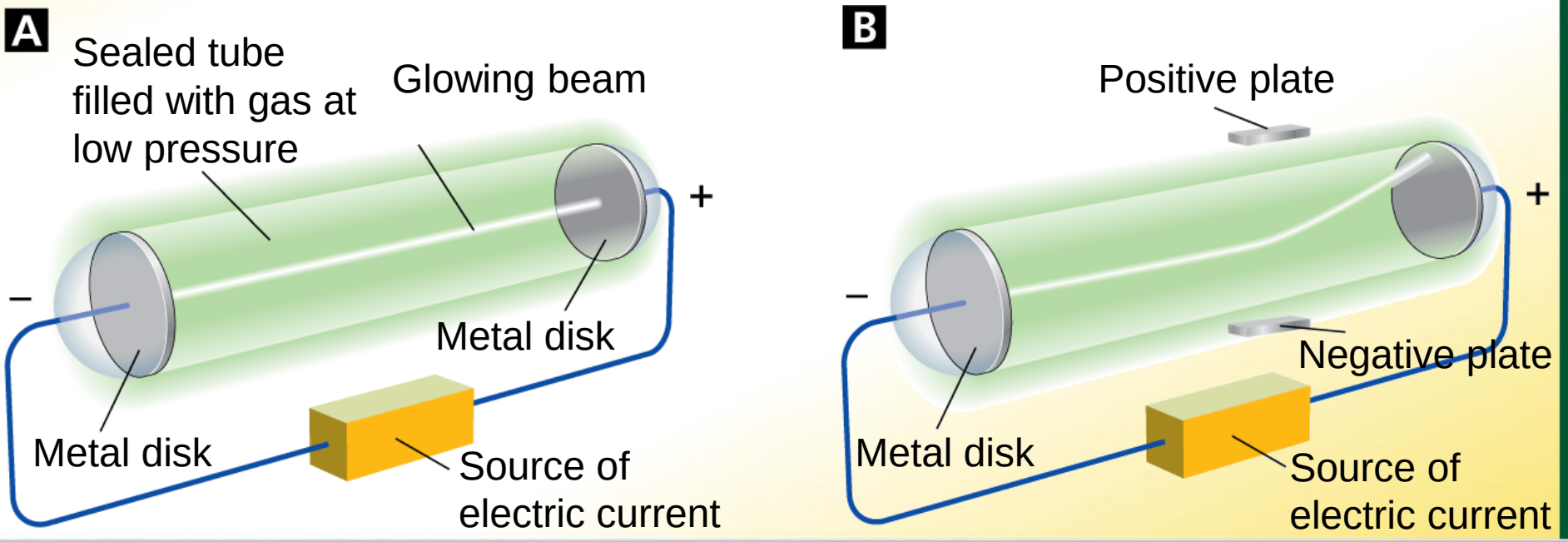
Practice Quiz

Chapter 4.1 and 4.2

Model of the Atom

Which scientist discovered the electron? What model did he create to explain atomic structure?



