CST: ——
Chem 2d.h
7a.c

Weather or NOt

171

ChemCatalyst

Q: What is weather? What causes weather?
Q: How do meteorologists predict things like weather?

* Show pic on screen *

Notes:

- What is weather?

- Weather is an interaction between...
  1. the sun (a heat source)
  2. water
  3. Earth's surface
  4. Atmosphere (gases in it)

172

Student Worksheet

Weather or Not

Name: _____

Date: _____Period _____

Purpose: In this activity you will heat and cool water in a flask with a balloon attached. Your observations will help you determine what makes the water "cycle."

Materials
250 mL Erlenmeyer flask
25 mL graduated cylinder
Medium sized party balloon
5 mL of water
Hot plate
Oven mitt
Ice

Procedure:
1. Place about 5 mL of water into a 250 mL Erlenmeyer flask.
2. Place the open end of a balloon over the mouth of the Erlenmeyer flask
3. Heat the flask on a hot plate until the water boils. Do not boil all the water away. (The hot plate setting should be about 4.)
4. After several minutes, use a towel or oven mitt to remove the flask from the hot plate.
5. Hold the flask standing upright in ice water.
6. Reheat and re-cool as desired to observe.

Optional additional investigation:
Repeat the procedure given above, except reverse steps 2 and 3: Once the water is boiling, remove the flask from the hot plate with an oven mitt. Put the balloon on the flask (be careful, the glass is very hot!) Once the balloon is attached, put the flask back on the hot plate.

Answer the following questions:
1. What did you observe when the flask was heated?

balloon inflates

2. What did you observe when the flask was cooled?

balloon deflates

3. Why did the balloon get so large?

$H_2O(l) \rightarrow H_2O(g)$ to inflate the balloon

4. What happens to the water molecules as the flask is cooled? What evidence d you have to support your answer?

$H_2O(g) \rightarrow H_2O(l)$ as seen in the water droplets on the flask

5. Water droplets come together to form clouds in the atmosphere at an altitude o about 2,000 meters. Do you think the air in the atmosphere becomes hotter or colder as the altitude increases? Explain using evidence from this experiment.

$H_2O(g) \rightarrow H_2O(l)$ in clouds so the temp must be colder

6. Gaseous water is also called water vapor. Humidity is the measure of the amoun of water vapor in the air. As the temperature of the air increases, what do you think happens to the humidity? Explain your thinking.

Humidity increases as temp increases because more $H_2O(l)$ can is turned to $H_2O(g)$

7. A meteorologist would say the pressure of the air inside the heated flask is greater than the pressure of the air inside the cooled flask.

   a) What evidence do you have that the pressure inside the heated flask is greater

balloon inflates

   b) What do you think air pressure measures?

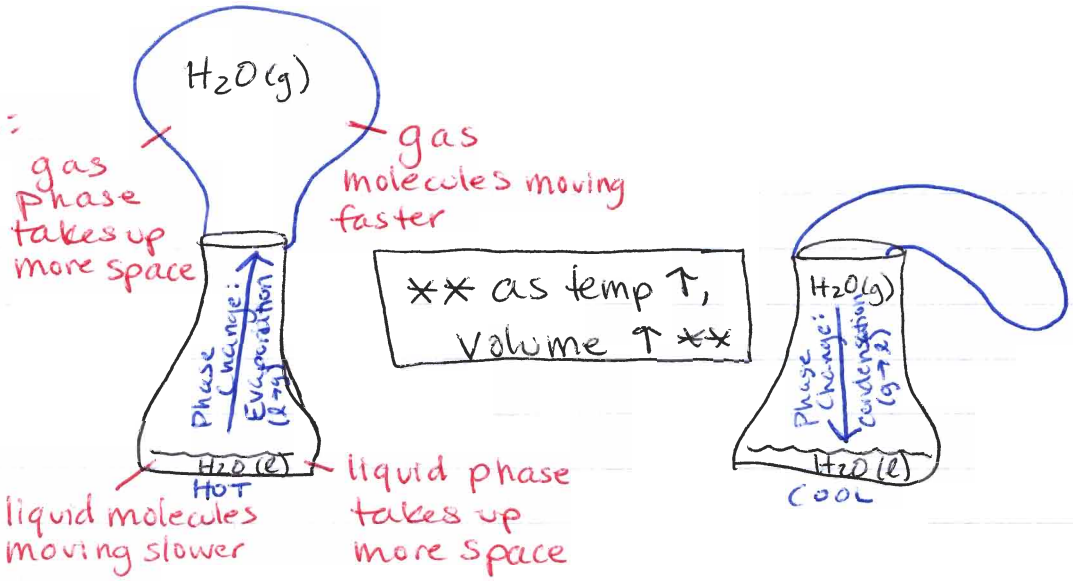
air molecules push on things

Making sense:
Based on this experiment, explain what causes water to "cycle" around the planet?

If you finish early…
Do the optional experiment. Explain your observations.

Making Sense Notes:

- Describe the molecular behavior & phase changes in our lab:



- What are phase changes?

- phase change: conversion between (s), (ℓ) & (g)
  - * type of physical change: the form or temperature of a substance is changed w/out changing its chemical make-up

- What phase changes require energy?

① Melting: (s) → (ℓ)
② Vaporization/Evaporation: (ℓ) → (g)
③ Sublimation: (s) → (g)

- What phase changes release energy?

① Condensation: (g) → (ℓ)
② deposition: (g) → (s)
③ freezing: (ℓ) → (s)

- What is a phase diagram?

- phase diagram: a graph of pressure vs. temperature that shows in which phase a substance exists under different conditions of temperature & pressure