

17.1: Chemistry is Known as the Central Science

What is **Basic Research**?

What is **Applied Research**?

Define **Chemistry**:

What does **MSDS** stand for? _____ What is it used for?

What is **Acute Exposure**?

What is **Chronic Exposure**?

Ex:

Ex:

What is an **LD₅₀**?

Ex: Chemical A has an LD₅₀ = 3.2 mg/kg, Chemical B has an LD₅₀ = 48 mg/kg. Which is more toxic? Why?

17.2: The Submicroscopic World Is Super-Small

Define **Matter**:

Examples of matter:

What is the most basic unit of matter? _____

What is a **Molecule**?

What are the *3 phases (or states) of matter*?

What's the 4th state of matter (though we won't talk much about this)?

Where is it found?

State of Matter	Shape	Attractive Forces Between Particles	Distance Between Particles (Use a little sketch!)	Examples

Solids can either be classified as _____ or _____.

What does a solid's classification depend on?

Define **amorphous solid**:

Examples of amorphous solids:

Define **crystalline solid**:

Examples of crystalline solids:

17.3: The Phase of Matter Can Change

• Melting:

• Freezing:

→ What is a Melting Point/Freezing Point?:

What is the freezing point of water? _____ Of ethanol? _____

• Evaporation:

→ What is a Boiling Point?:

What is the boiling point of water? _____

Why do humans sweat?

• Condensation:

Where have you seen condensation?

• Sublimation:

Example of a substance that undergoes sublimation:

Define Heat of Fusion:

Define Heat of Vaporization:

Imagine this... Why can you briefly touch your wetted finger on a hot skillet or stove without harm?

17.4-17.5: Physical and Chemical Properties & Changes

Each substance has its own unique properties that allow us to identify it and predict its interactions with other substances.

Define Physical Properties:

Ex:

Define Chemical Properties:

Ex:

Define Physical Changes:

Ex:

Define Chemical Changes:

Ex:

Is dissolving table salt in water a chemical or physical change? How do you know?

“Penny Demo”:

Physical Properties:

Physical Changes:

Chemical Change: Write a chemical equation for the reaction with the penny that you witnessed:

Chemical changes are represented by **chemical equations**: Label the *products & reactants* below:



Ex: iron + oxygen \rightarrow iron oxide

Rewrite this chemical reaction using elemental symbols.

What is a **chemical bond**?

Chemical change demo: Write a chemical equation for the reaction that you witnessed:

How did you know a chemical change occurred?

17.7: Elements Can Combine to Form Compounds

What is a **Compound?**:

Ex:

What is a **Chemical Formula?**:

Ex:

17.8: There Is a System for Naming Compounds

The 2 classes of naming compounds that exist are:

1.)

2.)

Common Name	Systematic Name	Chemical Formula

Why are common names used?

Write the chemical formula for each compound (the composition is given after each name):

1.) aluminum bromide: 1 atom aluminum, 3 atoms bromine _____

2.) calcium fluoride: 1 atom calcium, 2 atoms fluorine _____

3.) lead chromate: 1 atom lead, 1 atom chromium, 4 atoms oxygen _____

4.) benzene: 6 atoms carbon, 6 atoms hydrogen _____

How many of each atom is represented by the following chemical formulas?

1.) $C_{12}H_{22}O_{11}$ (sugar)

2.) $Al_2(SO_4)_3$

3.) $Ba(C_2H_3O_2)_2$

Compounds that Contain 1 Metal + 1 Nonmetal (Ionic Compounds):

Provide the name of each of the following IONIC compounds:

1.) $NaCl$

2.) Mg_3N_2

3.) $AlCl_3$

4.) Li_2O

5.) CaC_2

6.) NaH

Compounds that Contain 2 Nonmetals (Molecular Compounds):

Prefix	Number of atoms
Mono	1
	2
	3
	4
	5
	6
	7
	8
	9
	10

Provide the name of each of the following MOLECULAR compounds:

1.) N_2O_3

2.) S_2Cl_2

3.) N_2O_8

4.) P_5O_9

5.) I_4Cl_3

6.) C_6N_7

****The prefix “mono” is not used if there is only 1 of the first elements. Name the following compounds:**

Ex: 1.) SO_2

2.) SF_6

3.) NO_2

Physical & Chemical Properties and Changes

- 1.) Explain the difference between a physical and chemical change.
- 2.) Give an example of a chemical change that occurs when you prepare a meal.
- 3.) Explain why the evaporation of water is a physical change and not a chemical change.
- 4.) The law of conservation of mass applies to physical changes as well as to chemical changes. How might you demonstrate this law for melting ice?
- 5.) Observe a burning candle. What evidence do you have that there are chemical and physical changes in the candle as it burns?

INSTRUCTIONS: Classify each of the following properties of matter as physical [P] or chemical [C].

- | | |
|-----------------------------|--|
| 1. Color | 6. Reacts violently with chlorine |
| 2. Density | 7. Good conductor of heat |
| 3. Burns easily (flammable) | 8. Dissolves readily in water |
| 4. Not affected by acids | 9. Melts at 145°C |
| 5. Boils at 450°C | 10. Malleable (can be pounded into sheets) |

INSTRUCTIONS: Classify each of the following changes in matter as physical [P] or chemical [C].

- | | |
|---|-----------------------------|
| 1. Grinding chalk into powder | 6. Burning gasoline |
| 2. Dissolving salt in water | 7. Hammering gold into foil |
| 3. Cooking a steak on the grill until well done | 8. Melting ice |
| 4. Tearing a piece of paper | 9. Digesting food |
| 5. Stretching copper into wire | 10. Metal rusting |

Iron & Sulfur Demo: (Done in class)

Physical properties of Sulfur:

Of Iron:

How could a mixture of sulfur and iron be separated?

Write the chemical equation for the chemical change that occurred:

Can the product be separated in any way?

Chemical Compound Naming Worksheet

Name: _____

Provide the name of the following ionic compounds:

1.) BaCl₂

2.) GaAs

3.) AlBr₃

4.) NaI

5.) SrF₂

6.) Ag₂O

7.) Mg₃P₂

8.) LiH

9.) ZnN

10.) SeCl₂

11.) MgBr₂

12.) CrF₂

13.) RbF

14.) K₂S

15.) BeO

Provide the name of the following molecular compounds:

1. CCl₄ _____

2. CO _____

3. P₂O₅ _____

4. SF₆ _____

5. C₅H₈ _____

6. N₂O₃ _____

7. P₄O₁₀ _____

8. C₃H₆ _____

9. C₂H₄ _____

10. SO₃ _____

11. OCl₂ _____

12. CO₂ _____

13. C₈H₁₀ _____

14. ICl _____

15. CS₂ _____

16. NBr₃ _____

17. Si₃ _____

18. SeCl₂ _____