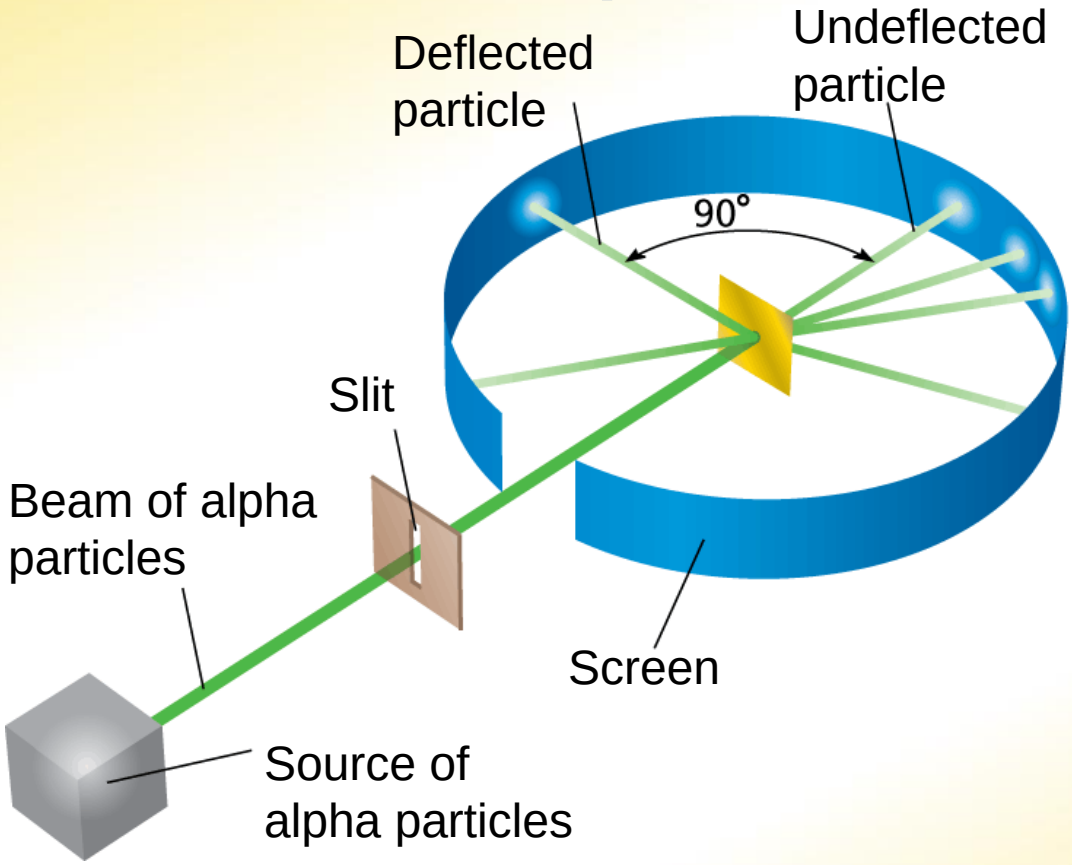
Thomson's Model of the Atom

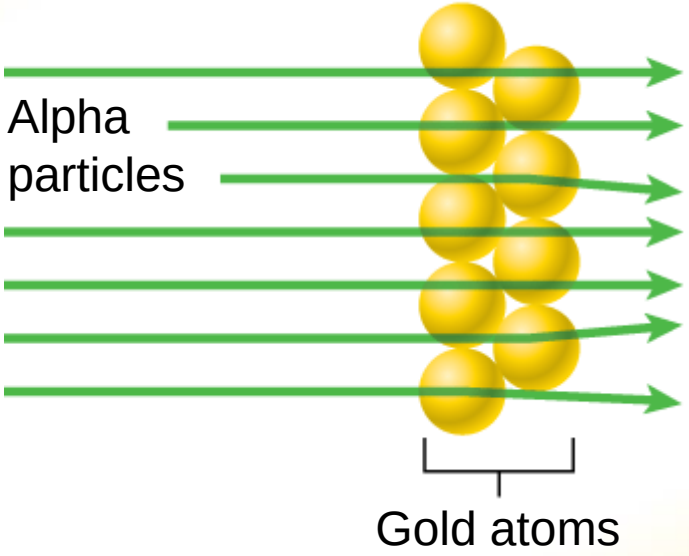
Thomson concluded that the particles in the beam had a negative charge (electrons) because they were attracted to the positive plate.

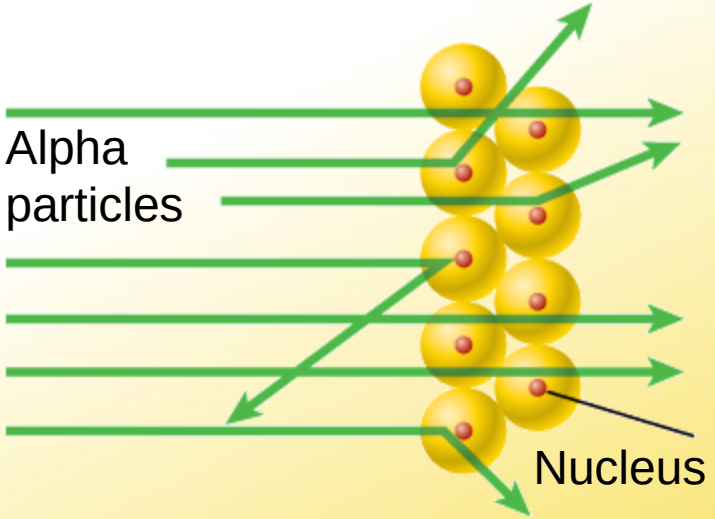
Thomson's model is called the "plum pudding" model. Today, it might be called the "chocolate chip ice cream" model.

Whose Model is this?

