without a microscope float in the water.

Estuary waters are very shallow (in North Carolina, less than thirty feet deep), which allows sunlight to reach the bottom. This promotes lots of plant growth. Roots and grasses offer protection for young fish and other animals. The grasses also form a protective barrier against waves, tides, and storms. Without strong plant roots and grasses, shorelines in tropical areas would be drastically changed by heavy storms.

These small fish and other animals that live in and near the grasses are an important food source for larger fish and for birds. Estuaries are also good provide a protected environment for species to hatch and grow in before they migrate to the sea to live out their adult lives.

- Sometimes estuaries are called nursery areas. Why do you think estuaries have been given that name?

_____

_____

Human Activity & Estuaries

Estuaries are home not only to many plants and animals, but to many humans as well. Many people live near estuaries, and big cities and important commercial ports are often located where rivers meet the sea. Many people use estuaries for recreation, such as boating, swimming, and fishing.

Human activity can harm the estuary environment. For example, some are cleared for shrimp farms and for raising crops. **Others are filled in to make new land for houses and other development.** Industry and shipping can disturb wildlife and alter the estuary habitat. In some places, human waste and other sewage drains directly into the water. Pollution can also be picked up by rivers from farms and cities and emptied into estuaries.

- What 4 human activities are harmful to estuaries?

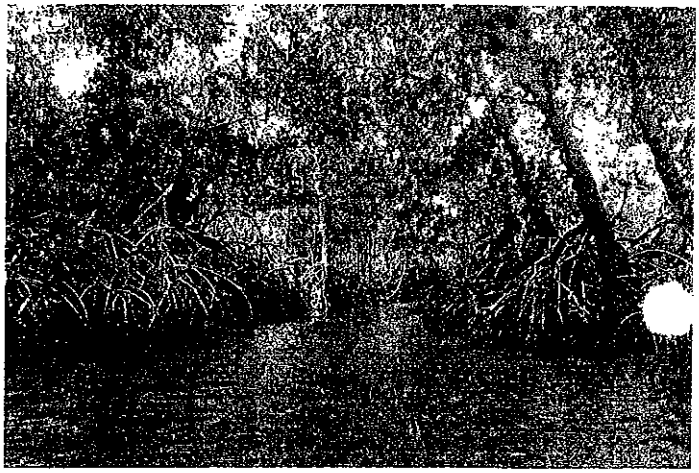
  1.

  2.

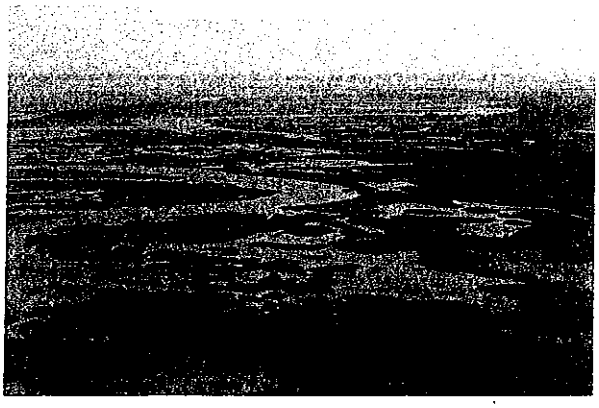
  3.

  4.

2 Examples of estuaries- Mangrove forests and salt marshes



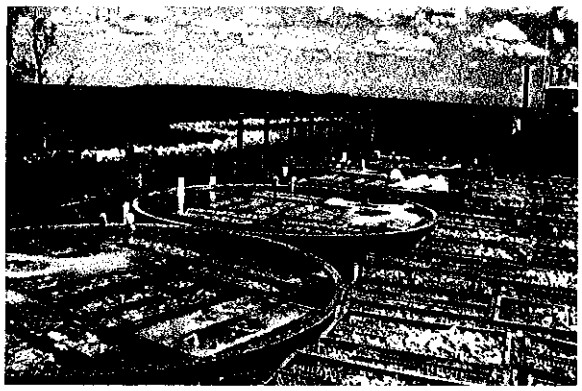
Mangrove swamps are found along the coasts in tropical and subtropical locations. The plants there have to be able to live in salty water. Because mangroves line estuaries, where freshwater rivers flow into the ocean, the water is often brackish – a mix of fresh and salt water. Because of their strong roots, they protect shorelines from erosion. Mangroves can live in changing salinity. Their leaves have specially adapted glands that give off (secrete) the salt they take in plus a waxy covering (cuticle) that keeps their own water from being lost. This allows them to live in a salty environment without drying out. Mangroves are threatened by habitat destruction as they were once cleared for beach front development. Their loss is marked by increased erosion, animal species loss, and increased storm damage and it is now illegal in Florida to cut down a mangrove tree.



