

# Warm-Up

## Atomic Theory



### Lesson Question



### Lesson Goals

**Describe** the development of the .

**Identify** the scientists and  that

shaped the atomic theory.

**Explain** how the atomic

theory

throughout history.



### Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

<input type="text"/>	smallest possible particle of an element
<input type="text"/>	a comparison or relationship between two values
<input type="text"/>	any substance that has a specific element or combination of atoms
<input type="text"/>	a pure substance that is made up of atoms of two or more different elements

**Matter and Energy**

Matter:

- has .
- space (volume).
- has specific  that allow for distinction.

Energy:

- is force that can  motion or changes in matter.

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**Democritus (460 BCE–370 BCE)****PROFILE**

- Was a philosopher who believed in ideas  experimentation
- Believed the universe consisted of empty space and   
(atomos)
- Thought atoms were
- Thought of atoms as  and the  throughout

**John Dalton (1766–1844)****PROFILE**

- Presented a theory that was difficult to prove because atoms could  directly
- Used  from air pressure and water vapor experiments to  
devise his
- Believed all matter was made of
- Believed atoms could  be created or destroyed

# Instruction | Atomic Theory

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## Dalton's Atomic Theory

- are composed of identical atoms.
  - Atoms of other elements are .
- A  is a rearrangement of the atoms into new .
  - A reaction does not create or destroy atoms, it only  them.
- are composed of two or more elements in fixed .
  - The  of atoms in a compound is  for all samples of the compound.

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## Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

determine	to use clues or evidence to make a <input type="text"/>
identify	to <input type="text"/> what something is
recognize	to <input type="text"/> or locate using clues

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**Words to Know**

charge	having positive or negative <input type="text"/> energy
electric	associated with the energy from the flow of <input type="text"/>
neutral	an overall charge of <input type="text"/> due to an equal amount of positive and negative charges

**J.J. Thomson (1856–1940)****PROFILE**

- Used  tubes
- the particle that produces  current
- Discovered that atoms have charges. An object has a  when it has positive or negative electrical energy.

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**What if . . . Dalton and Thomson had a conversation about atomic theory?**

- Dalton: Atoms are indivisible.
- Thomson: ... an atom is composed of individual parts that have different charges, one positive and one negative ...
- Dalton: Atoms are still the basic, smallest part of any element.

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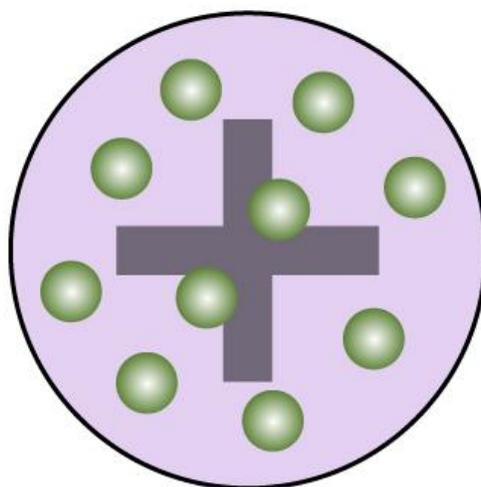
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**Thomson's "Plum Pudding" Model**

Thomson's results led to the proposal of a new atomic model, the

model. This model:

- showed electrons  in a sea of positive charges.
- Dalton's model (it was no longer a solid, indivisible sphere).
- used clues to  the existence of .
- determined that the overall charge of an atom is neutral. Objects that are  have an overall charge of zero due to an equal amount of positive and negative charges.



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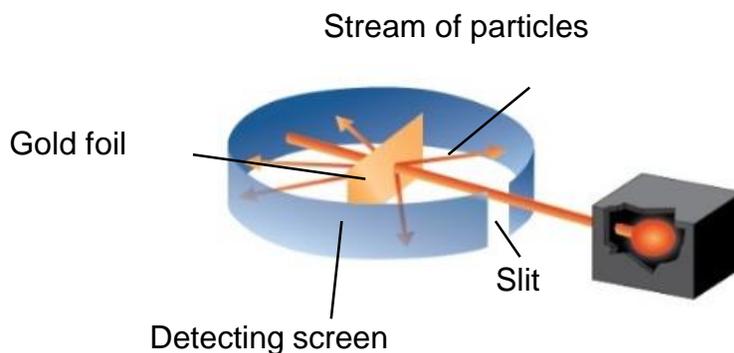
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## Ernest Rutherford (1871–1937)

### PROFILE

- Developed an experiment to  the plum pudding model
- Shot tiny,  charged particles out of a particle gun, toward a thin sheet of
- Detected  particles at various angles



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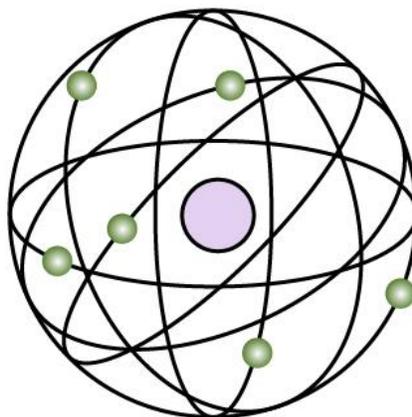
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### Rutherford's Orbital Atomic Model

Based on gold foil , Rutherford's model:

- the dense  with protons (positive particles).
- used clues and evidence from his experiment to determine that electrons must "" at some distance from the center.

