Bell Ringer #10:

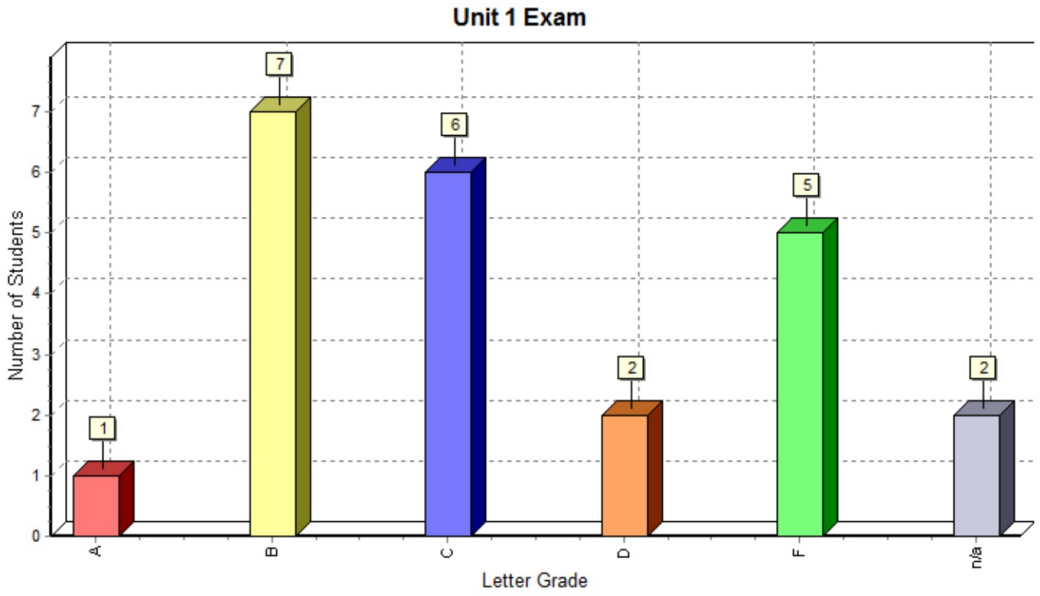
Socrative Room Name:
LEVEL70WARRIOR

Early Atomic Experiments and Theories

http://drmoad.weebly.com/

Agenda

Bell Ringer
Return Unit 1 Test
Practice: Finding Number of Neutrons
Observation Activity
Atomic History Notes
Cathode Ray Tube Experiment
Atomic Models Activity
The Mole
Mole Homework
Exit Ticket



Class average = 72%

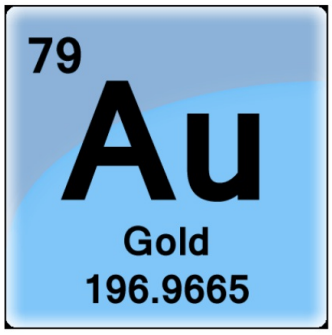
Practice Finding the Number of Neutrons

Individual Activity:

Determine the number of neutrons in a gold (Au) atom.

Practice Finding the Number of Neutrons

Determine the number of neutrons in a gold (Au) atom.



Round mass number
196.9665 rounds to 197

Atomic number = # of protons

(# of p^+) + (# of n^0) = mass number

79 + (# of n^0) = 197

(# of n^0) = 118 neutrons

Indirect Observation Activity

- You will be given a box with an item inside of it.
- Make indirect observations to identify the object.

Relvance: We cannot observe atoms directly, but through indirect observations we can deduce information them.

Dalton's Atomic Theory (1808)

1. Each element is made up of tiny particles called atoms.

2. The atoms of a given element are identical; the atoms of different elements are different in some fundamental way or ways.

Dalton's Atomic Theory (1808)

3. Chemical compounds are formed when atoms combine with each other. A given compound always has the same relative numbers and types of atoms.

4. Chemical reactions involve reorganization of the atoms - changes in the way they are bound together. The atoms themselves are not changed in a chemical reaction.

