

Do Now

- Acquire your lab book and begin your calculations for the pennies lab.



Pennies Lab Considerations

- You found the average mass of all of the pennies.
- How much does that differ from the weight of one penny?
- How much more accurate is the average of ten pennies?

This Week

- Monday: Intro to Ch.4 Atomic Structure. 4.1 & 4.2
- Tuesday: 4.3
- Wednesday: Chapter 4 HW questions due. Beans Lab. Atomic mass.
- Thursday: Review of Ch4.
- Friday: Quiz on Ch 4

Quizzes

- I will pass back the quizzes during the last 10 minutes of class.
- You will have time to look them over and ask questions about them.

Dimensional Analysis

- Ch 4 quiz will have a large section devoted to dimensional analysis.
- We will spend about 10-20 minutes each day this week on this process.
- On the quiz: you will have to know the metric prefixes from nano to Giga. You will convert in 2 & 3 dimensions.

The Atom

- The smallest particle (unit) of a substance.
- If you break a single atom apart, it becomes a different element.

Atomic Theories

- Democritus: Atoms are indivisible and indestructible.
- Dalton: Elements are composed of atoms. Atoms make up the materials we have. Chemical reactions make chemicals rearrange structure.

● Democritus

- Greek philosopher.
- First suggested that atoms are made of matter.
- Atomos: Greek for indivisible.



Dalton's Atomic Theory

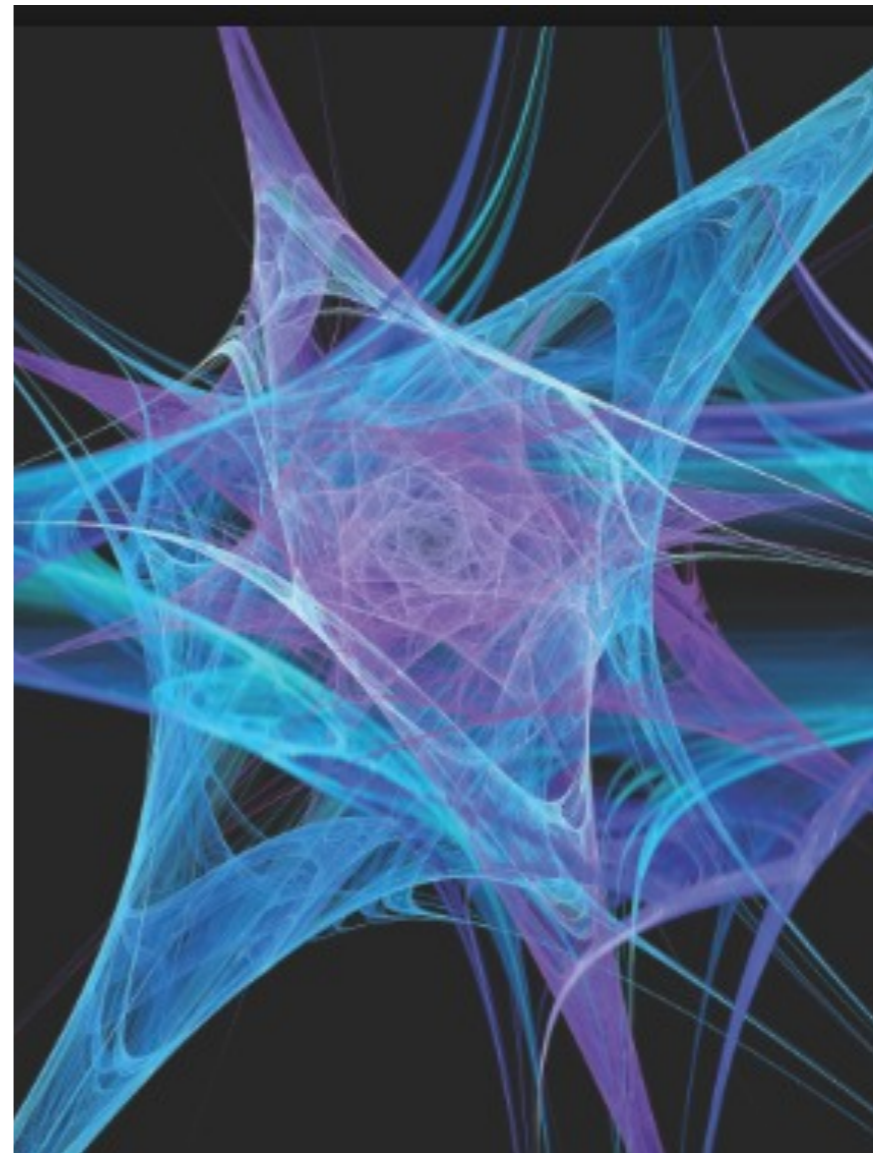
- Elements are composed of atoms.
- Atoms make up the materials we have.
- Chemical reactions make chemicals rearrange structure.
- Atoms mix together in **whole number** ratios to form compounds.

