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NAME: _____

Before You Read

How the Purity of Salt Water Could Change

1. Put a check mark (✓) next to the answer that is most correct.

a) Which of these would take the longest to decompose in the ocean?

- ○ **A** a cotton sock
- ○ **B** a plastic bottle
- ○ **C** an orange peel
- ○ **D** a wooden barrel

b) Which of these is most hazardous to marine wildlife when spilled from a ship?

- ○ **A** oil
- ○ **B** coal
- ○ **C** lumber
- ○ **D** vegetables

c) All of these are types of ocean pollution, *except*

- ○ **A** plastic
- ○ **B** fertilizer
- ○ **C** greenhouse gases
- ○ **D** spills from oil tankers

2. Circle the word **TRUE** if the statement is TRUE **or** Circle the word **FALSE** if it is FALSE.

a) Most plastic objects quickly dissolve in salt water.
TRUE **FALSE**

b) Sailors never threw things overboard in the early days of shipping.
TRUE **FALSE**

c) Fertilizer runoff can make parts of the ocean unable to support sea life.
TRUE **FALSE**

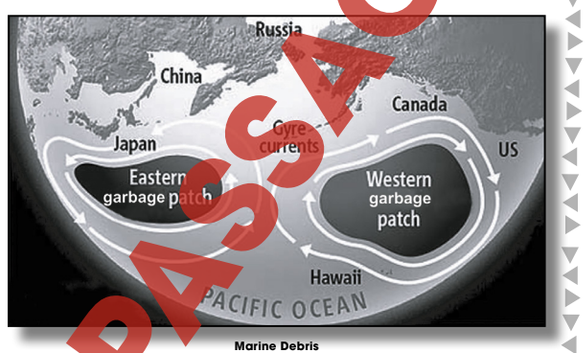
d) Toxic chemicals tend to concentrate in the animals at the top of a food chain.
TRUE **FALSE**

Reading Passage

NAME: _____

How the Purity of Salt Water Could Change

Imagine you are on a boat in the middle of the ocean with no land in sight. You can sail for days and days and see nothing but water. From this viewpoint, the ocean seems enormous, powerful, and mysterious. People once thought the ocean was so large and full of life that the actions of people could not change it. They thought that, no matter what people did to the ocean, it would be the same for all time. But they were wrong.



Marine Debris


Debris in the Great Garbage Patch

Not long ago, ships at sea disposed of all their trash, garbage, and sewage directly into the ocean. Some cities and factories also discharged anything they didn't want into the ocean. For hundreds of years the ocean seemed to swallow all these materials and leave hardly a trace.

But finally we have reached the point where the ocean is no longer able to absorb everything we would like to throw into it. There is a lot of junk floating on the ocean, and some parts of the ocean have more junk than others. Ocean currents cause floating trash to collect in large trash islands. One of the largest of these, the "Great Pacific Garbage Patch," in the North Pacific Ocean is at least as large as

After You Read

NAME: _____

How the Purity of Salt Water Could Change

1. Fill in each blank with a word from the list.

biodegradable	**dead zone**	**mercury**	**habitat**	**fertilizer**

a) _____ runoff from fields can create an ocean _____.

b) _____ tends to concentrate in species at the top of a food chain.

c) Wood is more _____ than plastic.

d) Oil spills cause damage to marine _____s.

2. Put a check mark (✓) next to the answer that is most correct.

a) If a material is biodegradable, it means

- ○ **A** it is toxic to most animal life.
- ○ **B** it is natural rather than synthetic.
- ○ **C** it serves as food for several different species.
- ○ **D** it is decomposed quickly by natural processes.

b) What is the main reason marine debris tends to collect in certain parts of the ocean?

- ○ **A** ocean tides
- ○ **B** trade routes
- ○ **C** wind patterns
- ○ **D** ocean currents

c) What do ocean dead zones lack that is needed to support fish and other marine animals?

- ○ **A** oxygen
- ○ **B** plant life
- ○ **C** nutrients
- ○ **D** carbon dioxide

NAME: _____

After You Read

How the Purity of Salt Water Could Change

3. Answer the questions in complete sentences.

a) Other than the greater amount, what makes today's ocean trash more of a problem than trash thrown in the ocean 200 years ago.

b) Explain why an oil spill is more destructive to ocean habitat than a coal spill.

