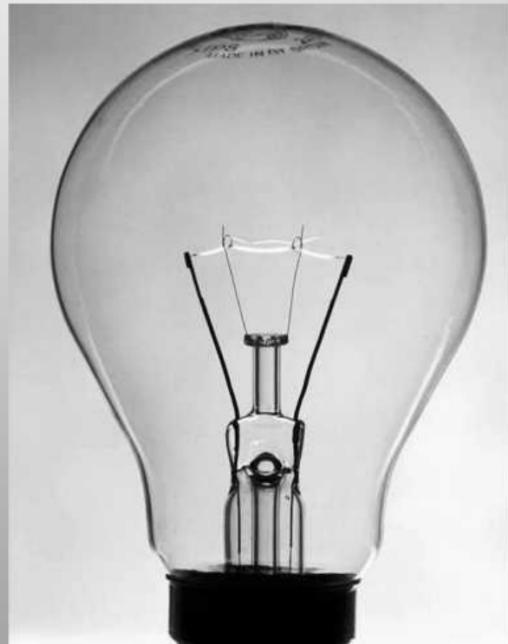


Chemical and physical properties – So what?

- Tungsten is usually used as the filament in lightbulbs because it has the highest melting point of any metal.
- It glows red hot when electricity runs through it, and it gives off both heat and light.



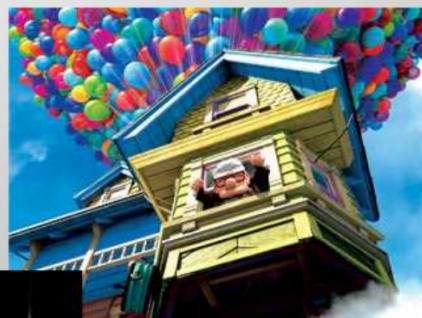
Chemical and physical properties – So what?

- Vanadium is heavier and harder than titanium, so mixing a tiny bit of vanadium with steel can make cheap tools that are still very strong.



Chemical and physical properties – So what?

- Helium is almost completely nonreactive (inert).
- It is lighter than air, so it's great for floating balloons (or making funny voices.)
- When electricity runs through helium, it glows a creamy pale peach color.



Chemical and physical properties – So what?

- In 1943, all US pennies were made of zinc plated steel because copper was being used in the war. The pennies had to be coated with zinc because steel will rust, but zinc won't.



Chemical and physical properties – So what?

- Sulfur smells awful. Rotten eggs, onions, and garlic all have sulfur in them. Stink bombs use sulfur to create a bad smell.
- Sulfur is also flammable, and it is one of the 3 main ingredients in gun powder.



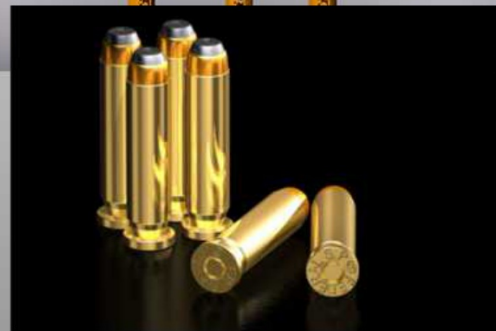
Chemical and physical properties – So v

- Chromium is famous for its intense luster. Chrome plated tools, jewelry, silverware, or car parts are very popular.



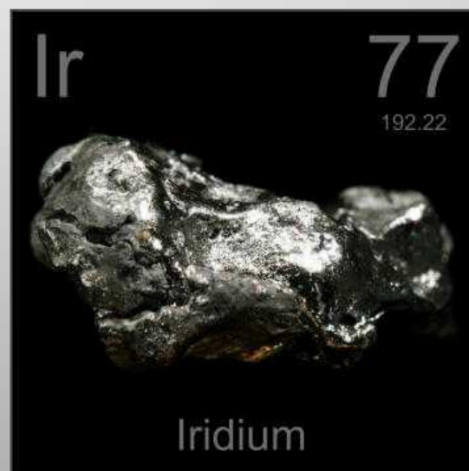
Chemical and physical properties – So what?

- Most bullets are made of lead because lead is a very dense metal. These bullets are required, by international law, to be coated with a different metal because lead has such a low melting point and is so malleable.



Chemical and physical properties – So what?

- The most dense elements are Iridium and osmium which have a density of about 22.6 g/cm³



Element abundance

- The most common element in the universe is Hydrogen (about 75%), and Helium (about 25%).
- The most common element on Earth is Oxygen (46.6%), and Silicon (27.7%).
- The most common element in your body is Oxygen (65%), and Carbon (18%).



Chemical and physical changes



Physical Change

- A Physical change is a change in a substance that does not change what the substance is.



