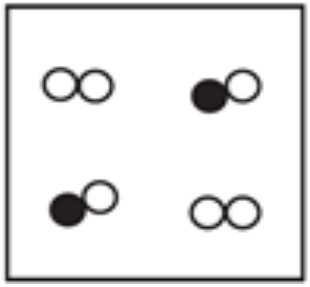
Unit 3 NAME

Class Work 10/31/13

3.3 Thomson's Model

SPARK

1) Identify the number of atoms for each element for $Ca(OH)_2$
2) What does the picture to the right represent?

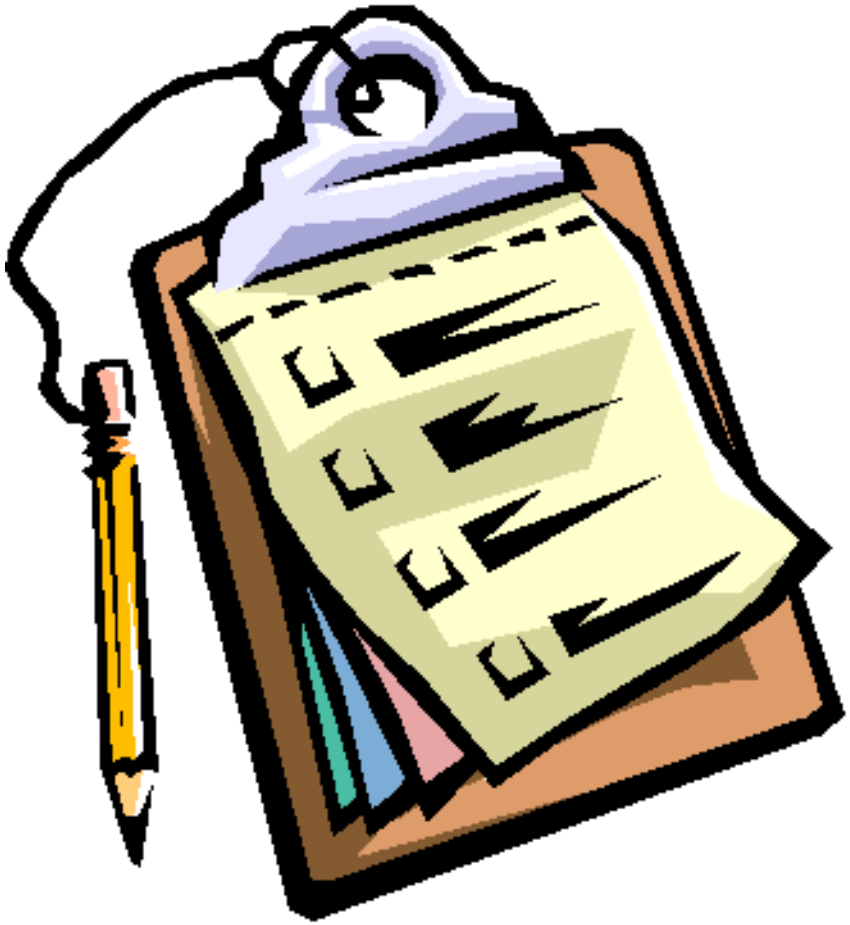


Objective

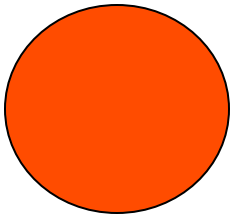
SWBAT relate experimental evidence from Thomson's experiment to his atomic model and describe the key concepts of the atomic model.

Agenda:

