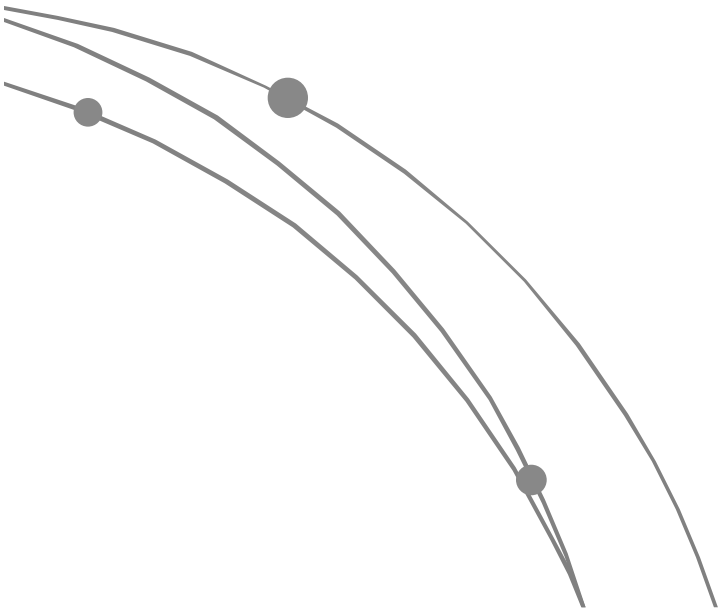
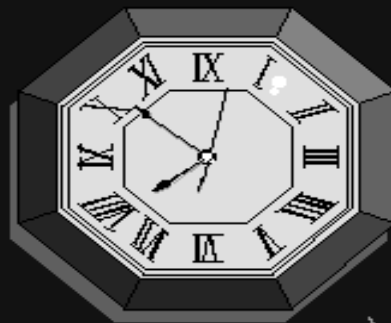


What is matter?



Notes

Matter is anything
that takes up space.



Measuring Matter

Volume

The amount of space matter take up.
Use a measuring cup or graduate to find volume.



Mass

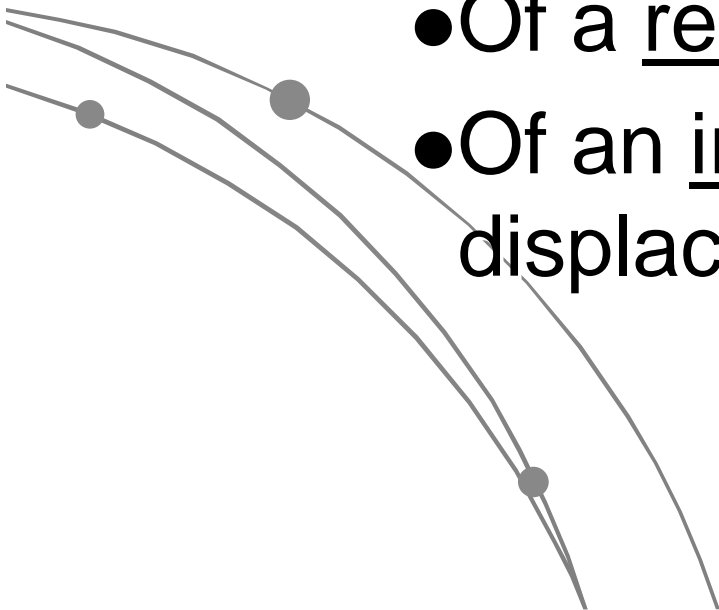
Mass is the amount of matter in an object.

Use a balance or scale to find mass.



Notes

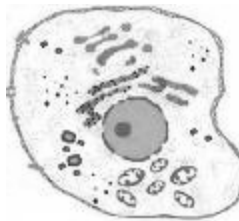
- Volume – the amount of space that matter takes up.
 - Of a liquid – measure in a beaker or g.c.
 - Of a regular solid – $L \times W \times H$
 - Of an irregular object – displacement in a g.c.



