

Classifying Matter Study Guide

First 20 Elements

Atomic Number	Chemical Symbol	Name
1	H	Hydrogen
2	He	Helium
3	Li	Lithium
4	Be	Beryllium
5	B	Boron
6	C	Carbon
7	N	Nitrogen
8	O	Oxygen
9	F	Fluorine
10	Ne	Neon
11	Na	Sodium
12	Mg	Magnesium
13	Al	Aluminum
14	Si	Silicon
15	P	Phosphorus
16	S	Sulphur
17	Cl	Chlorine
18	Ar	Argon
19	K	Potassium
20	Ca	Calcium

Other People's Interests

Person	Interest(s)
David	sleeping, videogames

Cara	stage crew, debate
Veronica	reading, exotic animals
Jon	coding, bowling
Owen	basketball shoes, baseball
Madeline	travel
Monica	swim
Gianni	rugby
Caitlin	softball
Samantha	travel
Stephan	fly fishing
Jessica	gymnastics
Finn	sailing
Chay	Red Sox
Emily	music
Jenny	soccer
Sara	soccer
Ben	javelin
Armaan	Raiders
Melanie	student council
Dileka	travel
Matt	marines
Shannon	basketball

Remember Unit 2 topics:

- significant figures (use with measurements only)
 - operations and rounding
 - counting
- scientific (exponential) notation
- graphing
- accuracy and precision
- percent error

What is Matter?

- matter: anything that takes up space and has volume; all physical “stuff” in general
 - (pure) substance: matter with a specific and unchanging chemical makeup and properties
 - element: a substance that cannot be broken down into simpler substances; the building blocks of matter
 - compounds: two or more different elements chemically combined
 - molecular compounds (molecules): covalently-combined substances
 - ionic compounds: compounds in which ions (charged particles) are held together by opposite charges
 - mixtures: a combination of different substances not chemically combined
 - heterogeneous: parts are easily separated and not uniform throughout; parts have their original properties and can easily be separated by physical means
 - homogeneous (solution): mixture is uniform; cannot easily pick out parts or separate them by mechanical means

Examples of:

homogeneous mixtures:

- salt water
- alloys
- well-mixed paint mixtures

heterogeneous mixtures:

- cereal in milk
- sand in water
- sand and iron filings

molecular compounds:

- H₂O
- CO₂
- H₂O₂

ionic compounds:

- NaCl
- KCl
- HCl

compounds:

- see molecular and ionic compounds

molecules (not compounds)

- H₂
- O₂
- N₂

elements:

- Ag
- Si
- Al

Properties and Changes

Properties:

- physical:
 - characteristics that can be observed or measured without changing the sample’s composition
 - one is phase:

- solids are incompressible, having a rigid structure of atoms close together, keeping its shape and volume
 - solids that form in liquid solutions during a chemical reaction are called precipitants
- liquids have higher energy than solids, still closely packed and mostly resistant to compression, but its particles can slide so that it keeps its volume but can flow to fit its container
- gas has a higher energy state, with its particles loosely packed, flying around everywhere, filling up the space provided and being easily compressible
 - a vapor is the gaseous state of a substance that is not a gas at room temperature
- chemical:
 - the ability of a substance to react with or turn into different substances

Changes:

- physical:
 - changes that alter a substance without changing its composition, usually changing its appearance or state
- chemical:
 - process that involves at least one substance to turn into another
 - new products will be created and will have a different composition and different properties
 - reactants will turn into products
 - evidence (discussed in class):
 - color change (changes of physical properties, except for state)
 - giving off energy (light or heat)
 - formation of a precipitant or gas (bubbles)
 - odor change
 - mass change

Concepts in the Textbooks that Weren't in Class

- laws:
 - law of definite proportions states that a compound is always composed of the same elements in the same ratios/proportion by mass
 - law of multiple proportions states that when different compounds are formed by a combination of the same elements, different masses of one element combine with the same relative mass of the other element in a ratio of small whole numbers --- this allows there to be infinitely many (theoretically) different compounds, even with a limited set of elements (e.g. H₂O and H₂O₂)
 - law of conservation of mass states that the mass of the reactants must be equal to the mass of the products in a chemical reaction
- separating mixtures depends on the type of mixture:
 - solid-liquid can be separated with filter paper
 - distillation separated components with different boiling points
 - crystallization creates highly pure solids
 - chromatography draws out components of a mixture over another material
- extensive properties depend on the amount of the substance; intensive properties are the same for a substance regardless of its amount