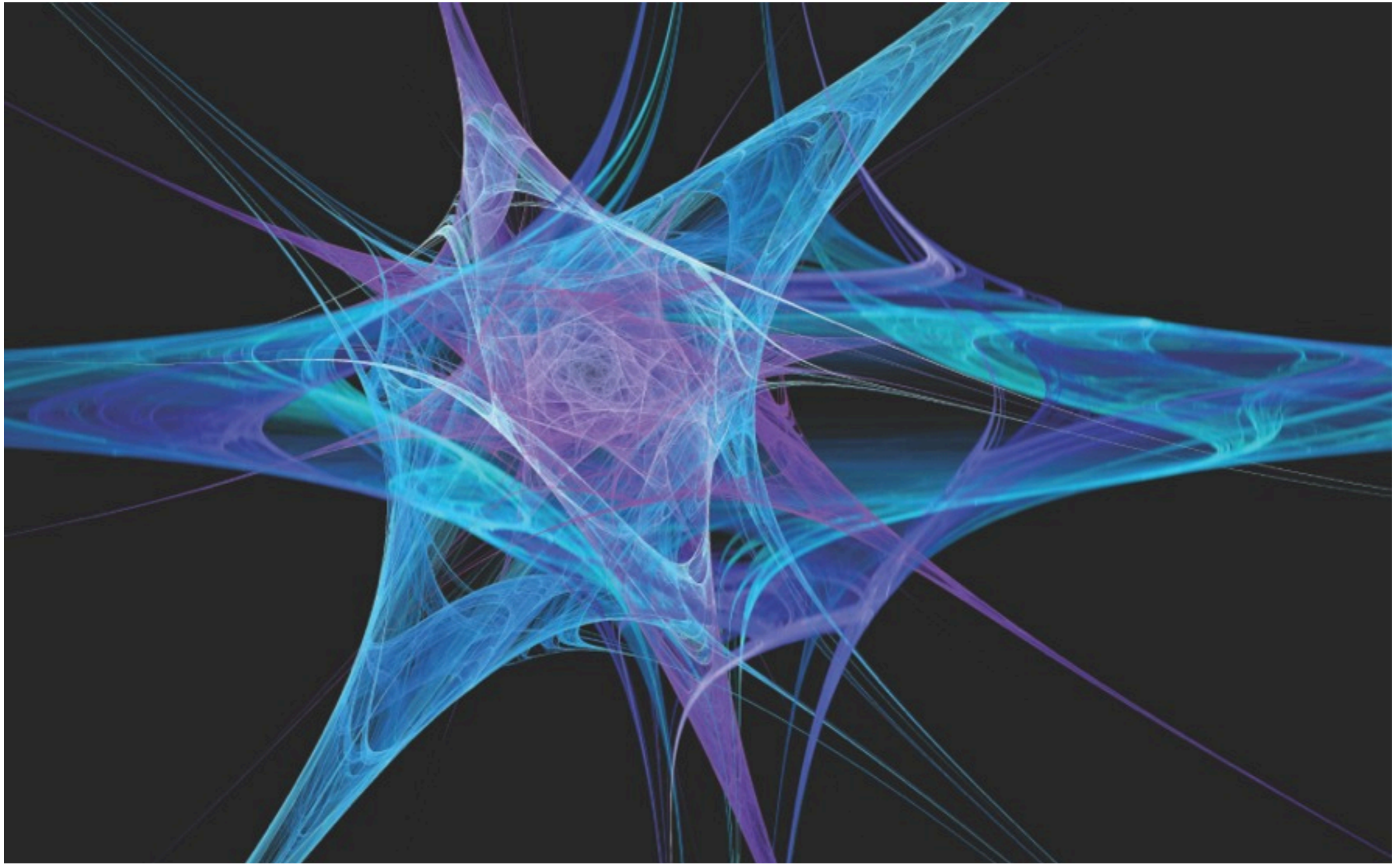


How small is an atom?