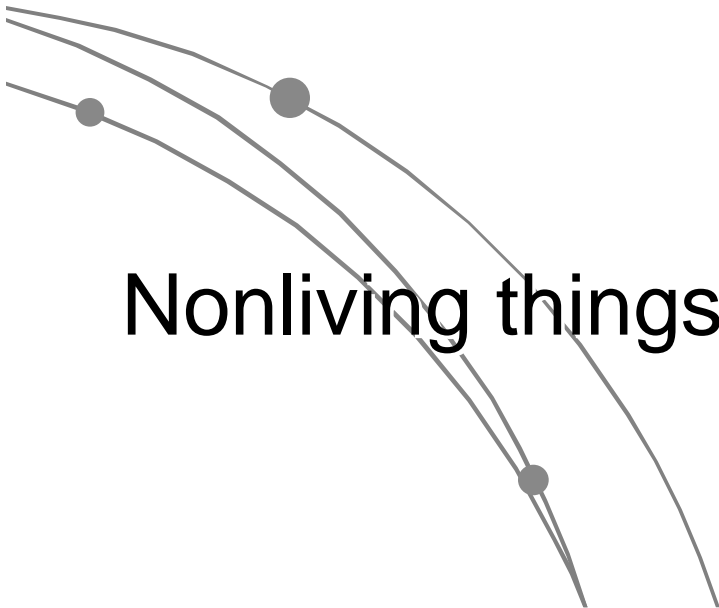
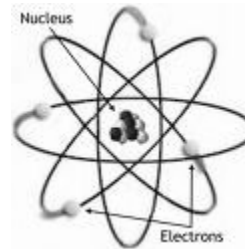
Notes

- Matter has mass
- Mass – the amount of matter in an object

Living things – cells



Nonliving things - atoms



Density

- Density – the amount of matter in a given space.

Which is more dense a golf ball or table tennis ball? Why?

How do their volumes compare? Their masses?



Density

- Density = $\frac{\text{Mass}}{\text{Volume}}$



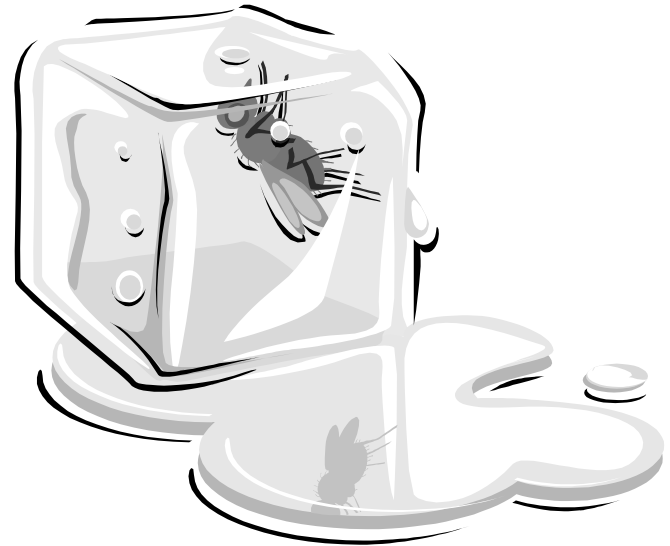
Density can help identify a substance

SUBSTANCE	DENSITY (G/CM ³)
AIR	0.0013
WOOD (OAK)	0.85
WATER	1.00
ICE	0.93
ALUMINUM	2.7
LEAD	11.3
GOLD	19.3
ETHANOL	0.94
METHANOL	0.79

