

CONTAIN YOUR EXCITEMENT



STUDENT WORKBOOK



CHEMISTRY – IT'S IN THE BAG!

Big changes can happen in small spaces. Watch what happens when you mix calcium chloride and sodium bicarbonate in a bag!

I

SO MANY CHANGES, SO LITTLE SPACE

This experiment will get you thinking about how changes on a microscopic level lead to changes we can observe.

WHAT YOU NEED:

FROM THE KIT:

- Sodium bicarbonate (baking soda)
- Bromothymol blue
- Calcium chloride
- Goggles
- Measuring scoop
- Pipet

- Graduated cup
- Spring scale
- Vial (without cap)
- Zip-close bag
- Stir rod

OTHER ITEMS:

- Water

WARNING! DO NOT EAT OR DRINK anything in this kit.
WARNING! Calcium chloride is a minor skin and eye irritant.
If you touch it, wash your hands. Wear eye protection.



WHAT TO DO:

STEP 1

Fill the plastic vial about three-quarters full with water



STEP 2

Shake some calcium chloride into the measuring scoop until it's full. Pour the calcium chloride from the scoop into the water, then stir with the stir rod for about 30 seconds.

Properties and Changes

Remember, chemistry is the study of what matter is like and how it changes. Properties are how we describe what matter is like, while changes are events that happen.

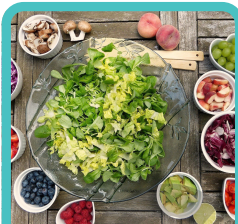
Properties and changes can be further classified as physical or chemical. A **physical change** is something that happens to a substance or object that doesn't change the identity of that substance. Physical change involves changing the size, shape, or state of something. A **chemical change** is something that happens to a substance or object and makes new substances. Chemical changes are sometimes called chemical reactions.

A **physical property** is a quality of a substance or object that can be observed using the five senses or by simple measurement. A **chemical property** is a quality of a substance or object that you can only observe by performing a chemical reaction. Here are some examples of physical and chemical properties and changes.

PHYSICAL PROPERTY



length



color

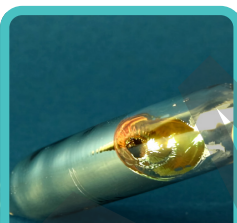


state of matter



solubility
(how well it dissolves)

CHEMICAL PROPERTY



reactivity



acidity



flammability



radioactivity

PHYSICAL CHANGE



rolling flat



tearing



changing state



dissolving in water

CHEMICAL CHANGE



corrosion (rusting)



acid-base reaction



combustion reaction

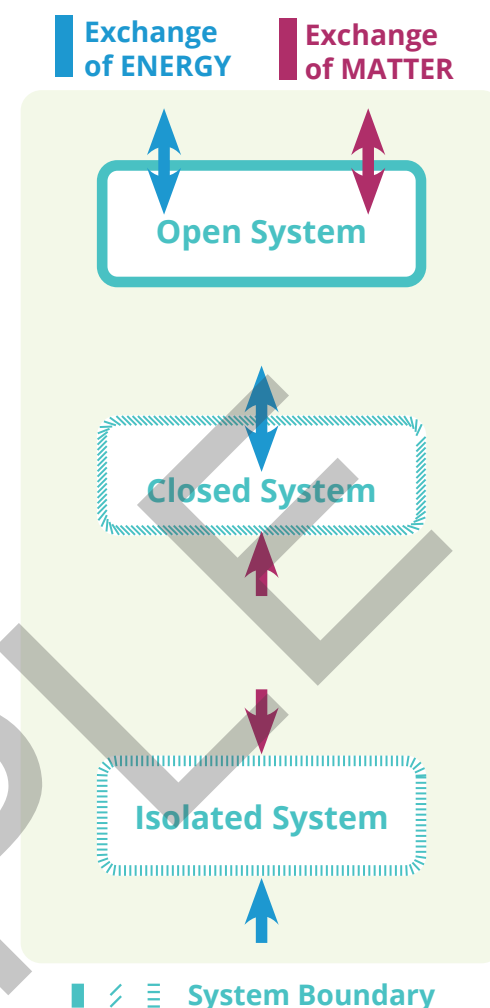


nuclear explosion

When the zip bag is open, substances can go in and out. Even if solid and liquid stay in the open bag, gases from outside the bag can come in, and gases from inside the bag can escape. A system that lets matter in and out is an **open system**.

If the bag is closed, matter can't go in or out, and the bag is a **closed system**.

Systems can be open or closed to either matter or energy. A system that is open for matter is also open to energy. A system that is closed for matter might be an open system in terms of energy. In the case of the bag, you can feel heat energy being released, so you know the system is open for energy even though it's not open for matter. A system that is closed to both matter and energy is an **isolated system**.

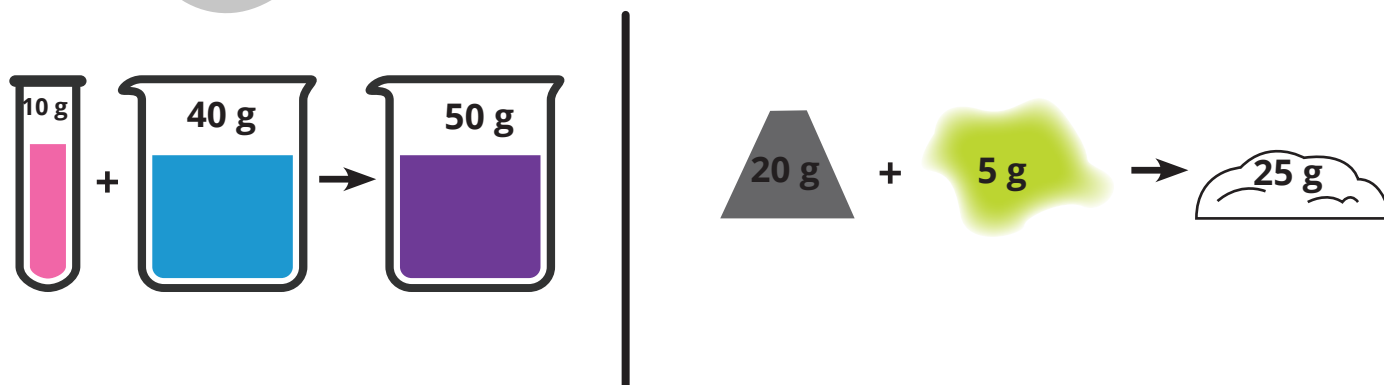


7

Conservation of Mass

Hundreds of years of scientific investigation have made it clear: the total mass of a closed system is always the same before and after a change, whether that change is physical or chemical. This is the Law of Conservation of Mass. It is sometimes called the Law of Conservation of Matter and restated as "Matter cannot be created or destroyed."

According to the **Law of Conservation of Mass**, if the system is closed, then all the mass present before a change must be present after a change. No mass can leave, and no mass can come in. Here are some examples of mass being conserved.





1. Did any of the experiments result in a change in mass? If so, which ones?
2. For the experiments in which the mass changed, was the Law of Conservation of Mass followed? Explain.
3. For the Alka Seltzer – Open Bag and “Baking” Baking Soda experiments, where did the lost mass go? Explain.
4. For the Burning Steel Wool experiment, where did the gained mass come from? Explain.



© Home Science Tools. All rights reserved.
Reproduction for personal or classroom use only.

Contact us at: www.homesciencetools.com/customer-service/

A Product of Homesciencetools.com

Kit	SU-CONTYR
Instructions	IN-CONTYRS
Revision Date	3/2021