The Gold Foil Experiment







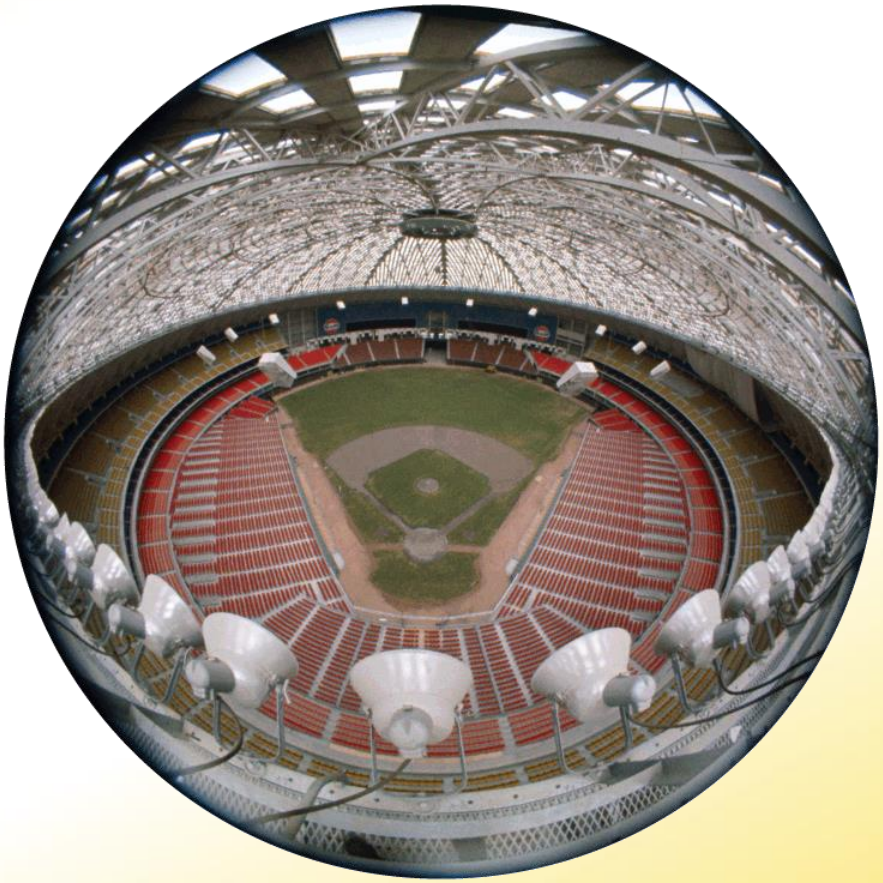
Rutherford's Atomic Theory

- The positive charge of an atom is not evenly spread throughout the atom.
- Positive charge is concentrated in a very small, central area.
- The **nucleus** of the atom is a dense, positively charged mass located in the center of the atom.

Rutherford's Atomic Theory

The Houston Astrodome occupies more than nine acres and seats 60,000 people. If the stadium were a model for an atom, a marble could represent its nucleus.

The total volume of an atom is about a trillion (10^{12}) times the volume of its nucleus.



Assessment Questions

1. Dalton's theory did not include which of the following points?
   a. All elements are composed of atoms.
   b. Most of an atom's mass is in its nucleus.
   c. Compounds contain atoms of more than one element.
   d. In a specific compound, atoms of different elements always combine in the same way.

Assessment Questions

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   ANS: B

Assessment Questions

2. J. J. Thomson's experiments provided the first evidence of
   a. atoms.
   b. a nucleus.
   c. subatomic particles.
   d. elements.

Assessment Questions

2. J. J. Thomson's experiments provided the first evidence of
   a. atoms.
   b. a nucleus.
   c. subatomic particles.
   d. elements.

   ANS: C

Assessment Questions

1. The concept of an atom as a small particle of matter that cannot be divided was proposed by the ancient Greek philosopher, Democritus.

   True
   False

Assessment Questions

1. The concept of an atom as a small particle of matter that cannot be divided was proposed by the ancient Greek philosopher, Democritus.

   True
   False

   ANS: T

Practice Problems

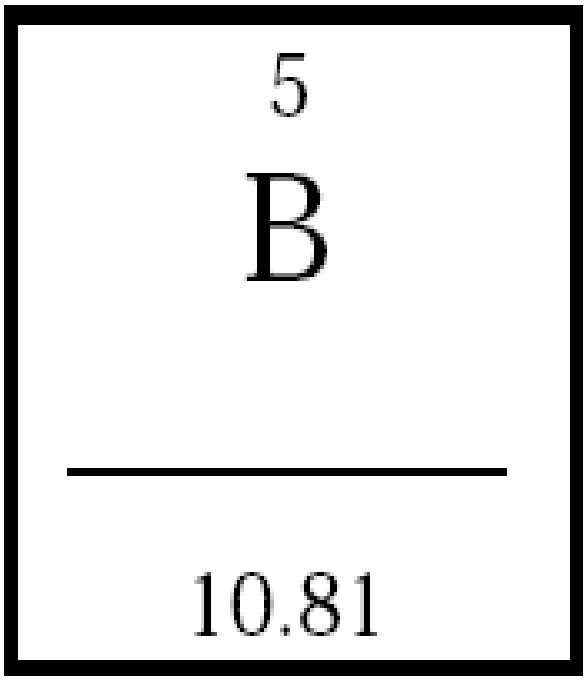
Find the # of protons, neutrons and electrons of each element. Assume neutral atoms. Add nuclear symbol to the right of each.