Extension & Applications

Spreading fertilizer on a field can lead to the death of fish in an area of the ocean. Explain the steps in the processes that lead from fertilizer to dying fish. You will need to describe at least three steps and use the words "runoff", "algae", and "oxygen."

Hands-On Activity # 1

Activity One

Design a Game

Make a board game from a world map. The game will be a contest to see which player can sail around the world first. This is what you will need:

- A large world map. This should be the kind that does not distort the shapes of oceans and continents.
- Objects to represent ships.
- A pair of dice.
- A strip of thin cardboard or thick paper.
- Blank 3 X 5 cards.

This is what you do to prepare the game:

- Find the scale of miles on the map and make a ruler with the strip of cardboard. Use the scale of miles to mark the ruler off in 100s of miles, up to 1200 miles.
- Write these things on the 3 X 5 cards

  - You caused an oil spill. Lose one turn. (on two cards)
  - Free pass through the Panama Canal (on one card—this is the only way you can use the canal.)
  - Free pass through the Suez Canal (on one card—this is the only way you can use the canal.)
  - Arctic sea ice melts. Take a shortcut through the Arctic Ocean. (on one card)
  - You were caught dumping trash in ocean. Go back 1000 miles to pick it up. (on one card)
  - You hit an ice berg. Go to nearest land for repairs. (on two cards)

To play:

- Choose a starting point at a coastal city.
- Shuffle the cards and place them upside down.
- Roll the dice to see who goes first.
- Each turn, roll the dice and move your ship the number of hundreds of miles shown on the dice. (for example, move 700 miles if you roll a 7) Use the ruler you made to measure distance.
- If you roll a double, take a card from the stack. If it is a free pass, keep it until you need it. After you use it, return it to the bottom of the stack. If it is a penalty, you do what it says right away and return the card to the bottom of the stack.
- Play continues until one player's ship circles the globe and returns to the starting point.

After You Read

NAME: _____

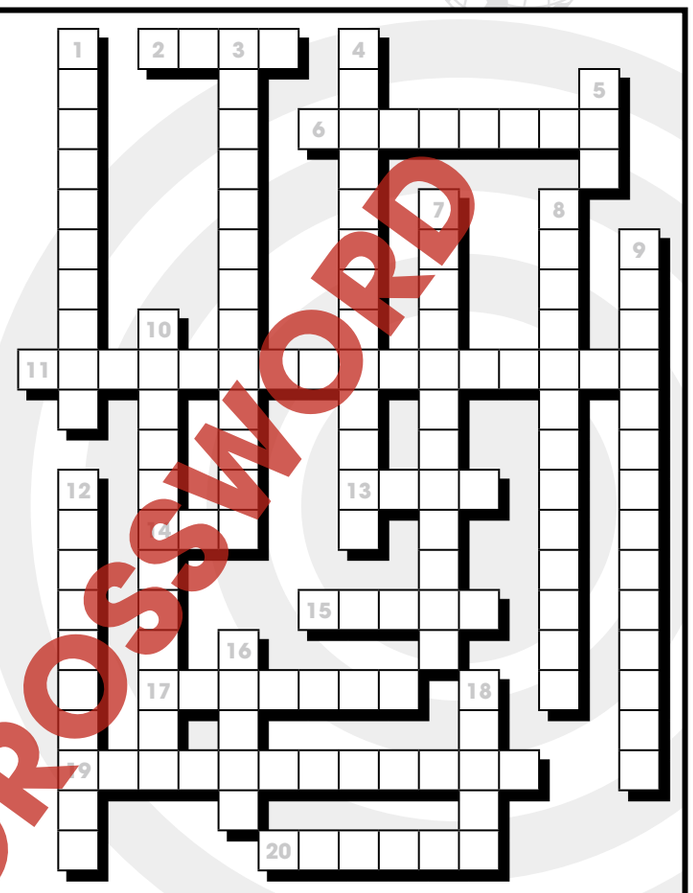
Crossword Puzzle!

Across

2. The chemical formula of sea salt.
6. A part of the ocean where fish cannot live.
11. This keeps Earth's heat from escaping into space.
13. This inland salt sea in Asia has lost 75% of its surface area.
14. Solid water
15. When water evaporates, it becomes water _____.
17. A giant ice cube floating in the ocean.
19. Saving resources by using them more carefully.
20. Oil, coal, and natural gas are _____ fuels.

