

# Chapter 12: matter

Lesson 1p. E4 matter, mass, density, volume,  
weight, conduct, insulate

1. The amount of matter in an object
2. Describes how much space a sample of matter takes up.
3. Tells how massive something is for its size.
4. Anything that has mass and takes up space.
5. Heat energy is able to pass through a material easily.
6. Heat energy cannot pass through a material easily.
7. Why does the diet coke can and the coke can act differently in water?

## Chapter 12: Matter

### Lesson 1

Matter: anything that has mass and takes up space.

Matter can be recognized by observable properties.

#### Properties of Matter

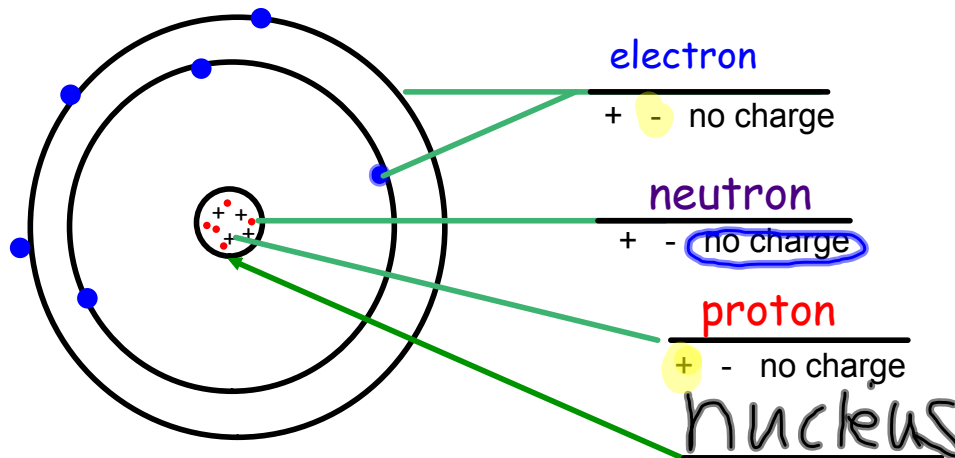
1. mass: weight of an object
2. volume- amount of space an object takes up
3. buoyancy- the ability to float
4. viscosity- the ability of a liquid to flow
5. magnetism
6. ability to conduct or insulate heat, electricity or sound
7. density- how tightly packed matter is.
8. bend
9. shine or luster
10. burning temperature (melting point)

**\*\*Every element is made of atoms.**

**\*\*All matter is made of elements**

## Atom Model

Label the atom below. Circle whether it has a positive, negative or no charge.



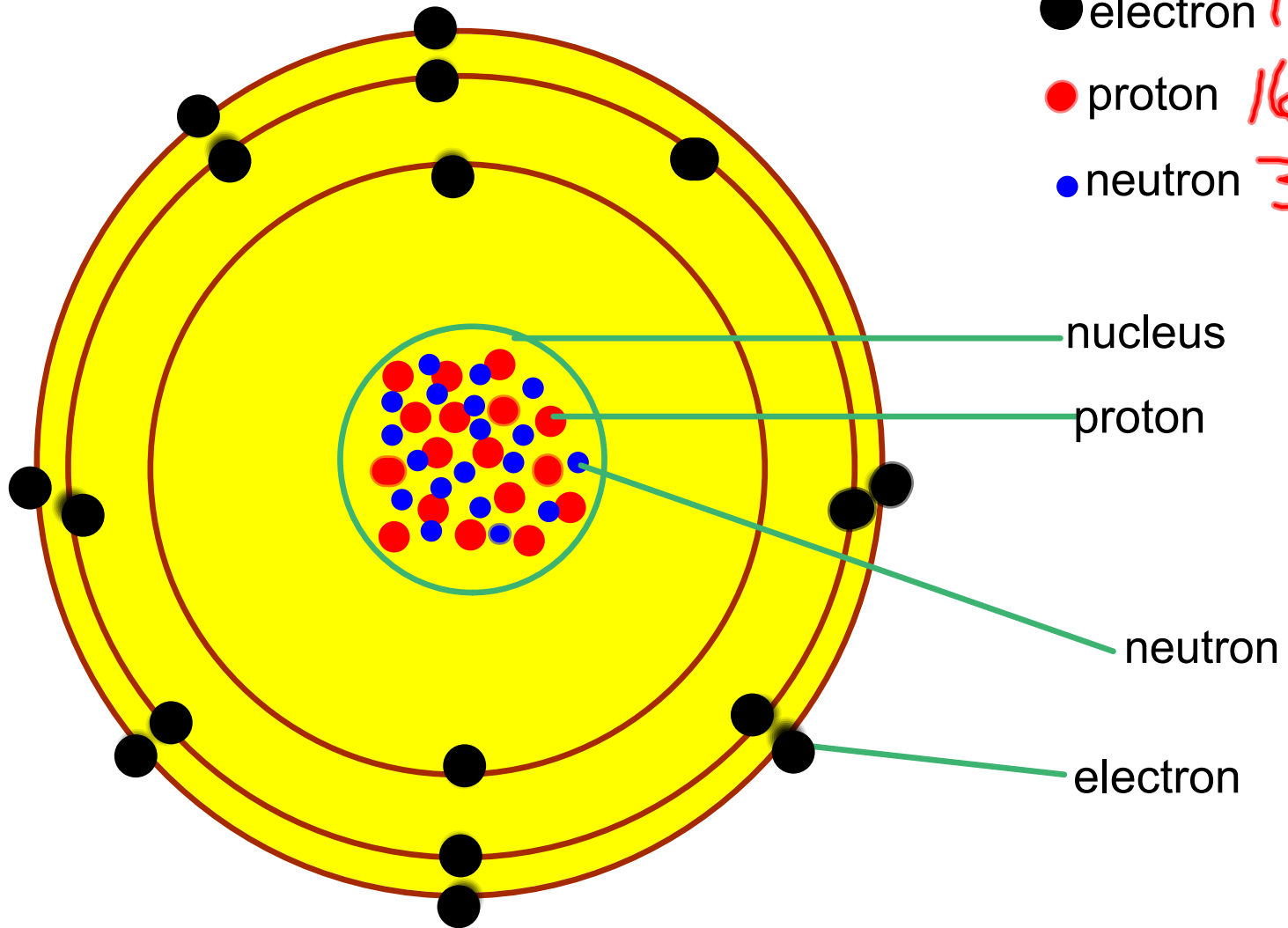
Could this be a real atom? Why or why not?