Sizing Up the Atom

- Atomic Radii of atoms range from 5×10^{-11} to 2×10^{-10} m.
- They can be “observed” using very powerful microscopes.





<http://mycampustalk.com/everything-you-need-to-know-about-the-atom...in-500-words-or-less/>

Dimensional Analysis

- Set up known as a fraction over 1.
- Multiply this fraction by equivalent fractions (things that equal 1).
- Cancel units until you get to your desired outcome of units.
- Do the math.

Convert 50 mi/hr to m/s.

From the quiz: There are 4.5 gross of eggs. If there are 12 dozen in a gross and 12 eggs per gross, how many eggs are there?

DA in multiple dimensions.

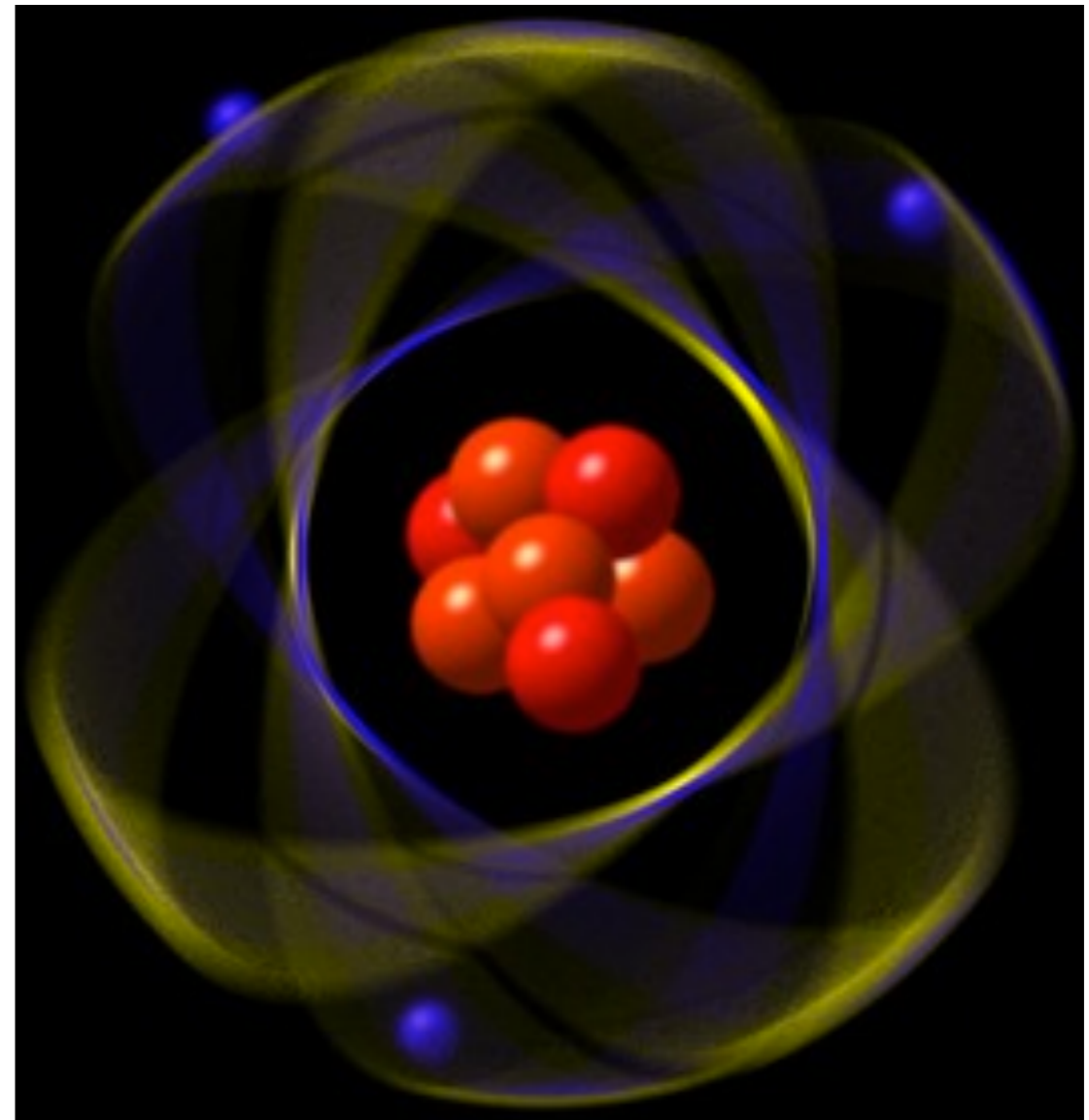
- Method one: keep equalities in one dimension and keep track of exponents.
- Method two: if you square the units of an equality, you have to square the number also.
- Stay tuned for examples.