- SPARK
- Objective
- Notes
- Practice
- Homework



Dalton’s Atomic Model



Charges of Particles

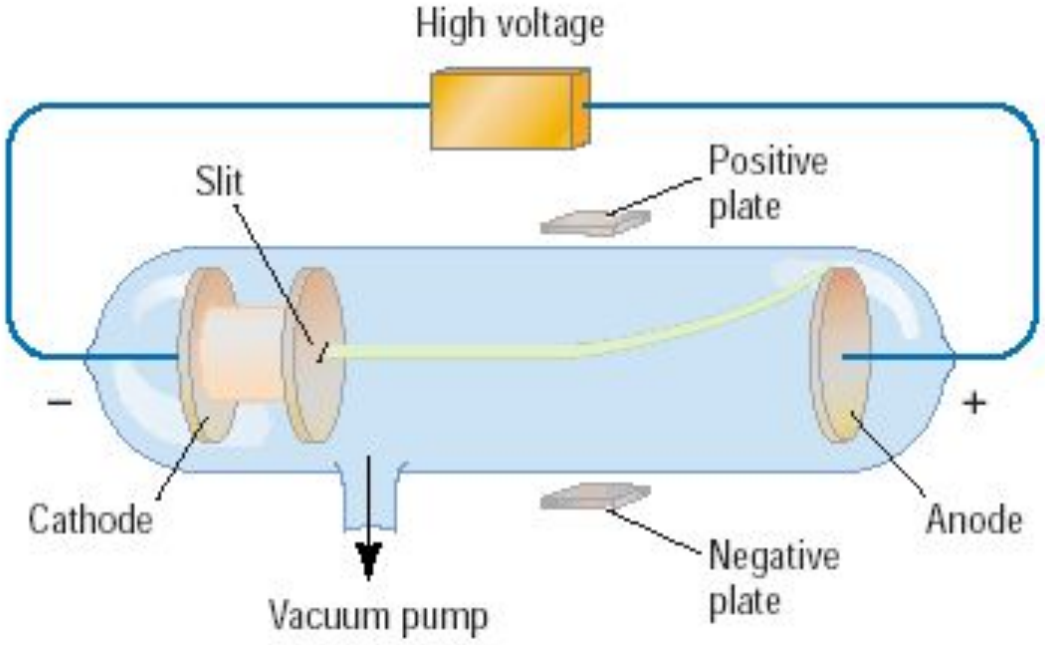
- Charges can be positive, negative or neutral.
- Unlike charges?
- Like charges?

Guided Reading Questions

- Underline answers to the following questions:
  1. What is a cathode ray tube?
  2. What is the purpose of this experiment?
  3. What is Thomson's hypothesis?
  4. What was his experimental setup?
  5. What were the results?
  6. What were his conclusions?

  These are the "main ideas." Write which question they answer in the margin. Follow the rest of our annotation strategies in the margin

What is a cathode ray tube?



Cathode ray tubes pass electricity through a gas that is contained at a very low pressure.

Guided Reading Questions

- Underline answers to the following questions:
  2. What is the purpose of this experiment?
  3. What is Thomson's hypothesis?
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PAIR-SHARE

- Compare what you annotated with your neighbor and explain your rationale

Purpose

- Understand what is the charge of these particles (cathode ray)

Hypothesis

- The cathode ray particles are negatively charged.

Experiment

- Put electric plates (one positive, one negative) along a cathode ray tube and observed whether or not the ray was deflected.
- Put a magnet along the side of the tube to see if the magnet attract or repel.

Results 1

Cathode ray was attracted to positive side of the electric plate and the magnet.

Conclusion 1

There must be particles that are negatively charged. We call them electrons.

How did Thomson know that the cathode ray in the cathode ray tube was negatively charged?

Results/Conclusion 2:

Results: Charge to mass ratio is extremely large

Conclusion:

- Electrons mass is very very small (smaller than hydrogen atom).
- Electron must be inside of an atom, the atom must contain other particles that account for most of the mass.

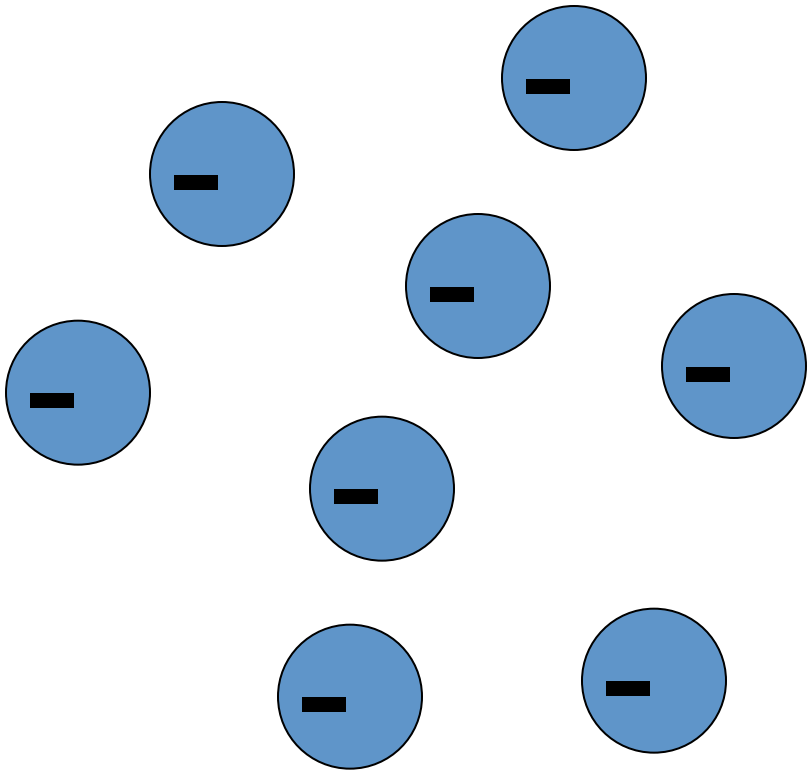
Results/Conclusion 3:

- Results: Constant charge to mass ratio for different gases (elements).

