

Module 2: Atomic Structure and the History of Atomic Theory



Topic 1 Content: Foundations of Atomic Structure

Introduction

Foundations of Atomic Structure

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For centuries, people wondered about the tiniest particle of matter that could exist. Over time, different philosophers and scientists contributed to the theory of the atom. Using the arrows in the upper right corner of the activity, view an interactive timeline of the contributions made by these philosophers and scientists.



Early Greeks Early Alchemists 19th Century Scientists

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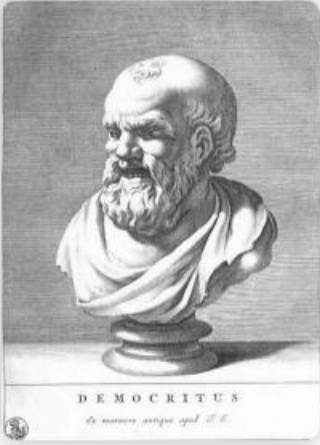
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Democritus


Foundations of Atomic Structure

Democritus

A famous Greek philosopher, Democritus, who lived from around 460 BC to 370 BC, is given credit for the notion that there is one very small particle that composes all matter and cannot be subdivided. He called this particle "atomos," which means indivisible in Greek.



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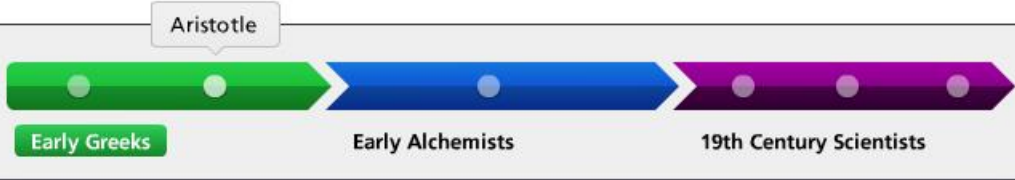
Aristotle

Foundations of Atomic Structure

Aristotle

Another very famous Greek philosopher of that era, Aristotle, who lived from 384 BC to 322 BC, disagreed with Democritus. Instead, he proposed that all matter is composed of four elements: earth, or soil, air, fire, and water.

It is important to note that all of the theories about matter at this time were just based on discussion and debate. There was virtually no scientific evidence to back up their theories.



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Early Alchemists


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Early Alchemists

During the next two centuries, most effort towards the understanding of the basic fundamental particle of matter was directed in one main area: turning substances into gold. The people pursuing this goal were called “alchemists”, which is where the word chemistry comes from. Although the word “alchemist” conjures up visions of mysterious looking wizards in crazy laboratories, some of their work and research became important techniques in the field of chemistry. Early alchemists kept elaborate notes and diagrams, teaching us a lot about the art of observation in science. They developed and observed various techniques, including distillation, which are still important today. It was an early



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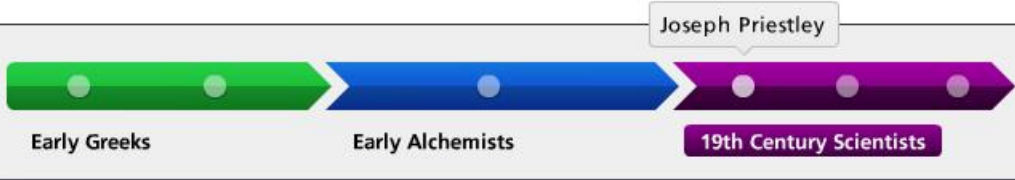
Joseph Priestley

Foundations of Atomic Structure

Joseph Priestley



Joseph Priestley, who lived from 1733 until 1804 AD, discovered that substances could combine together or break apart to form new substances with different properties. He performed numerous reactions with mercury which produced a gas.



The diagram features a horizontal timeline with three colored arrow-shaped segments pointing right: a green segment labeled 'Early Greeks', a blue segment labeled 'Early Alchemists', and a purple segment labeled '19th Century Scientists'. A callout box labeled 'Joseph Priestley' is positioned above the purple segment, indicating his contribution to the field.

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Antoine Lavoisier


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Antoine Lavoisier

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John Dalton


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John Dalton

It was John Dalton, who lived from 1766 until 1844 AD, who truly combined all of the chemical knowledge known at the time to come up with the Atomic Theory in 1803. Dalton was very curious about why substances always combined in certain ratios. He discovered that when Substance A combined with Substance B, they did so in a particular proportion. This led him to theorize that all matter is made of atoms, similar to Democritus' "atomos," which are indivisible and indestructible.



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