6 **C** **12.011**	p+ = n = e- =
1 **H** **1.008**	p+ = n = e- =
11 **Na** **22.990**	p+ = n = e- =
34 **Se** **78.96**	p+ = n = e- =

Practice Problems

# of protons, neutrons and electrons of each element.
For NEUTRAL atoms, # p+ = # e-.

6 **C** **12.011**	p+ = 6 n = 6 e- = 6	$_{6}C^{12}$
1 **H** **1.008**	p+ = 1 n = 0 e- = 1	$_{1}H^{1}$
11 **Na** **22.990**	p+ = 11 n = 12 e- = 11	$_{11}Na^{23}$
34 **Se** **78.96**	p+ = 34 n = 45 e- = 34	$_{34}Se^{79}$



Atomic # = _____

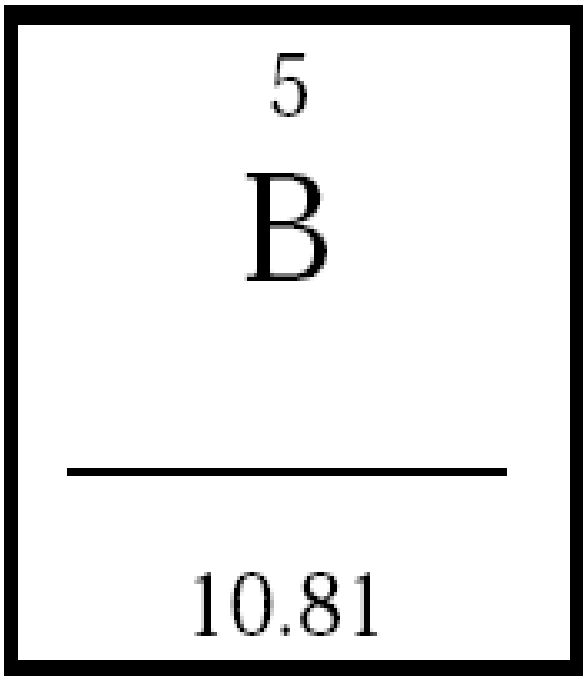
Atomic Mass = _____

# of Protons = _____

# of Neutrons = _____

# of Electrons = _____

Nuclear Symbol



Nuclear Symbol

(*atomic mass*)

$$^{11}_{5}B$$

(*atomic number*)