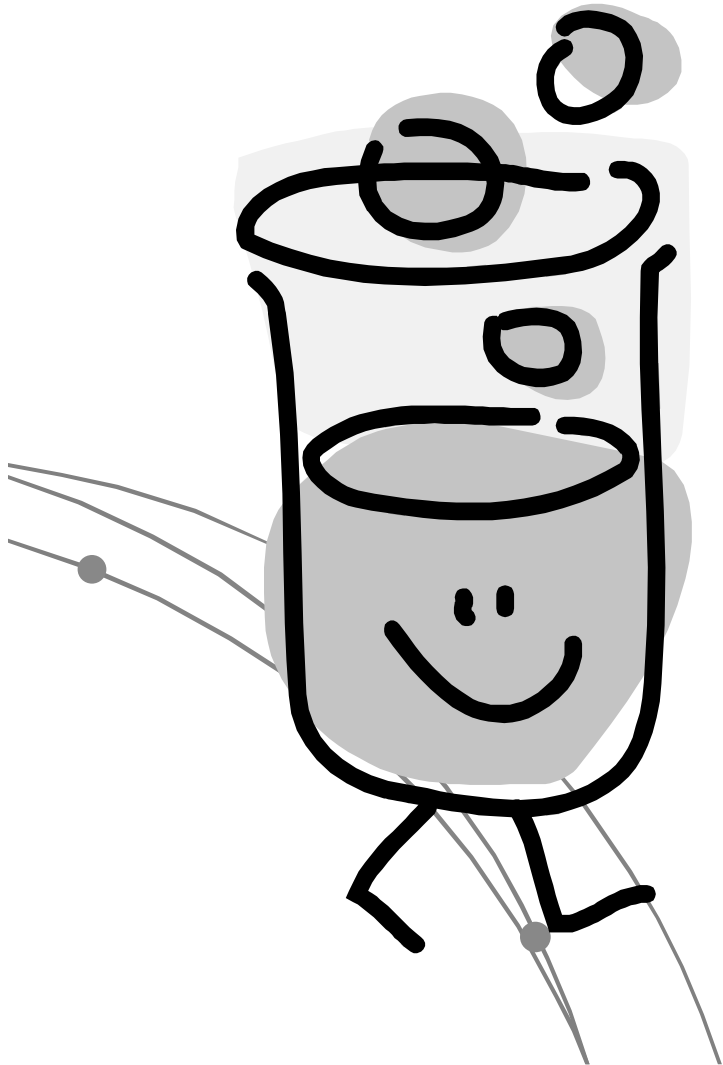
Physical Properties (Fill in Spider)

Ways to physically describe matter:

- density
- physical state (solid, liquid or gas at certain temperatures and pressures)
- color
- odor
- solubility in water (the ability of substance to dissolve in water)



Some more examples of physical properties are:



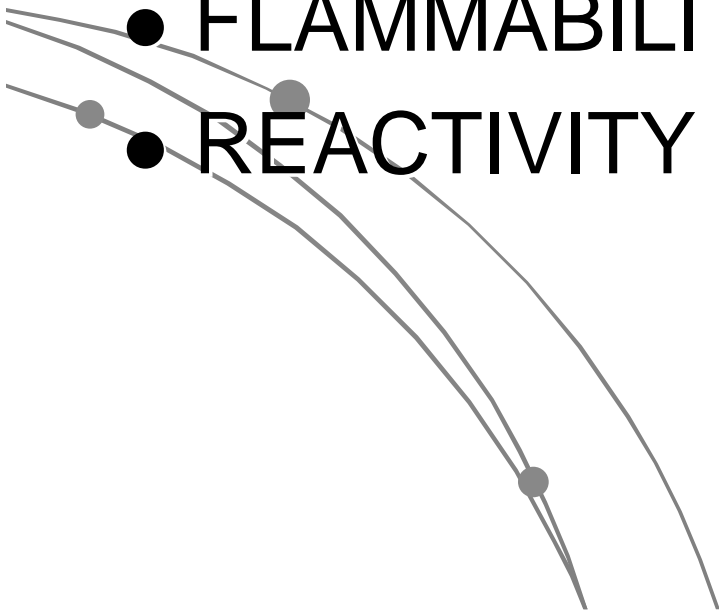
- melting point
- boiling point
- hardness
- malleability
- conductivity

Chemical Property

- A chemical property describes an object/substances' ability to change into something new.

