

Name: _____

Period: _____

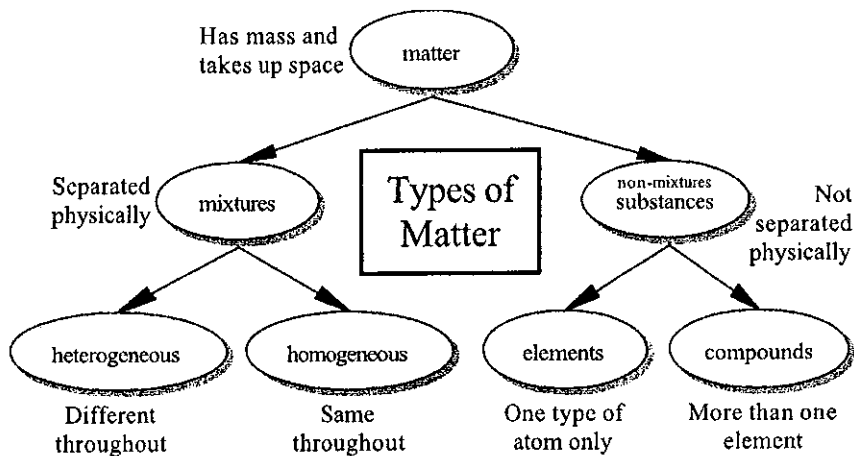
Classification of Matter

Much of science involves describing the universe. To do this we must be able to *classify* the things we encounter.

Anything that has mass and takes up space we call *matter*.

Everything you can touch or hold we call *matter*, but only *most* of what you can see is matter (lightening is not, it is *energy*).

A **mixture** is made up of more than one kind of matter and can be **separated physically**.
Ways to physically separate include: **sorting; filtering; heating; cooling.**



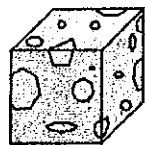
Substances cannot be separated physically.
Compounds can be separated chemically.
Elements can only be separated by *nuclear* means.

To tell the difference in chemical formulas remember that each element uses one capital letter. Two capital letters—must be a compound

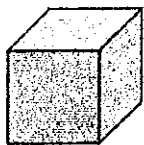
Examples of mixtures

Homogenous:
milk;
salt water;
vanilla ice cream

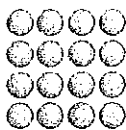
Heterogeneous:
chicken soup;
orange juice
rocky road ice cream



Heterogenous Mixture: Rocky Road



Homogenous Mixture: Vanilla



Element:



Compound:

Examples of substances:

Elements:
Iron (Fe)
Oxygen (O₂)

Compounds:
Rust (FeO₂)
Carbon Dioxide (CO₂)

Metric Overview

Science uses the **Metric System** because it is a decimal system. To convert to larger or smaller units you just have to move the decimal.

Basic Units are: Meters for length
 Grams for mass
 Liters for volume

Basic Prefixes are: kilo means multiply by 1000
 centi means divide by 100
 milli means divide by 1000

| | | | | | |
|-------|-------|-------|-------|-------|--------|
| | Gram | | | | |
| Kilo- | Heca- | Deka- | Meter | Deci- | Centi- |
| | | | Liter | | Milli- |

1 Meter is just bigger than a yard
1 Liter is just bigger than a quart
1 Gram is about the mass of a dollar bill

States of Matter

| States of Matter | States of Water |
|------------------|-----------------|
| Solid | Ice |
| Liquid | Water |
| Gas | Steam |

When a substance changes temperature it can change its state of matter, but it *will not* change chemically.

Other definitions we will learn:
(Try to relate these words to water.)

- Boiling point*— temperature that turns a liquid to a gas.
- Freezing point*—temperature that turns a liquid to a solid.
- Melting point*—temperature that turns a solid to a liquid.
- Condensation*—when a gas turns to a liquid.
- Evaporation*—when a liquid turns to a gas.
- Sublimation*—when a solid turns straight to a gas.

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|-----------------------------|--|-----------|--|
| 1. Substance or non-mixture | a. Made up of two types of matter that can be physically separated. | 1. Meter | a. Divide by 1000. This is the smallest standard metric prefix. |
| 2. Mixture | b. Two samples might not be the same. | 2. Kilo- | b. The standard metric unit of mass; it is very small. |
| 3. Heterogeneous Mixture | c. Two samples will have the same makeup. | 3. Gram | c. The standard metric unit of length; equal to 3.3 feet. |
| 4. Matter | d. Has only one kind of atom in the same. | 4. Milli- | d. The standard metric unit of volume. Used to measure liquids. |
| 5. Element | e. Contains two kinds of atoms that <i>cannot</i> be physically separated. | 5. Centi- | e. Means divide by 100. Easy to remember by the word <i>cent-ury</i> . |
| 6. Homogeneous Mixture | f. Cannot be separated by physical means. | 6. Liter | f. Prefix that means multiply by 1000. |
| 7. Compound | g. A classification of anything that has mass and takes up space. | | |

| | |
|--|--|
| <p>List heterogeneous and homogenous mixtures for:</p> <p><u>Mixture</u> <u>Heterogenous</u> <u>Homogenous</u></p> <p>Jello</p> <p>Ice cream</p> <p>Soup</p> | <p>Mark these as elements (E) or compounds (C):</p> <p>Water (H₂O) _____ Carbon Dioxide (CO₂) _____</p> <p>Hydrogen (H) _____ Sodium (Na) _____</p> <p>Helium (He) _____ Silver (Ag) _____</p> |
|--|--|

Lab

Lab Station 1. Solid Mixtures

There are a number of mixtures that are solid at room temperature. Brass is a mixture of copper and zinc. Soil (dirt) is also a solid mixture at room temperature. *Which is homogenous, brass or soil? What test would you use to determine this?*

Our lab examples - Sugar cookies vs. Chocolate Chip cookies
Record them as homogenous or heterogeneous. Be sure to record how you determined this (be specific).

Lab Station 2. Liquid Mixtures

Salt water is a _____ mixture that is liquid at room temperature.
 Orange juice is a _____ mixture.

Our lab examples - Tomato soup vs. Vegetable soup
Record which is homogenous or heterogeneous. Be sure to record how you determined this.

Lab Station 3. Substances: Elements versus Compounds

In our life we work almost exclusively with compounds, but a few objects are elements, such as iron. The biggest reason for this is that elements tend to combine into compounds. If its name is on the Periodic Chart, it is an element. Our examples: Aluminum (Al) versus Table Salt (sodium chloride: NaCl).

Record which is the element and which is the compound. Be sure to record how you determined this.

Using the Periodic Chart, find 5 elements you recognize. Record their names and their chemical symbol (abbreviation).

Element 1— _____

Element 2— _____

Element 3— _____

Element 4— _____

Element 5— _____

LAB WRITE UP—A one page write up about what you did in the lab. You must write it as a descriptive essay, using proper English and punctuation. Due next class.