Salt marshes are coastal wetlands that are flooded and drained by **salt** water brought in by the tides. Salt marshes protect shorelines from erosion by buffering wave action and trapping sediments. They reduce flooding by slowing and absorbing rainwater and protect water quality by filtering runoff, and by metabolizing excess nutrients. These intertidal habitats are essential for healthy fisheries, coastlines, and communities—and they are an integral part of our economy and culture. They also provide essential food, refuge, or nursery habitat for more than 75 percent of fisheries species, including shrimp, blue crab, and many finfish.

Resources from the Ocean

About 20 % of people depend heavily on fish and other ocean organisms for food. These fish are caught in coastal waters or areas of upwellings. There is concern that the fish population is decreasing because of the improvement of fishing methods. Sometimes the fish can be caught faster than they can reproduce. This is known as **overfishing**. To prevent overfishing, laws need to be passed to limit catches so fish that are caught can be replaces by new fish that are born. In addition to overfishing, by catch, or by-kill is another problem caused by the commercial fishing industry. **By-catch** occurs when fishing nets catch nearly everything in their path. A net used to pick up shrimp will capture turtles, fish, dolphins and other animals. The portion that are caught are tossed back into the ocean either dead or dying. Nets need to be designed to prevent this. Unfortunately, even with improvements, nearly 30% of fish caught are still thrown away.



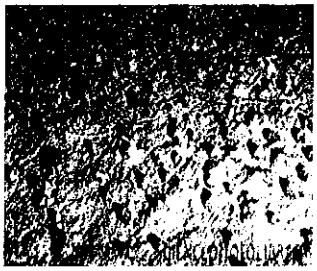
As fish and other aquatic food organisms decline, ***aquaculture*** often becomes the next option. Aquaculture is the farming of saltwater and freshwater organisms. There are many advantages and disadvantages to aquaculture. Providing food for the growing population is an obvious advantage. However, the creation of dead zones, and the clearing of wetlands to provide space for fish farms are just two problems created by them.

Ocean organisms are also important sources of other products besides foods. Ocean organisms also provide materials that are used in products such as detergents and paints. Some are used in making medicines. Many detergents, shampoos, and cosmetics are made from a base of algae, for example. Some sediment containing parts of diatoms are used in abrasives and polishes.

In addition to living organisms, the ocean contains valuable ***nonliving resources***. Some nonliving ocean resources include water, fuels, and minerals. Sediments on the continental shelves are mined for gravel, sand, shells, diamonds, and gold.

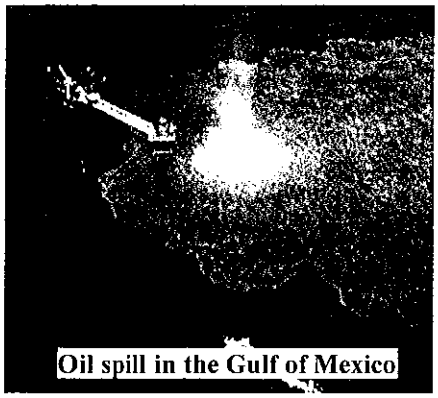
Some metals are obtained when ocean water is *desalinated* to produce fresh water. Other metals collect in lumps called **manganese *nodules*** on the ocean floor.

Manganese nodules on ocean floor



Because they are found so far beneath the ocean's surface, these nodules have not yet been mined.