- FLAMMABILITY

- REACTIVITY

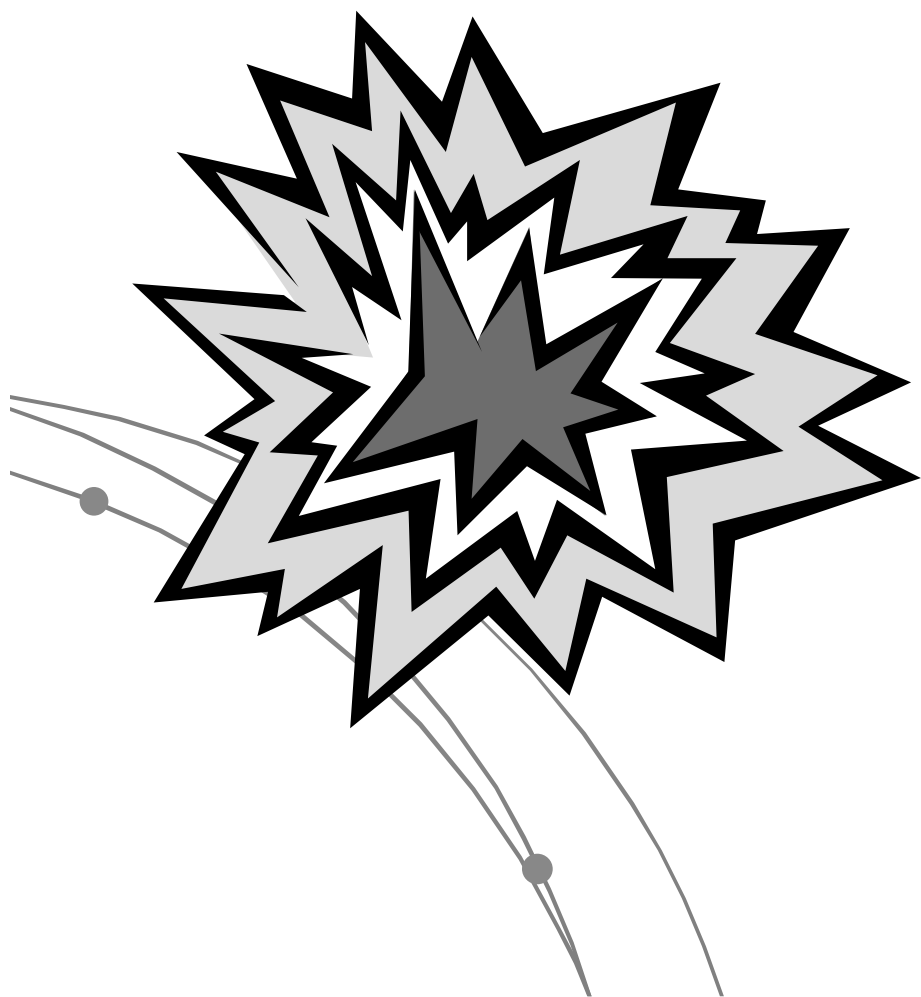


Some examples of chemical properties are:

- paper burns
- iron rusts
- gold does not rust
- wood rots
- nitrogen does not burn
- silver does not react with water
- sodium reacts with water

