Name _____ Mod _____ Student Number_____

Lab # _____ Bernoulli's Principle

Directions: For each of the following mini-labs you are to provide a complete set of observations, detailed diagrams which have been carefully labeled, and a set of conclusions. All observations and conclusions are to be in COMPLETE SENTENCES. You may use your text as a reference when answering conclusion questions.

A. Materials: two candles of equal height, matches, drinking straw

1. Set up two candles one to two inches apart from each other. Light the candles.

2. Take a straw and blow a stream of air BETWEEN the candle flames. DO NOT PLACE THE STRAW BETWEEN THE FLAMES. Notice which way the flames bend.

3. What happens to the candle flames when you blow between them?

4. Use Bernoulli's Principle to explain why the candle flames bend the way they do. Don't forget to include a DETAILED DIAGRAM. Label all parts of the experiment. (Include areas of high pressure, low pressure, air movement, movement of the flame, etc.)

B. Materials: funnel, styrofoam ball

1. Wash the funnel in soapy water and rinse. Hold the funnel upside down. Place the styrofoam ball as far into the funnel as it will go. Hold the ball in place with your fingers.

2. Blow HARD into the stem of the funnel and release the ball while you are blowing. Observe what happens to the ball. Note: the harder that you blow the more firmly the ball resists leaving the funnel.

3. Explain why the ball remains in the funnel even though you are attempting to blow it out. What happens when you stop blowing?

C. Materials: 2 styrofoam balls, tape, thread, ring stand, ring, a straw

1. Tape the end of a piece of thread to each of the styrofoam balls. Tape the other ends of the threads to the ring on your ring stand so that the balls are suspended above the table and about 3/4 of an inch apart.

2. Use the straw to blow a stream of air between the two styrofoam balls. Notice the way they move.

3. What happens when you direct the air stream between the styrofoam balls? Try blowing softer then harder.

4. Use Bernoulli's Principle to explain your observations.

D. Materials: sheet of notebook paper, straw

1. Fold the sheet of notebook paper in half. Stand the paper so that the fold faces up. (See diagram.)

2. Use the straw to blow a stream of air through the center of the open space in the folded paper. Note which way the paper bends when you blow through the straw. Try blowing harder then softer. What happens when you blow and change the air speed under the folded paper?

3. Explain your observations using Bernoulli's Principle.

E. Materials: index card, pin, wooden spool

1. Place the pin through the center of the index card. Lower the pin, with the card attached, into the opening in a spool.

2. Blow through the other end of the spool. Are you able to blow the card from the spool? While blowing through the spool, point the card in different directions (up, down, and sideways). Does this make any difference in your ability to blow the card from the spool?

3. Explain what happens.

F. Materials: large test tube, small styrofoam ball

1. Rest the test tube on a horizontal surface. Place the styrofoam ball in the test tube approximately one inch from the mouth. (See diagram.)

2. Use the straw to direct a stream of air at a slight angle AWAY FROM THE MOUTH of the test tube. Observe the motion of the ball.

3. In which direction does the ball move?

4. Use Bernoulli's Principle to explain your observations.

G. Materials: sheet of notebook paper

1. Hold a piece of notebook paper against your chin and blow hard over the top of the paper. Observe the motion of the paper.

2. Explain why the paper behaves as it does.

H. Materials: dime, petri dish

1. Place a dime on a table with its center 2 inches from the edge. Behind the dime place a petri dish with its center 8 inches from the table's edge.

2. With you lips 1/4 inch above the edge of the table, BLOW HARD OVER THE DIME toward a point about 6 inches above the middle of the dish. With practice you will see the dime rise up in the air stream and fly with it into the dish or over it.

3. Explain why the dime behaves as it does.

I. Materials: flask, glass tubing (1 short, 1 long), 2-hole stopper, rubber hose, small styrofoam ball

1. Arrange the materials as shown in the diagram.

2. Rest the styrofoam ball directly above the opening of the longer glass tube. Blow into the rubber tube. The ball should rise into the air and appear to float.

3. Explain why the ball remains suspended in the air.