Fuels are another important ocean resource. Oil and natural gas are formed when the remains of dead organisms sink to the ocean floor. There, the remains are covered with layers of sediments. Over a long period of time, heat and pressure change the remains to oil and gas. The continental shelves have the richest deposits of oil and gas.



Oil spill in the Gulf of Mexico

Although some ocean pollution is the result of natural occurrences, most pollution is related to human activities and comes from the land. Sewage, chemicals, and trash are dumped into the ocean. Runoff from fields and roads contains harmful chemicals. An oil spill from a damaged oil tanker or drilling platform harms marine organisms. There are certain bacteria that live in the ocean that feed on the oil and multiply, eventually cleaning up the oil spilled.

Drilling for oil offshore

Nations own the ocean resources near their land, but no nation owns the open ocean or the ocean floor below it. Because the world ocean is a continuous body of water that has no boundaries, it is difficult to determine who, if anyone should control portions of it. Nations must cooperate to manage and protect the oceans, an attempt made by the United Nations, through its **1994 Law of the Sea**, which calls on countries to enforce pollution controls, regulate fishing and attempts to divide rights to undersea resources.

Garbage on barges to be dumped in the open ocean.

Many people love to visit beaches all over the world. They stay in hotels, hire boats, go out to eat, etc. That means money for the people who live in these areas. **Tourism** provides more than 200 million jobs all over the world. The tourism industry is based on natural resources present in each country BUT tourism often has a ***negative impact*** on coastal and ocean ecosystems.

The negative effects of tourism start with the over development of coastal habitats and the annihilation of entire ecosystems, like estuaries, in order to build hotels and restaurants. Garbage and sewage generated by natives and visitors can add to an already existing solid waste and garbage disposal issue. Often visitors produce more waste than locals, and much of it ends up as untreated sewage dumped in the ocean. This causes eutrophication because it results in excessive algal bloom. It can also lead to disease epidemics.

Ecotourism and **cultural tourism** are a new trend that favors low impact tourism and promotes a respect for local cultures and ecosystems.

Ecotourism is defined as the responsible travel to natural areas which conserves the environment and improves the welfare of the local people. A walk through the rainforest is not eco-tourism unless that particular walk somehow **benefits that environment** and the people who live there. A rafting trip is only eco-tourism if it raises awareness and funds to help **protect the watershed**. This is also known as part **sustainable tourism** because it can actually promote **conservation** of the environment. **Sustainable tourism** is tourism that can be continued for a long time and includes benefits for the social, economic, natural, and cultural environments of an area.

Please type the http and read the article.
http://www.smh.com.au/travel/travel-news/relentless-tourism-spawns-trouble-in-paradise-20130504-2j0bd.html

Name_____

Resources from the Ocean

1. True or False? About 10% of people depend heavily on fish and other ocean organisms for food.
2. The farming of saltwater and freshwater organisms is called _____.
3. Use the table to answer the questions below.

Total Catch (in metric tons)		
Fish Species	1970	1993
Haddock	829,300	226,500
Atlantic cod	2,817,500	1,028,700
Peruvian	11,845,300	7,464,600

4. How did the catches of these three fish change in the period shown?

_____

5. Why do you think these changes might have occurred?

_____

6. What can be done to protect fish populations?

_____

7. What is by-catch? _____
8. Name some ways humans use algae?

_____

9. What are some nonliving resources from the ocean floor?

_____

10. When metals concentrate around pieces of shell on the ocean floor, they form black lumps called

_____.

11. Where are deposits of natural gas and oil located in the oceans?

_____

12. Where does most pollution in the ocean come from?

_____

13. What natural process occurs to help clean the ocean after an oil spill?

_____

14. Describe who owns the oceans and the area they claim as theirs.

_____

15. Why must nations cooperate to reduce ocean pollution?

_____

16. What provides jobs to millions of people but can also hurt the environment?

_____

17. What is sustainable tourism?

_____

18. What is eco tourism?

_____

19. Describe some of the negative effects of tourism on an area?

_____

_____

20. Give an example of eco tourism.

_____

Did you read the article? Thoughts?