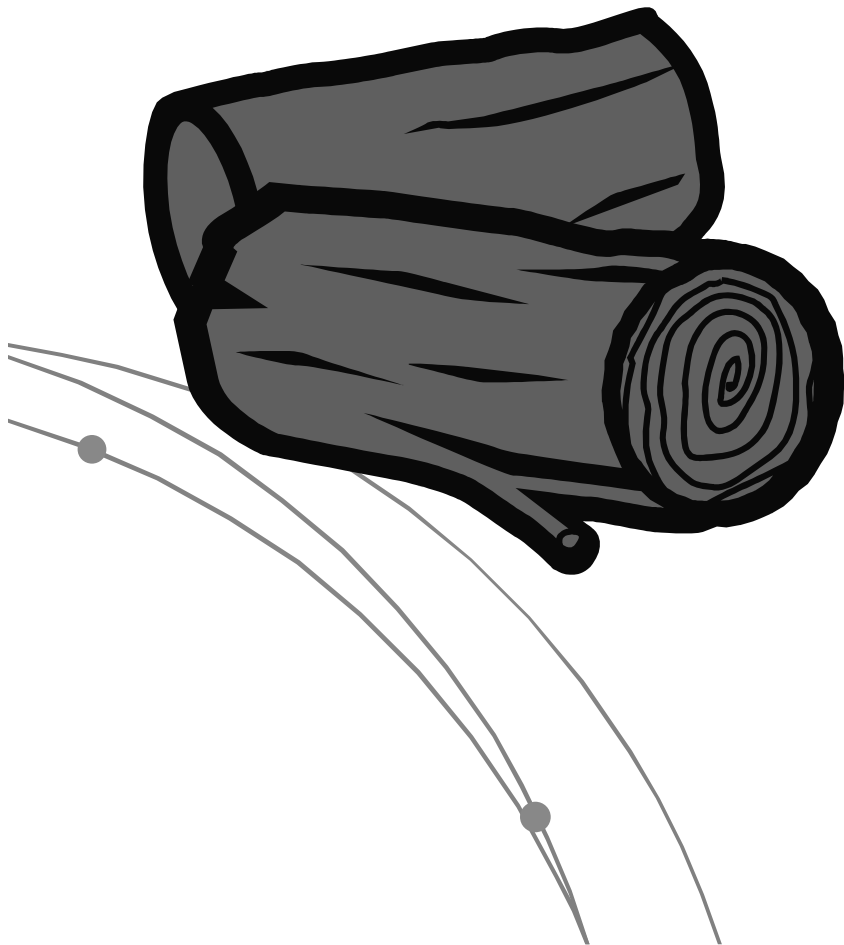


In each of these, the substance's chemical property is its tendency to:



- react
- tarnish
- corrode
- explode

Physical vs. Chemical Properties



Wood

- Physical Property:
 - Grainy texture
- Chemical Property:
 - Flammable

Physical vs. Chemical Properties



Baking Soda

- Physical Property:
 - White powder
- Chemical Property:
 - Reacts with vinegar to produce bubbles

Physical vs. Chemical Properties

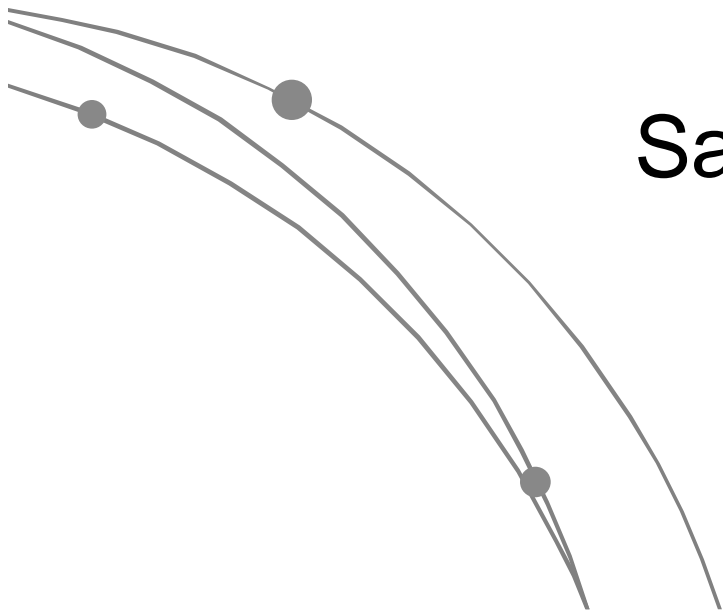


THESE PIPES ARE IN THE
MIDDLE OF CHEMICAL
CHANGES AS THEY RUST.