How many cm^3 in
 1.5m^3 ?

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 1.5m^3 ?

Atomic Structure

- Defining Sub-Atomic Particles
- Rutherford Atomic Model



Sub-Atomic Particles

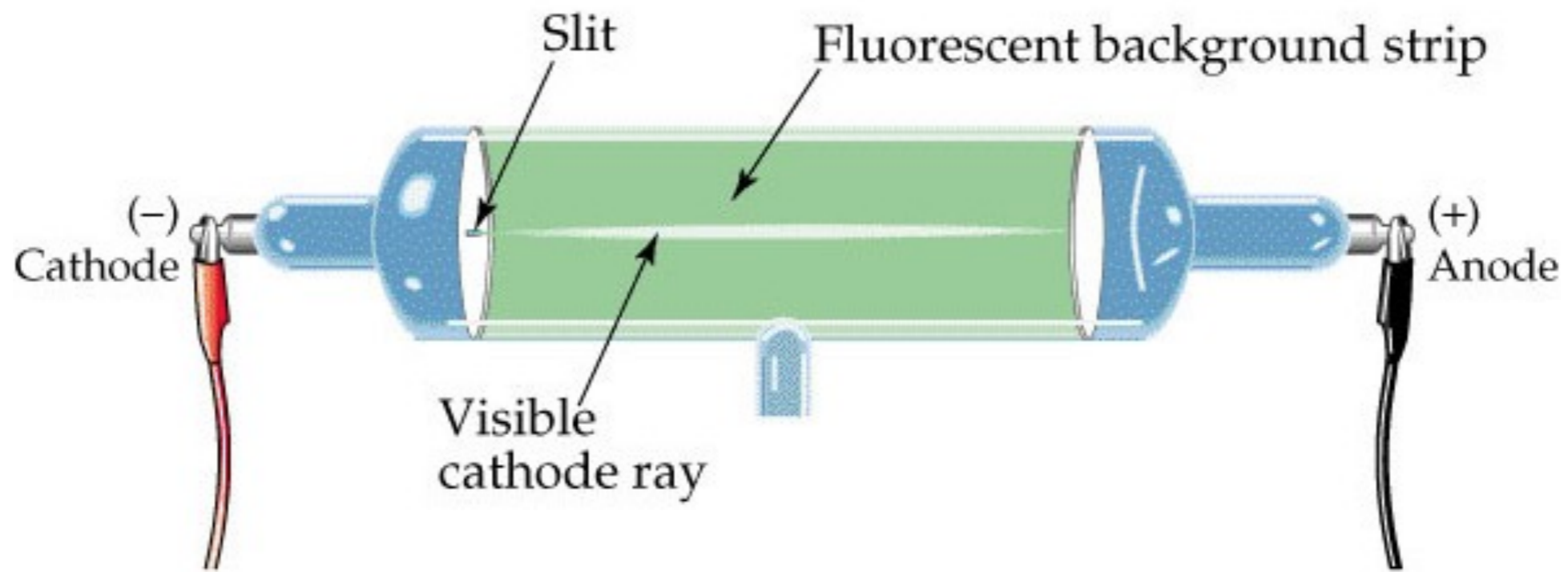
- Proton (p^+)-Positively charged particle that gives an atom its physical and chemical properties. Found in nucleus.
- Neutron (n^0)-Neutrally charged particle found in the nucleus.

Electrons: e^-

- “Orbits” the nucleus.
- In a “regular” atom, same number of protons and electrons.
- “Responsible” for bonding.
- 1,800 times lighter than a proton or neutron.