This could not be a real atom because there are not the same number of protons as electrons.

Chlorine

Cl

- Key*
- electron 16
  - proton 16
  - neutron 3



## Lesson 1 Notes E4-E17:

★ Everything is made of matter.

★ Measuring Matter

- length, width, height - inches, cm

- mass - grams (g), (kg), lbs. Pds. oz. scale

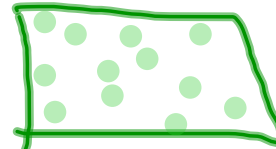
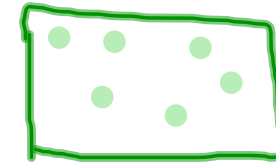
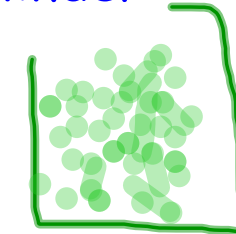
- volume - liters (l) (ml) graduated cylinder

Density

- solids are the most dense

- gases are the least dense

- liquids are in between



★ Density determines an objects buoyancy

## Lesson 2:

Vocabulary : element, compound, atom, proton, neutron, electron, nucleus, molecule,

1. a particle in the space outside the nucleus with a negative charge
2. a particle in the nucleus with a positive charge
3. a particle in the nucleus with no charge
4. a substance that is formed by a chemical combination of two or more elements
5. the smallest unit of an element
6. a pure substance that cannot be broken down into any other substance
7. a particle that contains more than one atom joined together.
8. an atom's dense center, where most of its mass is.

## Lesson 2: Elements and Compounds



### What is matter made of?

★ matter is made of elements

Element - pure substance

- basic building block of all matter

- each element has its own properties

Which group can  
name the most  
elements in two  
minutes?

-elements are on the Periodic Table

Ex) gold, mercury, iron, carbon

Elements are given a letter symbol

First letter- Capital

Second letter -lower case

Ex) Nickel **Ni**      Hydrogen **H**

Zinc **Z**      Helium **He**

Gold **Au**      Carbon **C**

Aluminum **Al**      Copper **Cu**

There are 112 elements

Compounds - combo of two or more elements  
-chemically combined (not physically)

makes something new water  $H_2O$

Write as a chemical formula

↳ contains all the elements that make it up

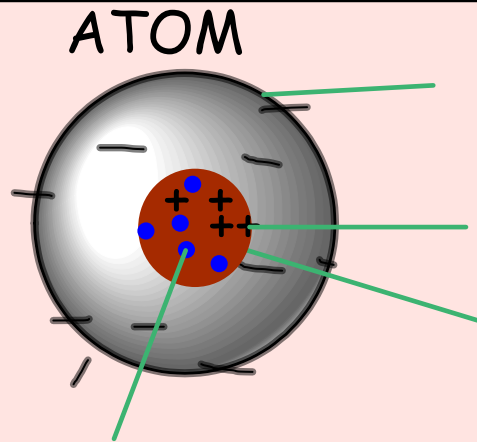
Water	$H_2O$	
Carbon Monoxide	$CO_2$	
baking Soda	$NaHCO_3$	

## What are elements made of?

ATOMS- smallest unit of matter that keeps the properties of that element

\*millions of atoms are in one grain of sand

## What's inside an atom?



-no charge  
neutrons  
proton  
-electron  
nucleus

\* the number of protons determines what element it is

ex) carbon- 6 protons


ex) oxygen- 8 protons

# What are molecules?

-particles that contain more than one atom

ex) Nitrogen  $N_2$  

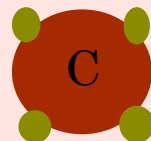
Oxygen  $O_2$  

$O_3$  

Carbon Dioxide  $CO_2$



Methane  $CH_4$



Elements have only one kind of atom

Compounds- have two or more different atoms

## **Solids**

Lowest energy state  
Definite/fixed shape  
Particles tightly packed together  
Definite volume  
Vibrating particles  
Take up space  
Can break  
Sounds travel fast through  
can compress

## **Liquids**

Medium energy state  
Takes the shape of container  
Definite/fixed volume  
Wet  
Does not compress  
Moving particles/must add energy  
Fluids Can be poured  
Takes up space  
Medium for sound and light travel

## **Gases**

Highest energy state  
Can Compress  
molecules are further apart than solid and liquid  
No definite/fixed shape  
No definite volume  
Has mass  
Fills its container