Iron

- Physical Property:
 - Malleable (able to be shaped)
- Chemical Property:
 - Reacts with oxygen to form rust

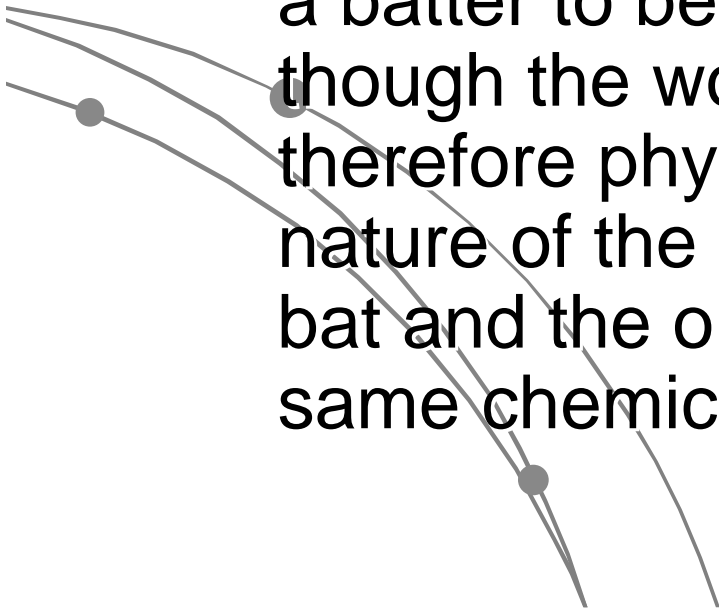
Physical and Chemical Changes



Same or Different

Physical Change

- Changes only the physical property of the substance
 - An example of a physical change occurs when making a baseball bat. Wood is carefully crafted into a shape which will allow a batter to best apply force on the ball. Even though the wood has changed shape and therefore physical properties, the chemical nature of the wood has not been altered. The bat and the original piece of wood are still the same chemical substance.



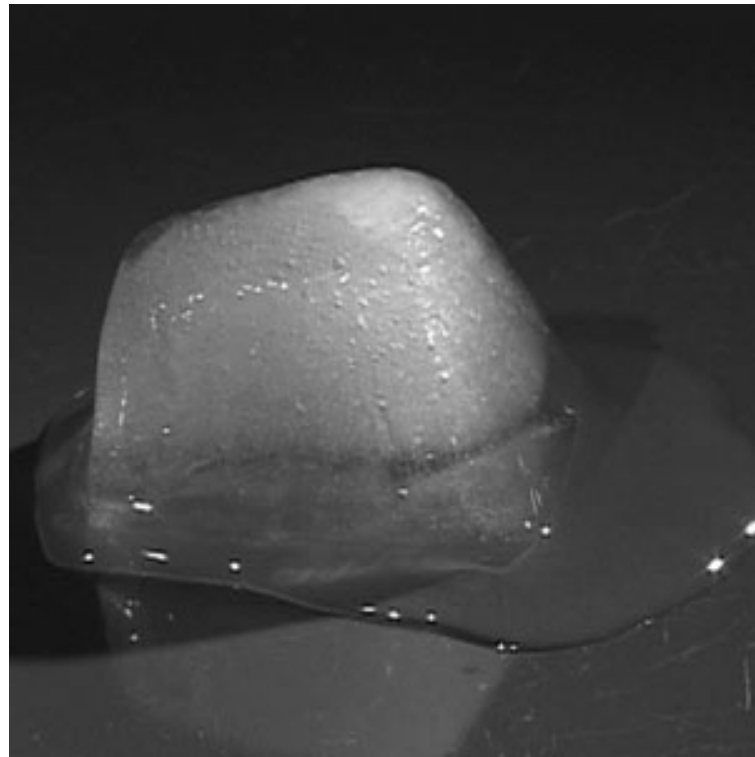
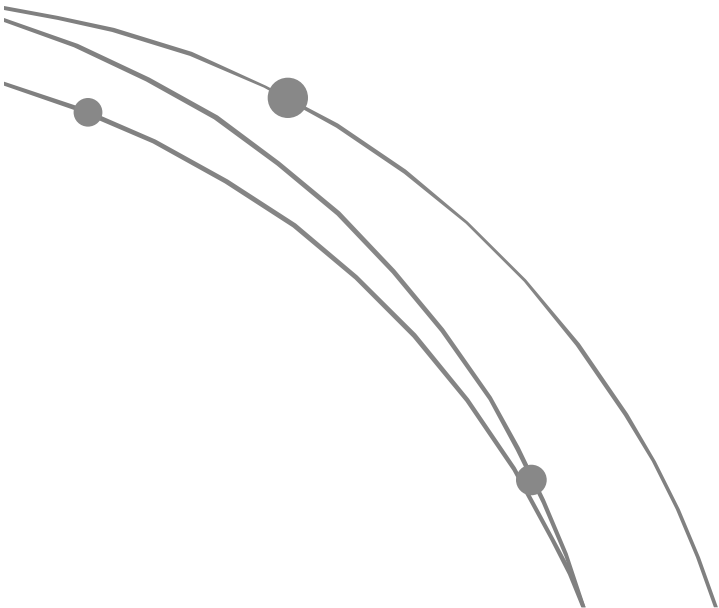
Physical Changes in Matter