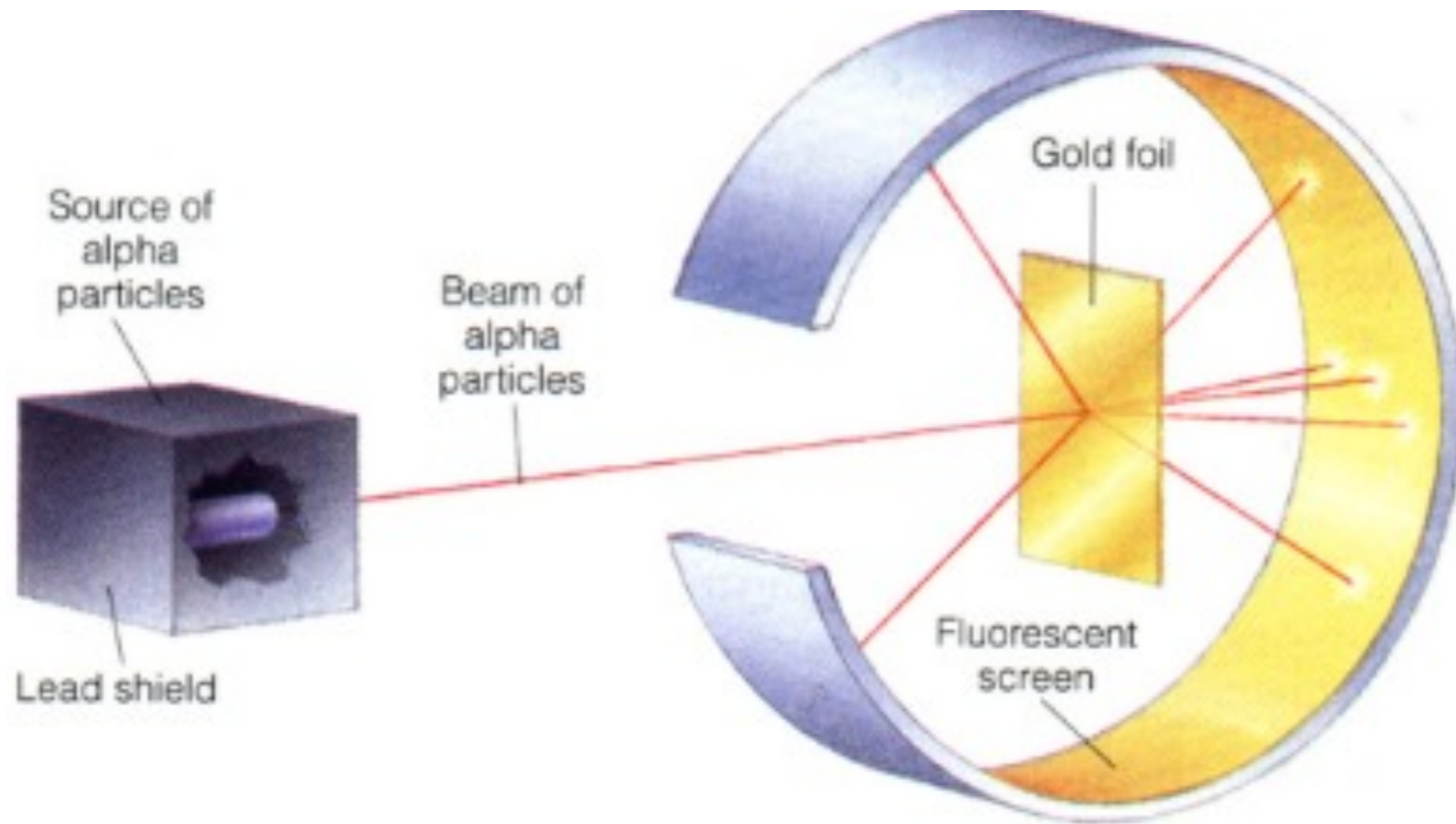
Mass of Particles

- Proton-1 atomic mass unit (AMU).
 $1.67 \times 10^{-24} \text{g}$.
- Neutron-1 AMU.
- Electron-1/1,840 AMU or
 $9.11 \times 10^{-28} \text{g}$.



JJ Thompson

Charges in the Tube



Rutherford: Gold Foil Experiment

The Nucleus

- Really small. Marble in the middle of Lincoln Financial Field.
- Where almost all of the mass of an atom is located.

Quizzes

- I will take individual questions about grades in a moment.
- Please look over what you got wrong.
- I will recollect them before you leave.