Conservation of Mass Lab



Name: ______ Partner(s): ______



"Now a little green food coloring so it looks cool."

Safety:

- <u>Never taste</u> or eat anything in the science room.
- Wash your hands and equipment thoroughly before and after completing this activity
- Goggles must be worn at all times

Some pre-lab brain activity (3 marks):

- 1. What is the law of conservation of mass?
- 2. Why is it hard to prove the law when a gas is produced?
- 3. What is the difference between an "open" system & a "closed" system?

In this activity you will show experimentally conservation of mass.

Question:

During chemical reactions can all mass be accounted for and measured?

Materials:

• See each experiment

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Name:			

Partner(s): _____

Reaction 1: Baking soda and Vinegar (3 marks)

Materials: 2 beakers, balance, vinegar, baking soda, plastic bag

Part 1: Open System

- 1. Calibrate, or set the balance to 0.
- 2. Fill a beaker with 20 mL of vinegar.
- 3. Add one spoonful of baking soda into the second beaker.
- 4. Place both beakers on the balance & record the starting mass.
- 5. Dump the baking soda into the beaker. Do not stir.
- 6. Place the empty beaker back on the balance. Record the ending mass, including both beakers.
- 7. Calculate the amount of mass changed.

Part 2: Closed System

- 1. Clean & dry both beakers.
- 2. Fill a clean beaker with 30 mL of vinegar.
- 3. Add one spoonful of baking soda into a clean plastic bag.
- 4. Gently place the beaker with vinegar in the plastic bag. Do NOT spill the vinegar!
- 5. Try to push all air out of the bag. *Seal* the bag & place it on the balance without spilling the vinegar. Record the starting mass.
- 6. Without opening the bag, tip the beaker, mixing the vinegar with the baking soda.
- 7. Still without opening the bag, record the ending mass of the contents of the plastic bag.
- 8. Calculate the amount of mass changed.

Analysis (4 marks):

1. Compare part 1, the open system, to part 2, the closed system. What was the same? What was different?

2. How does the conservation of mass relate to this activity?

Baking Soda & Vinegar:		
<i>Open</i> System		
Starting mass:	g	
Ending mass:	g	
Amount Changed:	g	



Name:	
Partner(s):	

<u>Reaction 2: Effervescent Tablet and Water</u> (3 marks) Materials:

- One Erlenmeyer flask
- Water

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• Balloon

Scale

• Three effervescent tablets

Procedure:

Using the materials above create and briefly explain how you will test conservation of mass using an effervescent tablet and water in an open and closed system. Hint: You may want to start by figuring out what happens when you mix an effervescent tablet with water.

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Part 1: Open System (3 marks)

Part 2: Closed System (3 marks)

Effervescent Tablet and Water:
Open System
Starting mass: g
Ending mass:g
Amount Changed: g

Name:	 	
Partner(s):		

Analysis (6 marks):

1. Scientists write chemical reactions like mathematical formulas. The reactants are on the left of the arrow & the products are on the right of the arrow.

Reactants → Products

The effervescent tablet contains a chemical called sodium bicarbonate (baking soda!). This chemical reacts with water according to the following reaction:

$H_20 + NaHCO_3 \rightarrow NaOH + CO_2 + H_20$

a. Count the number of each element, on each side of the equation, & record below. For example, there are 3 hydrogens on the reactant side.

Element	Hydrogen	Carbon	Oxygen	Sodium
Reactants	3			
Products				

- b. Is this reaction "balanced"? Hint: Are there the same amount of each element on both sides of the equation?
- 2. Compare part 1 of this reaction, the open system, to part 2, the closed system. What did you notice?

3. How does this reaction compare to the reaction of baking soda & vinegar?