Discovery of the Electron (1897)

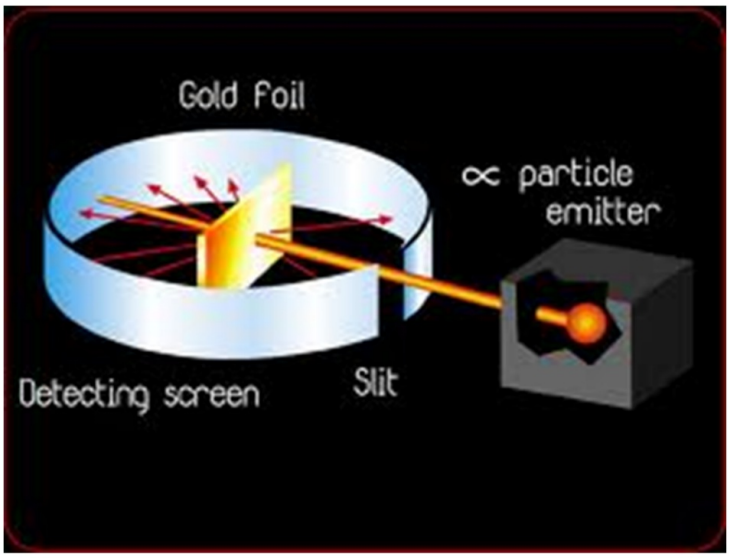
J.J. Thomson discovered the electron:

- Discovered in 1897
- Used a cathode ray tube
- Showed the electron to be negative and have mass
- Later Milikan would determine the mass of an electron with the oil drop experiment (1/1840 the mass of the proton)

Discovery of the Nucleus:

- Nucleus discovered by Ernest Rutherford in 1911. (He is on the New Zealand $100 bill)
- Conducted the gold foil experiment
- Got very unexpected results
- Showed the nucleus is small and massive in caparison to other particles
- Showed the nucleus to have a positive charge

Ernest Rutherford discovered the nucleus of the atom



Gold Foil Experiment:

https://www.youtube.com/watch?v=XBqHkraf8iE

Protons and Neutrons:

- Protons discovered by Goldstein in 1886 (travels opposite direction of electron in cathode ray tube)
- Neutron discovered by Chadwick in 1932 (hard to discover because it lacks a charge)

Cathode Ray Tube Experiment:

https://www.youtube.com/watch?v=Rb6MguN0Uj4

- Who discovered the electron?
- What did Dalton's atomic model propose?
- What piece of equipment did Thomson use to discover the electron?
- Thomson wanted to know if the stuff that composes the cathode ray had a _____ charge.
- When charge plates were introduced, the cathode ray bent upward toward the _____ charge plate.
- The discovery allowed him to conclude that the electron had a _____ charge.
- Thomson concludes that the particles that make up cathode rays are _____ times smaller than a _____ atom.

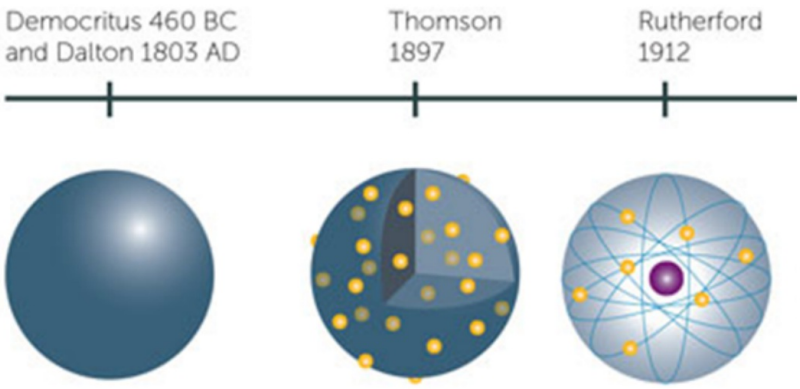
Atomic Models:

Dalton

Thomson

Rutherford

Atomic Models:



What is a mole?

- Mole Abbreviation = mol
- The mole is the unit scientist use to represent the amount of a substance.

In Chemistry class, a mole is not a furry little critter that lives under ground

The Mole

- A mole (mol) is an amount of substance that contains = 6.022×10^{23} items

- A dozen (dzn) is an amount of substance that contains = 12 items

Why is the mole such a big number?

The Mole

- A mole of different substances vary in size, mass and volume.

The Mole

- A dozen eggs is smaller than a dozen cars.

- A mole of copper fits in your hand
- A mole of oranges is larger than the Earth

The Mole

- One mole is = to 6.022×10^{23} atoms

How do you count atoms?

Counting Atoms

- Chemists count atoms by weighing them (determining the mass)

1 mole is = to the Atomic Mass (Red Number on your periodic table)

Conversions

1 mole = Atomic Mass (Red Number)
1 mole = 6.022×10^{23} atoms

18.5 g of sodium = _____ moles of sodium

Conversions

1 mole = Atomic Mass (Red Number)
1 mole = 6.022×10^{23} atoms

2.3 moles of oxygen = _____ g of oxygen

Conversions

1 mole = Atomic Mass (Red Number)
1 mole = 6.022×10^{23} atoms

2 g of copper = _____atoms of copper

Mole Homework

Look on drmoad.weebly.com

Exit Ticket #6:

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Moles