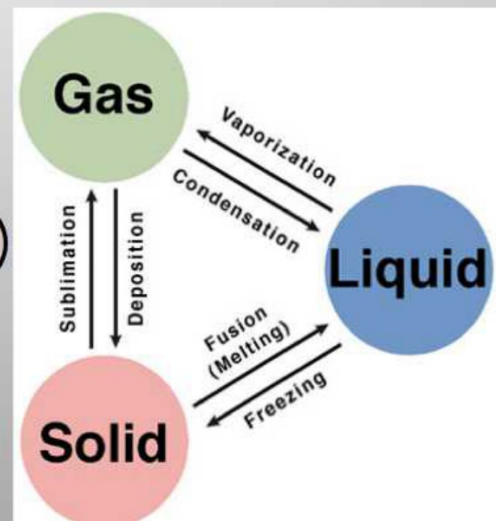
Physical Change - examples

Examples of physical change include:

- Change in shape
- Change in size
- Change in phase

Change in phase

- Melting (solid to liquid)
- Boiling (liquid to gas)
- Evaporation (liquid to gas)
- Condensation (gas to liquid)
- Freezing (liquid to solid)
- Sublimation (solid to gas)
- Deposition (gas to solid)



Physical Change

- Physical changes might be caused by:
 - Grinding
 - Cutting
 - Crushing
 - Bending
 - Breaking
 - Heating/cooling
 - (change in phase)
 - Squishing



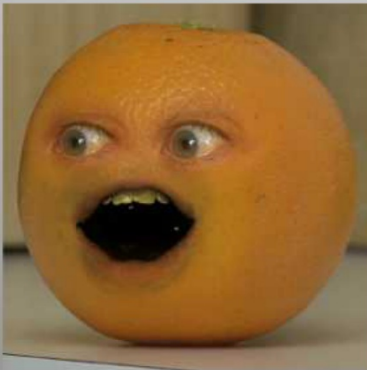
Physical Change

- Evidence that a physical change has occurred might include:
 - Change in shape
 - Change in form
 - Change in size
 - Change in phase
(This is always a physical change!)
 - Physical changes are usually reversible



Physical change

- What could you do to these items to cause a physical change to occur?



Chemical change

- A chemical change is a change in which a substance is changed into a different substance. (You've changed what it is.)



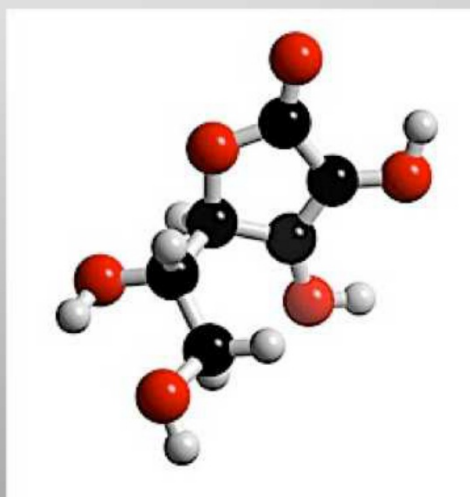
Chemical change

- Examples of chemical changes include:
 - Burning
 - Rusting
 - Tarnishing
 - Decomposing
 - Polymerization



Chemical change

- Chemical changes occur when a chemical reaction causes bonds between atoms to break or to form.



Chemical Change: Evidence

- Evidence that a chemical change has occurred might include: *Temp Change*
 - A color change
 - An odor change
 - Formation of a precipitate (you mix two liquids and make a solid)
 - Gas is formed (bubbles)
 - Changes in physical properties.



Physical and Chemical change

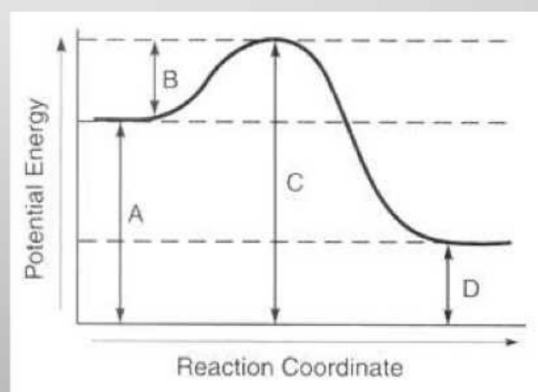
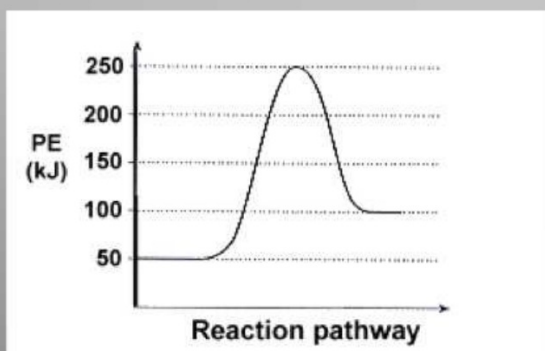
- During a chemical change **energy can be released** in the form of:
 - Heat
 - Light



Mystery Baggies

Chemical change – Chemical reactions

- When a chemical change occurs, energy is either released or absorbed.



Physical and Chemical change - heat

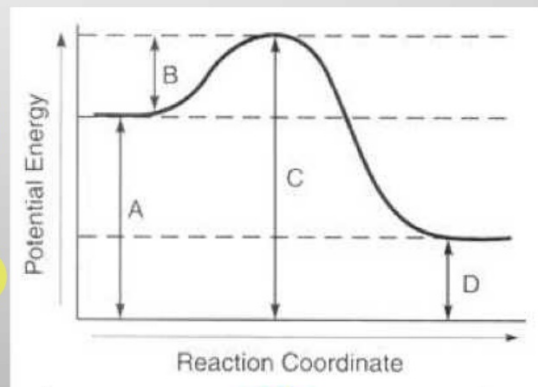
- A chemical reaction that releases energy in the form of heat is called exothermic.

– Heat comes OUT

- Exo = out

- Thermic = heat

– It will feel HOT.



Physical and Chemical change - heat

- A chemical reaction that **absorbs energy in the form of heat** is called **endothermic**.

– Heat goes IN

- Endo = in

- Thermic = heat

– It will feel COLD