Down

1. All the gases above Earth's surface make up the _____.
3. Rising global temperature is an example of this.
4. Any one of the gases that trap Earth's heat.
5. A large body of water.
7. The process before precipitation.
8. 3.5% is the _____ of salt in sea water.
9. This process cannot take place below an ocean depth of 2000 feet.
10. Removing the salt from salt water.
12. Evaporation, condensation, precipitation, runoff.
16. Sea _____ is zero altitude.
18. A low-lying tropical island.



Word List

ARAL	DEAD ZONE	LEVEL
ATMOSPHERE	DESALINATION	NaCl
ATOLL	FOSSIL	PHOTOSYNTHESIS
CLIMATE CHANGE	GREENHOUSE EFFECT	SEA
CONCENTRATION	GREENHOUSE GAS	VAPOR
CONDENSATION	ICE	WATER CYCLE
CONSERVATION	ICE BERG	

(Note: For answers of more than one word, do not put a space between the words.)

After You Read

NAME: _____

Comprehension Quiz

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Part A 7

Circle the word **TRUE** if the statement is TRUE **or** Circle the word **FALSE** if it is FALSE.

1. All Earth's salt water is in the oceans.
   TRUE **FALSE**
2. Ocean water is 71% salt.
   TRUE **FALSE**
3. Water enters the ocean through runoff and leaves by evaporation.
   TRUE **FALSE**
4. An increased greenhouse effect will lead to higher ocean levels.
   TRUE **FALSE**
5. Most of Earth's ice is in icebergs.
   TRUE **FALSE**
6. Fertilizer runoff can cause ocean dead zones.
   TRUE **FALSE**
7. Materials poured down storm drains go to sewage treatment plants.
   TRUE **FALSE**

Part B 3

Put a check mark (✓) next to the answer that is most correct.

a) Which of these is a greenhouse gas?
- ○ **A** oxygen
- ○ **B** nitrogen
- ○ **C** carbon dioxide
- ○ **D** sodium chloride

b) What percent of Earth's water is salt water?
- ○ **A** 3.5%
- ○ **B** 29%
- ○ **C** 71%
- ○ **D** 97.7%

c) What problem might people living on tropical atolls face if global temperature continues to rise?
- ○ **A** drought
- ○ **B** flooding
- ○ **C** pollution
- ○ **D** tsunami

SUBTOTAL: /10

Chemical Composition of Seawater

NAME: _____

After You Read

How the Purity of Salt Water Could Change

3. Answer the questions in complete sentences.

a) Other than the greater amount, what makes today's ocean trash more of a problem than trash thrown in the ocean 200 years ago.

b) Explain why an oil spill is more destructive to ocean habitat than a coal spill.

Extension & Applications

Spreading fertilizer on a field can lead to the death of fish in an area of the ocean. Explain the steps in the processes that lead from fertilizer to dying fish. You will need to describe at least three steps and use the words "runoff", "algae", and "oxygen."

3.

a) Most of the materials thrown into the ocean 100 years ago were biodegradable.

b) Oil floats on the surface where it sticks to animals and damages habitat, whereas coal sinks to the bottom.

Extension & Applications

Answers will vary:
The steps leading from fertilizer runoff to dying fish are as follows:

Fertilizer runs from fields and into streams that lead to the ocean.

Nutrients in fertilizer encourage the growth of marine algae.

Algae die.

Algae are decomposed by organisms that remove oxygen from the water.

Fish die from lack of oxygen.

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Activity Two

- Challenger Deep in the Mariana Trench
- 11,000 meters
- 1,095 as great as at the surface
- Yes—flat fish, sea worms
- Two
- Ooze, flatfish, sea worms, shrimp
- Spherical steel cabin, self-propelled, gasoline-filled float, iron shot ballast
- There are currently no vessels capable of carrying people to the Challenger Deep.

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Activity Three

- Ocean, 3.5%; Great Salt Lake, about 14%(varies greatly); Dead Sea, 30%
- It would be easier to float in all these bodies of water than in fresh water. It would be difficult to sink in the Great Salt Lake or the Dead Sea.

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Activity Four

- To nearly all parts of the ocean
- They were not biodegradable.
- The packaging decomposed in sea water.
- Yes. One of the largest caused Nike shoes to wash up on beaches all over the world.
- The paths of the toys gave scientists a more accurate idea of the paths followed by ocean currents.

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