

Lab # \_\_\_\_\_ Mystery Blue

Name \_\_\_\_\_

Mod \_\_\_\_\_ Student number \_\_\_\_\_

Date \_\_\_\_\_

Materials: flask, solid stopper, dextrose, methylene blue indicator, water, graduated cylinder, NaOH, forceps, beam balance, scoopula, safety glasses, lab apron

Procedure:

- ( )1. Place 35 mL H<sub>2</sub>O in the flask.
- ( )2. Zero the balance. On separate pieces of paper, weigh out 0.7 g NaOH and 0.4 g dextrose. Have your instructor check these amounts before proceeding with the laboratory!

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NOTE: NaOH is in pellet form and must be handled with forceps, not with your fingers. NaOH is a poison and will cause severe burns to the skin and eyes.

- ( )3. Add each of the above chemicals to the water in the flask.
- ( )4. Place the stopper on the flask. While holding the stopper in place with your thumb, shake the contents of the flask until both solids have completely dissolved.
- ( )5. Add 10 drops of methylene blue indicator to the contents of the flask.
- ( )6. Replace the stopper on the flask. Leave the stopper in place for the remaining portion of this laboratory. Now SWIRL the liquid gently until the entire solution is a distinct blue.
- ( )7. Allow the bottle to stand for a few minutes until the blue fades and the solution becomes colorless. IF YOUR SOLUTION DOES NOT BECOME COLORLESS YOUR MEASUREMENTS WERE INCORRECT OR YOU FAILED TO FOLLOW THE INSTRUCTIONS.
- ( )8. Now pick up the bottle, and while holding the stopper in place with your thumb, give the flask one or two quick jerks upward. The solution should again turn to blue. Upon standing for a few minutes the color again gradually fades and then becomes colorless. IF YOUR LIQUID FAILS TO DO THIS YOU LABORATORY GRADE WILL BE LESS THAN SATISFACTORY.
- ( )9. Step #8 may be repeated many times if your measurements were correct. When you are through observing the contents of the bottle, bring both the bottle and this paper to your instructor for verification of your success.

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initials

- ( )10. Complete the assigned follow-up activity on the next page.

## Follow-up: Mystery Blue

Explanation: Oxygen plays an important role in this chemical reaction. When oxygen is in the solution the liquid is a deep blue. The air above the flask provides the oxygen when the flask is shaken. If the flask is allowed to sit combining with the dextrose gradually uses up the oxygen. The solution without oxygen is colorless. This reaction may be observed many times depending upon how often the flask is shaken.

1. What is it that the air above the liquid in the flask provides?
2. Why is it necessary to shake the flask and its contents?
3. What happens to the oxygen in the liquid if the flask is allowed to sit?
4. What color is the liquid after the oxygen has been used up?
5. What color is the liquid in the flask when oxygen is in the solution?
6. Shaking the flask allows the reaction to be observed many times. Why?

Oxygen - physical properties (Complete the following on this sheet of paper.)

- |                               |                         |
|-------------------------------|-------------------------|
| a. symbol                     | j. number of neutrons   |
| b. atomic number              | k. number of electrons  |
| c. atomic weight              | l. melting point        |
| d. state                      | m. boiling point        |
| e. color code (Sargent-Welch) | n. density at 0°C       |
| f. metal/non-metal            | o. color                |
| g. period                     | p. atomic diagram       |
| h. group                      | q. electron dot formula |
| i. number of protons          | r. valence              |

2. What is the percentage of oxygen in the earth's atmosphere?
3. What is O<sub>3</sub>?
4. What important role does O<sub>3</sub> play in protecting the earth?
5. Oxygen has several isotopes. How many are there?
6. If you wished to purchase oxygen, how much would it cost per cubic foot
7. List several commercial uses for oxygen.