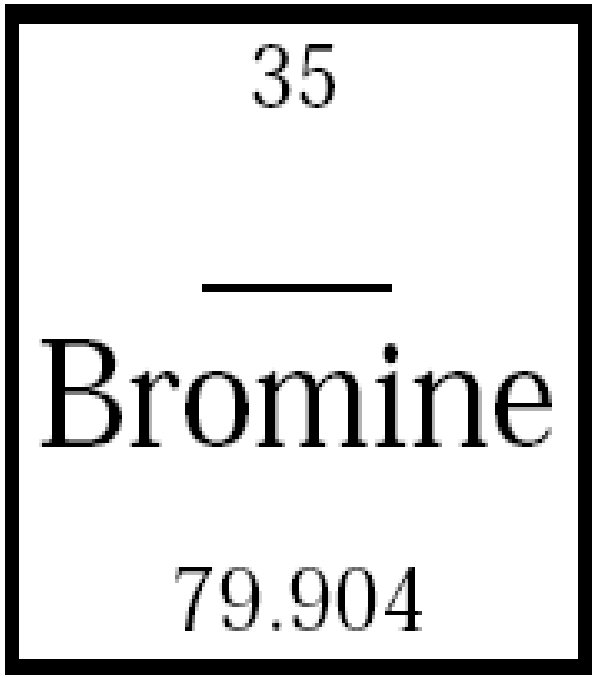
(p) Atomic # = 5

(p + n) Atomic Mass = 11

# of Protons = 5

# of Neutrons = 6 (*atomic mass - protons*)

# of Electrons = 5



Nuclear Symbol

Atomic # = _____

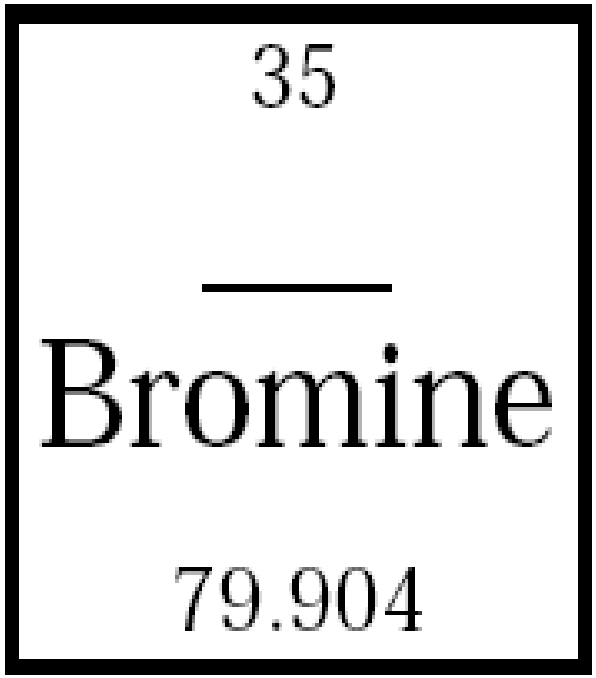
Atomic Mass = _____

# of Protons = _____

# of Neutrons = _____

# of Electrons = _____

Nuclear Symbol



(*atomic mass*)

$^{80}_{35}Br$

(*atomic number*)

(p) Atomic # = 35

(p + n) Atomic Mass = 80

# of Protons = 35

# of Neutrons = 45 (*atomic mass - protons*)

# of Electrons = 35

Properties of Subatomic Particles

What are three subatomic particles? Give their charge, mass, and location.

Properties of Subatomic Particles

What are three subatomic particles?

Properties of Subatomic Particles

Particle	Symbol	Relative Charge	Relative Mass (proton = 1)	Actual Mass (g)	Model
Electron	e^-	1−	$\frac{1}{1836}$	9.11×10^{-28}	
Proton	p^+	1+	1	1.674×10^{-24}	
Neutron	n	0	1	1.675×10^{-24}	

Which scientist discovered:

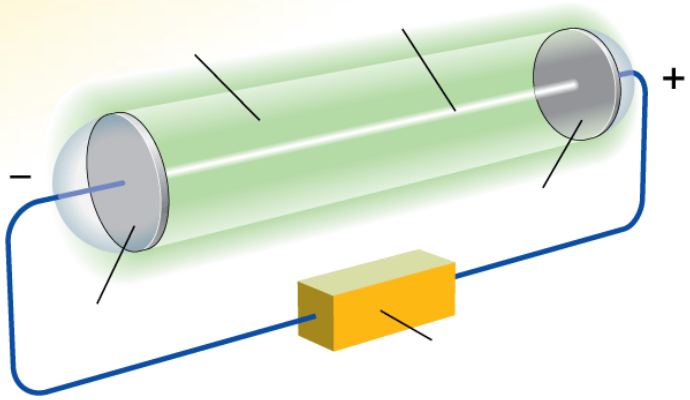
Electrons

Neutrons

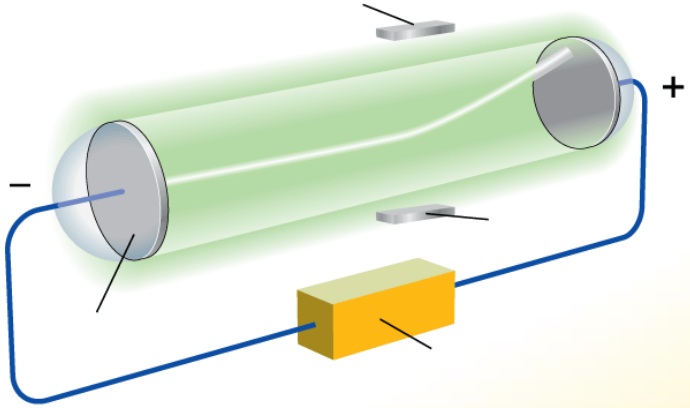
Which scientist discovered:

Electrons … Thomson

A



B



Neutrons … Chadwick

Assessment Questions

1. In which way do isotopes of an element differ?
   a. number of electrons in the atom
   b. number of protons in the atom
   c. number of neutrons in the atom
   d. net charge of the atom

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   ANS: C

Assessment Questions

1. Of the three subatomic particles that form the atom, the one with the smallest mass is the neutron.

   True
   False

Assessment Questions

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   True
   False

   ANS: F, electron