Name: _____

Conservation of Mass

Purpose: Is mass conserved during physical changes?

Part 1: Cutting Paper

Materials:

- Scale
- 8.5" x 11" sheet of paper

Procedure:

1. Measure the mass of the piece of paper using the scale. Record this measurement.
2. Rip the piece of paper into 12 pieces.
3. Measure the mass of each of the 12 pieces individually and add the total mass together.
4. Measure the mass of all 12 pieces at the same time.

Data:

Mass of whole paper (g)	Mass of each piece (g)												Mass of 12 pieces (g)

Part 2: Inflating Balloon

Materials:

- Scale
- Empty plastic soda bottle
- Container filled with ice, water, and salt
- 2 balloons
- Paper towel

Procedure:

1. Blow up one of your balloons.
2. Use the scale to measure the mass of your blown up balloon and the mass of your empty balloon.
3. Record and compare these masses.
4. Blow up the empty balloon and stretch the opening of the inflated balloon over the opening of the soda bottle.
5. Measure the mass of the bottle-balloon contraption. Record this measurement.
6. Place the bottle with attached balloon into the container filled with ice, water, and salt. Allow bottle to sit in the ice bath for 1 minute.
7. Make observations about what happened to the balloon and to the mass of the system.
8. Use the paper towel to remove all condensation from the bottle and balloon.
9. Measure the mass of the bottle-balloon contraption and record this measurement.

Data:

Mass of inflated balloon	Mass of deflated balloon	Original mass of bottle-balloon contraption	Final mass of bottle-balloon contraption

Observations:

Part 3: Changing State

Materials:

- Erlenmeyer flask or empty glass bottle
- Hot pate
- Scale
- Bucket filled with ice water and salt
- Balloon
- Tongs
- Goggles

Procedure:

1. Fill the glass flask or bottle halfway with water.
2. Place the bottle onto the hot plate.
3. When steam begins to rise from the top of the bottle, quickly cover the bottle with the balloon and remove from the hot plate.
4. Submerge the bottle into the ice, water, and salt bath. Allow the bottle to sit inside the bath for 1 minute.
5. With the balloon still stretched over the lip of the bottle, push the balloon inside the bottle.
6. Measure the mass of the bottle and balloon. Record this measurement.
7. Place the bottle and balloon back onto the hot plate. Allow the water inside the bottle to boil.
8. Once the water starts to boil, remove from the heat and measure the mass once more.

Data:

Initial Mass	Final Mass

Observations:

Analysis and Conclusion:

1. Explain your results from all three parts.

2. Is mass always conserved in a physical change?

3. Why is it important to understand that mass cannot be created or destroyed?

4. How did Part 3 differ from Parts 1 and 2?

5. Why was it important to have a closed system in this experiment?

6. What other experiments could you perform to test conservation of mass in a physical change?