

The Search of Atoms

Watch the video and answer the following questions.

1. Around 440 BCE, Democritus first proposed that everything in the world was made up of tiny _____ surrounded by _____ and he even speculated that they vary in _____ and _____ depending on the _____ they compose. He called these particles _____.
2. Who disagreed with Democritus?
 - A. Aristotle
 - B. John Dalton
 - C. J. J. Thompson
 - D. Ernest Rutherford
3. Aristotle believed that matter was made of four elements: _____, _____, _____ and _____.
4. John Dalton showed that common substances always _____ into the same elements in the same _____. For example, water can break down into _____, _____ and _____. Another example, like carbon dioxide, it can be broken down into _____, _____ and _____. The various combinations of atoms of different elements have a particular _____ and _____ that could neither be _____ nor _____.
5. Development of the Atom models. Please use words and drawings if necessary to explain the differences or development of each model.
 - (1) J. J. Thompson, the chocolate chip cookie model
 - The discovery of _____
 - Atoms as uniformly packed spheres of _____ matter filled with _____ charged electrons
 - (2) Ernest Rutherford
 - The father of the _____
 - while most of the particles did _____, some
 - Atoms consisted largely of empty space with just a few electrons while most of the _____ was _____ in the centre which he termed the nucleus. The alpha particles _____ the gaps but _____ from the dense positively charged nucleus.
 - (3) Niels Bohr
 - Electrons orbit the nucleus at _____ and _____ able to jump from one level to another but not to exist in the space between.
 - (4) Other experiments
 - Rather than simply being discrete particles, electrons _____ behaved like _____, not being _____ to a _____ point in space.
 - (5) Werner Heisenberg
 - It was impossible to determine both the _____ and _____ of electrons as they moved around an atom.
6. Now, look back to 440 BCE, was Democritus correct? Why do you think so?
7. Please summarise the history timeline: person's name, main theory, new terms etc.

ANSWER SHEET

1. particles, empty space, size, shape, substance, Atomos.
2. A
3. earth, wind, water, fire
4. broke down, proportions; oxygen, hydrogen, hydrogen; carbon, oxygen, oxygen; size, mass; created, destroyed
5. (1) Electrons, positive, negatively
(2) Nuclear age; mass, concentrated, passed through, bounced back
(3) fixed, energies, distances
(4) simultaneously, waves, confined, particular
(5) exact, position, speed
6. Yes.