Label the nucleus "N." Circle one electron.



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### Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

emission	<input type="text"/> or release
predict	To <input type="text"/> based on <input type="text"/> such as a mathematical equation or model

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## Words to Know

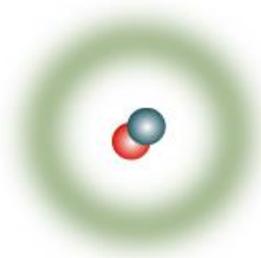
specific	<input type="text"/> or having a certain measured value
energy levels	<input type="text"/> that electrons may occupy around the nucleus of an atom that are associated with a specific amount of <input type="text"/>

## Niels Bohr (1885–1962)

### PROFILE

Niels Bohr used experimental data from emission, or discharge, and absorption spectra of elements to shape his theory:

- Believed electrons occupy specific, or exact,
- Said energy levels are  from the nucleus
- Said there are specific amounts of  that are required to move electrons to the next energy level



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**Erwin Schrödinger (1887–1961)****PROFILE**

- Modeled a  equation that allowed scientists to identify the properties of electrons as both a wave and a particle
- Believed electrons do not stay in a certain orbit, but can have a  zone around the nucleus (electron cloud)
- Believed the wave equation could predict the  location of an electron

# Summary

## Atomic Theory



### Lesson Question

How did the atomic theory develop and change?



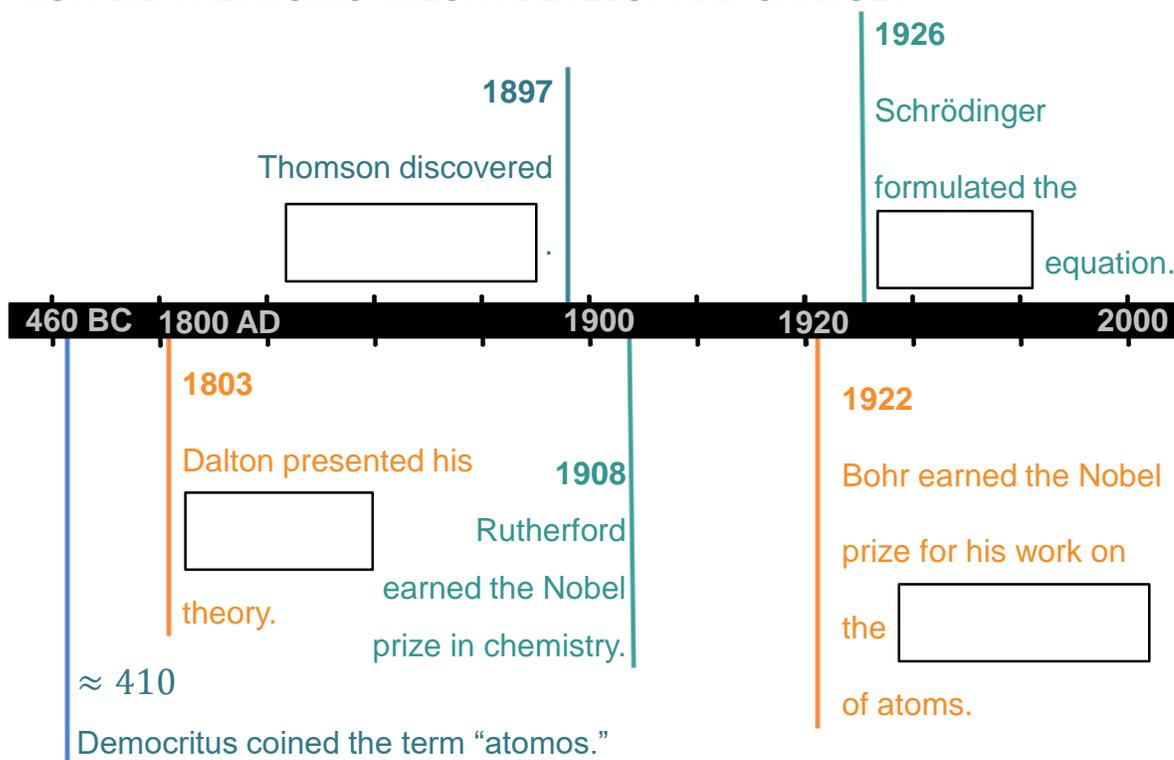
### Answer

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### Review: Key Concept

HOW DID THE ATOMIC THEORY DEVELOP AND CHANGE?





# Summary

## Atomic Theory

*Use this space to write any questions or thoughts about this lesson.*