

Experiment: Salt Concentration in Ocean Water
(E. Science 9-18-1c)

Purpose: To consider the effects of large concentration of salt in soil and to demonstrate how the salt concentration in ocean water increases.

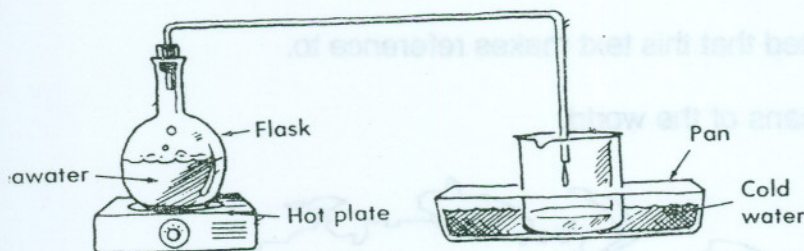
Materials: beaker (100 mL) heat lamp
sand flask hot plate
stopper (1 hole) towel salt
glass tubing with bend glycerol
plastic storage box water

Methods: **Part A: Effects of Large Concentration of salt in soil.**

1. Mix 100 mL of salt with 100 mL of sand. Pour the mixture into the bottom of the storage box. Add enough water to dissolve the salt. Cover this mixture with a layer of sand five centimeters thick.
2. Set the pan under the heat lamp or in a sunny location. Allow the pan to remain undisturbed overnight.
3. Record your observations, include a sketch.

Part B: Increasing Salt Concentration

1. Dissolve 10 mL of salt in 50 mL of water and pour it into the flask. Record the volume of "ocean water" in the results table.
2. Set up the distillation apparatus as shown in the figure.
3. Place a flask on the hot plate. Slowly boil the water until all the water has evaporated.



4. Record the volume of water recovered in the beaker. Record in results table.
5. Record the appearance of the bottom of the flask under "Observations" in results table.

Results:

Part A: Observations: _____

Part B:

Volume of salt water: _____ mL volume of water recovered: _____ mL

Observations: _____

Conclusions:

1. What happened to the water in the flask as you boiled the solution?
2. What happened inside the flask that was being heated?
3. Would the water in the heated beaker taste salty?

4. Would the water in the cool beaker collecting the steam taste salty?
5. What remains in the flask that was heated?
6. Is the amount of water you placed in the heated beaker the same as the beaker in which you cooled the vapor? Explain.
7. What did you observe on the sides of the flask that was heated?
8. How might the desalination process be used to extract minerals from seawater?
9. Explain how desalination produces fresh water?

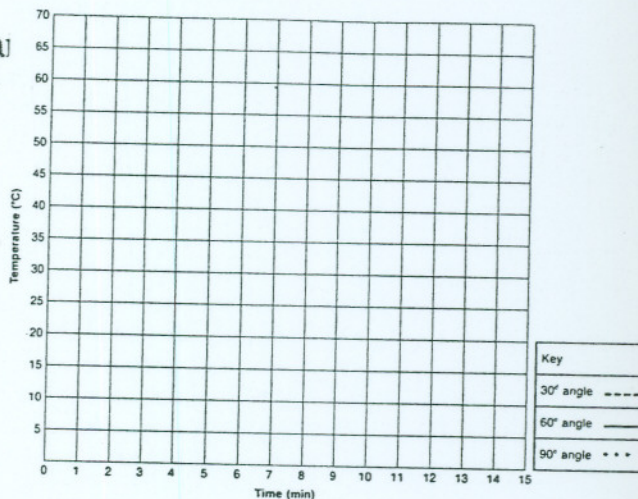
Discussion:

1. If a stream flowed through the sand and salt mixture, what would happen to the salt?
2. In areas that use river water for irrigation, how could salt become a problem?
3. Explain how the salt content of the ocean is increased naturally.
4. Why is the distillation of ocean water on a large scale not profitable?
5. On a windy and rainy day, near the oceans, the air tastes salty. What does this tell you about salt in the water cycle near oceans?
- 7a. Read Nehemiah 9:6. Who created the oceans (seas)?
- 7b. List all the other things that God created that this text makes reference to.
8. On the world map below, label the oceans of the world.



Part B: Angle of Insolation and Temperature

time	30°	60°	90°
0	_____	_____	_____
2	_____	_____	_____
4	_____	_____	_____
6	_____	_____	_____
8	_____	_____	_____
10	_____	_____	_____
12	_____	_____	_____
14	_____	_____	_____
16	_____	_____	_____



Conclusions:

1. Which point on the globe moved the farthest distance in all three trials?
2. Which point on the globe moved the least distance in all three trials?
3. Which point on the globe did not move at all in the three trials?
4. If you were located on the earth at 60° S at what latitude N would you have the same linear velocity?

Discussion:

1. On what does the linear velocity of a point on Earth depend on?
2. How does the linear velocity change as you move from the equator to the pole?
3. If you have greater velocity at the equator does this mean you have greater or less inertia?
4. How would this greater velocity affect the shape of our Earth?
5. What is the relationship of the size of the angle of insolation and the temperature?
As the angle of insolation increases the surface temperature will _____
6. In reference to the northern hemisphere describe the direction of the Earth's axis throughout the year.
7. What causes the seasons?
8. If you were at the North Pole when will the sun not set as the Earth rotates?
9. Since the North Pole sometimes has 24 hours of sunlight, why is the North Pole always cold?
10. In the Northern Hemisphere on what days does each season begin?
spring: _____ fall: _____
summer: _____ winter: _____
11. On the fourth day of creation (Gen 1: 14 - 19) God created day and night. What Earth process must God have started so that there is the cycle of day and night?
12. What must He have started so that there would be years?
13. To have seasons what must God have done to the orientation of the Earth axis?