



# THE LAW OF CONSERVATION OF MASS

Students .....

Class ..... Date ..... Group number .....

## EXPERIMENT 1

### MATERIALS

laboratory balance, graduated cylinder, funnel, teaspoon, baking soda, vinegar, balloon.

### PROCEDURE

*See what the teacher does and number the steps from 1 to 7.*

- Take note of the total weight.
- Carefully pour baking soda into the graduated cylinder.
- Put a teaspoon of baking soda into the balloon, using the funnel.
- Pour about 5 mL of vinegar into the graduated cylinder.
- Put the full balloon and the graduated cylinder, with vinegar inside, on the balance pan.
- Take note of the total weight.
- Put the empty balloon on the balance pan.

### WHAT HAPPENS

Starting total weight is ..... g

After pouring the baking soda into the graduated cylinder we have observed effervescence.

Final total weight is ..... g

## CONCLUSIONS

Since the final weight is smaller than the initial one, in the reaction a little mass has been lost..... Lavoisier was wrong!!!

The law of conservation of mass is false!!

... but it isn't possible.... There must be a mistake...



During the experiment, some of the mass has been ..... (added, lost or balanced?) into the ..... (container, vinegar, or atmosphere?) because of the effervescence!

If we close the graduated cylinder with the balloon before pour the baking soda into the container, we create a closed system and no gas and no mass can be lost.

Now let's repeat the experiment!

# EXPERIMENT 2

## MATERIALS

The same tools and substances.

## PROCEDURE

*Do this second experiment.*

- 1) Pour about 5 mL of vinegar into the graduated cylinder.
- 2) Place a teaspoon of baking soda into the balloon, using the funnel.
- 3) Put the full balloon and the graduated cylinder, with vinegar inside, on the balance pan.
- 4) Take note of the total weight.
- 5) Close the graduated cylinder with the balloon then pour the baking soda in it.
- 6) Take note of the total weight.

## WHAT HAPPENS

Starting total weight is ..... g

When we poured the baking soda into the graduated cylinder we have observed effervescence and the balloon is blown up.

Final total weight is ..... g

## CONCLUSIONS

If we close the graduated cylinder with the balloon and pour the baking soda in it, we create a closed system so that no gas and no mass can be lost.

Lavoisier's law is safe!

**In a chemical reaction the mass of the products is equal to the mass of the reactants.**

The effervescence is produced by the bubbles of CO<sub>2</sub> (carbon dioxide) released by the reaction below.



acetic acid (vinegar) + sodium bicarbonate (baking soda) = sodium acetate + water + carbon dioxide

*HOMEWORK: draw a picture of this second experiment.*