- Cut
- Tear
- Folded
- Written On
- Painted
- Liquid
- Solid
- Gas
- Mixture
- Solution



The material itself is the same before and after the change. The change CAN be “undone.”

- Ice melting: an example of physical change



Chemical Change

- Occurs when one or more substances are changed into entirely NEW substances
- They have different properties from the original substance
- Some signs (or *evidence*) of chemical change are:
 - a gas is produced,
 - the temperature changes,
 - a substance disappears,
 - a solid is formed
 - a color change occurs,
 - a new odor is produced.

Chemical Change

- Cannot easily be undone
 - Have you ever tried to un-fry an egg?



Original Substance-Eggs

Heat is added



New Substance-Fried Eggs

Examples of Physical and Chemical Changes

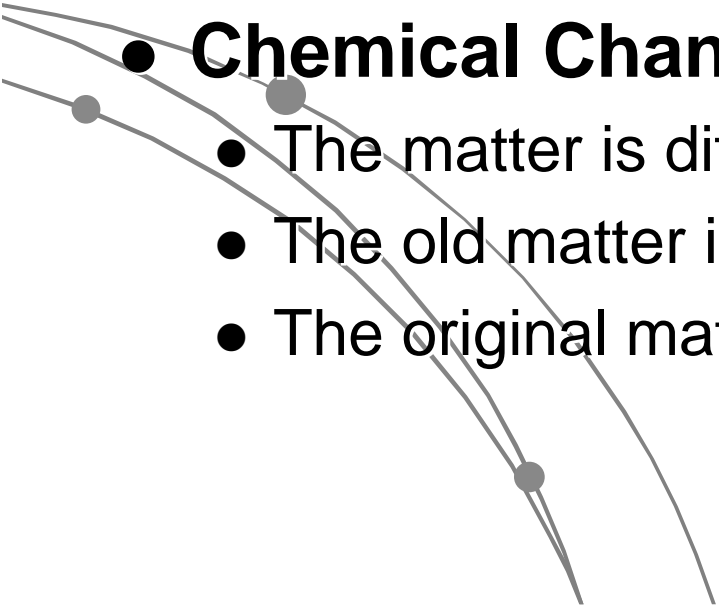
Physical Changes	Chemical Changes
Aluminum foil is cut in half.	Milk goes sour.
Clay is molded into a new shape.	Jewelry tarnishes.
Butter melts on warm toast.	Bread becomes toast.
Water evaporates from the surface of the ocean.	Rust forms on a nail left outside.
A juice box in the freezer freezes.	Gasoline is ignited.
Rubbing alcohol evaporates on your hand.	Hydrogen peroxide bubbles in a cut.
	Food scraps are turned into compost in a compost pile.
	A match is lit.
	You take an antacid to settle your stomach.
	Your body digests food.
	You fry an egg.

Summing it Up

- **Physical Change:**

- The matter is the same.
- The original matter can be recovered.
- The particles of the substance are rearranged.

- **Chemical Change:**

- The matter is different.
 - The old matter is no longer present.
 - The original matter cannot be recovered.
- 

Questions?

