



Timeline of the Atom

Companion worksheet — complete this as you explore the interactive timeline.

Name: _____ **Date:** _____

Instructions: For each scientist below, use the interactive Timeline of the Atom to answer the question in your own words.

1. Democritus (~440 BCE)

What did Democritus propose, and how did he arrive at the idea (was it based on experiment or reasoning)?

2. John Dalton (1803)

What is Dalton's model called, and what were the main points of his atomic theory?

3. J.J. Thomson (1897)

What did Thomson discover, and what is his model nicknamed? Why that name?



4. Ernest Rutherford (1911)

Describe the gold foil experiment. What surprising result led Rutherford to propose the nucleus?

5. Niels Bohr (1913)

What problem with Rutherford's model did Bohr solve, and how did he change the model?

6. The quantum mechanical model (1920s onward)

How is the electron cloud model different from Bohr's planetary model? Why is a "cloud" a better description than an orbit?



Put the models in order

Number these models 1 through 6 in the order they were developed, from earliest to most recent.

	Plum pudding model (Thomson)
	Electron cloud / quantum mechanical model
	Solid sphere model (Dalton)
	Nuclear model (Rutherford)
	Atomos — indivisible particles (Democritus)
	Planetary model (Bohr)

Reflection

Which change between models do you think was the biggest surprise for scientists at the time, and why? Use evidence from at least two models in your answer.



Sketch each model

Draw a simple sketch of each atomic model in the boxes below.

Dalton's model

Thomson's model

Rutherford's model

Bohr's model



TEACHER ANSWER KEY — remove or skip this page before printing for students

1. Democritus (~440 BCE): Proposed matter is made of indivisible particles called atomos. This was based on reasoning/philosophy, not experiment.
2. Dalton (1803): Solid sphere / "billiard ball" model. Atoms are indestructible, identical within an element, differ between elements, and combine in fixed whole-number ratios to form compounds.
3. Thomson (1897): Discovered the electron using cathode ray tubes. Model nicknamed "plum pudding" — electrons scattered through a sphere of positive charge, like plums in a pudding.
4. Rutherford (1911): Gold foil experiment — most particles passed through, but some bounced back, showing atoms have a tiny, dense, positively charged nucleus with mostly empty space around it.
5. Bohr (1913): Solved the problem of electrons spiraling into the nucleus by proposing fixed energy levels (like rungs on a ladder) that electrons jump between.
6. Quantum mechanical model (1920s+): Electrons don't follow fixed orbits; their position is described as a probability cloud (orbital) rather than a precise path.

Correct order (earliest to most recent):

1. Democritus → 2. Dalton → 3. Thomson → 4. Rutherford → 5. Bohr → 6. Quantum mechanical model

Teaching notes

- This worksheet pairs with the Timeline of the Atom interactive at learnsightsystems.com/resources/chemistry — students should have the interactive open while completing pages 1–2.
- The reflection question (page 3) has no single correct answer — look for students citing specific evidence (e.g. the gold foil results, or emission spectra) rather than just restating a model name.
- Common misconception to watch for: students often assume each model was "proven wrong" and discarded, rather than refined. Emphasize that each new model explained something the previous one couldn't.