- Conclusion: All elements must contain identically charged electrons.

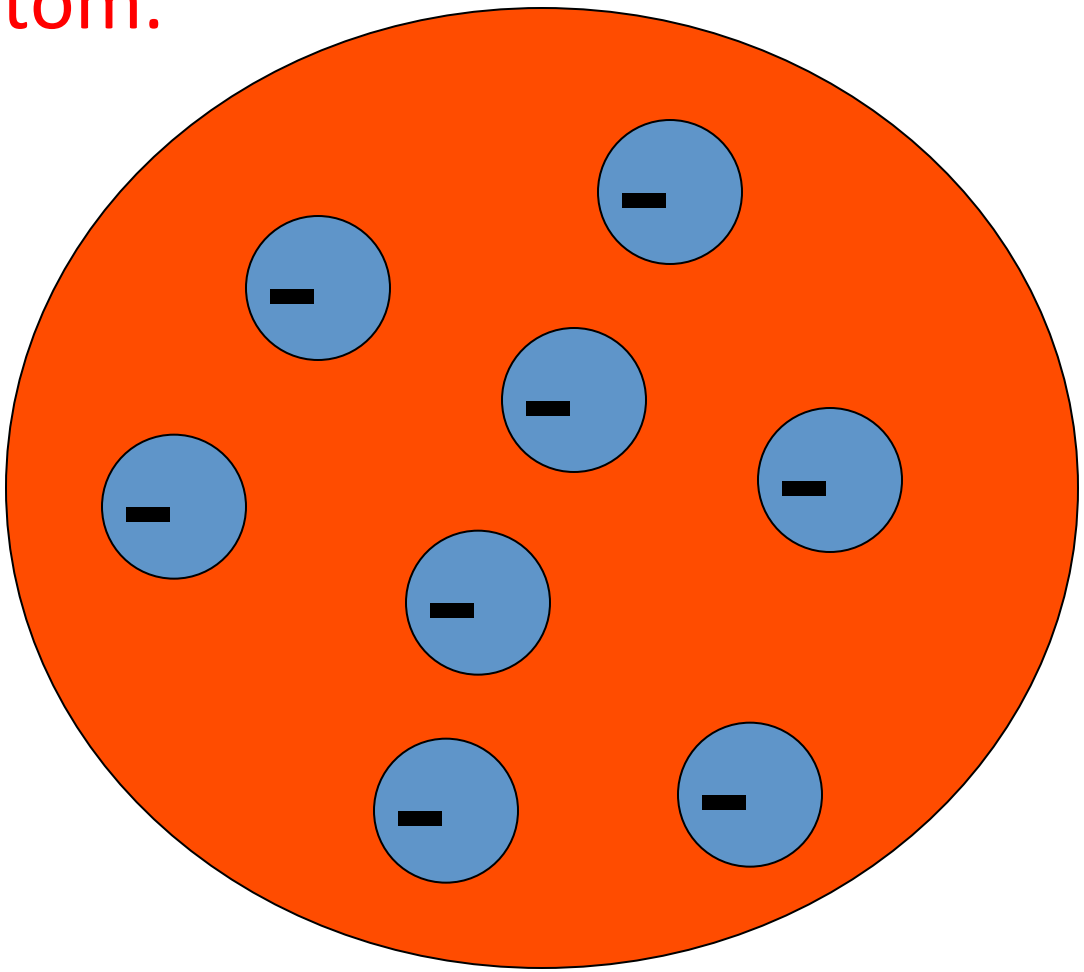
Thomson's Atomic Model

- Atoms contain negatively charged particles, electrons



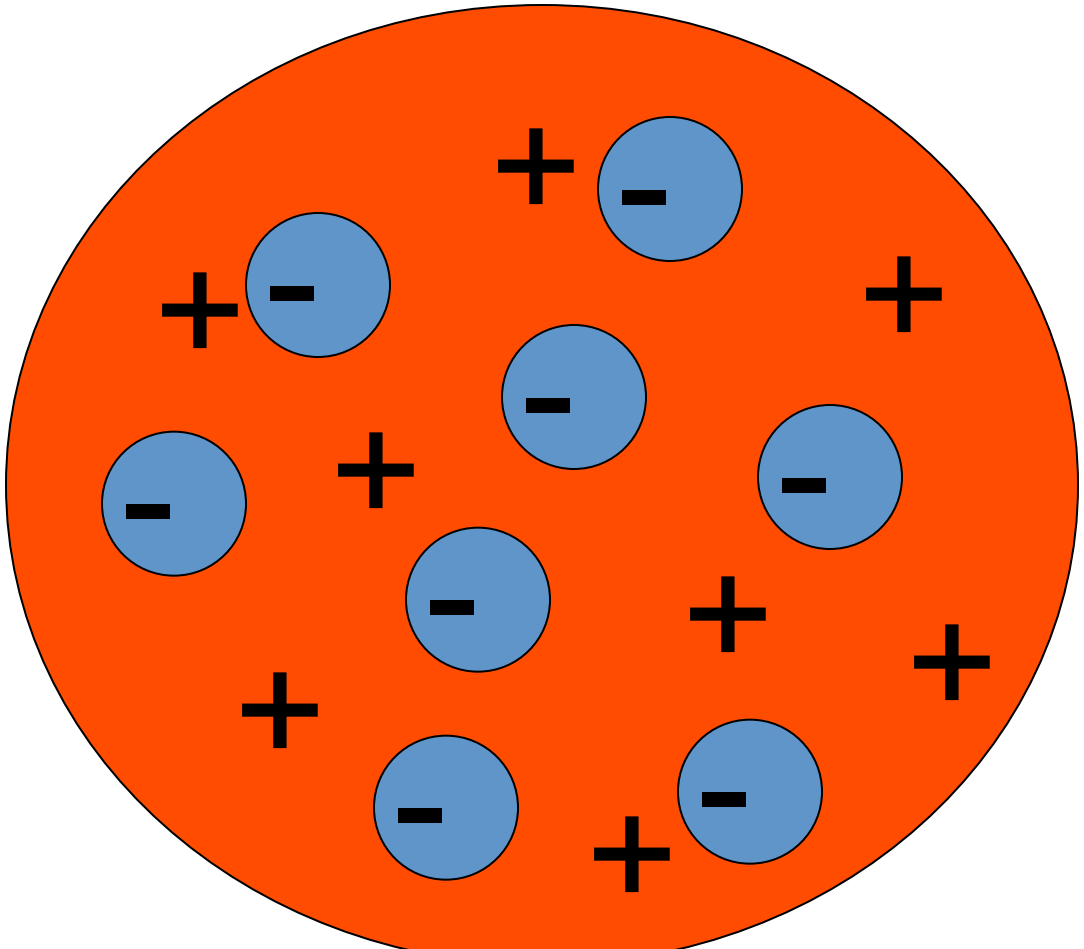
Thomson's Atomic Model

- These electrons are small compared to the rest of the atom.

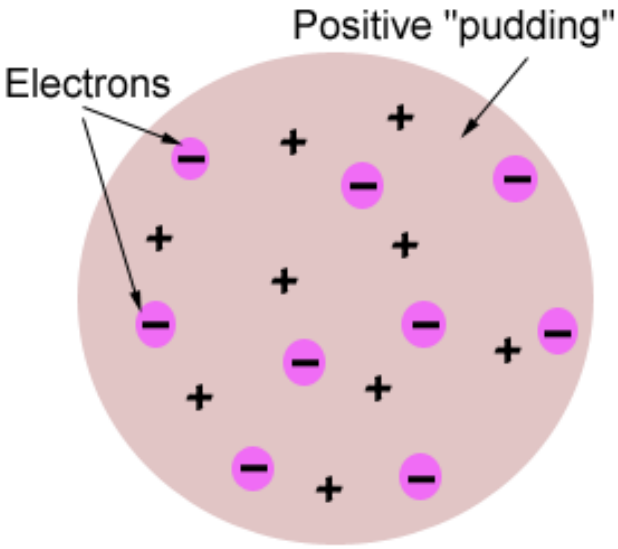


Thomson's Atomic Model

Thomson knew atoms are neutral, so there must be positive particles in the atom to balance the negative charge of the electrons.



Plum Pudding Model



- Plums = electrons
- Pudding = positively charged surrounding

Why did he think “the pudding” was the positively charged?

Why did he think the “pudding” was most of the mass and volume of the atom?

Summary

- Atoms have electrons -> negatively charged
- Atoms are overall neutral ->must have + particles
- Electrons mass is SO small -> much smaller than the overall mass of an atom -> something else in the atom must make up most of mass of the atom
- All elements had the same charge to mass ratio ->all elements have electrons and all electrons are the same

HOMEWORK