

ELEMENTS4LIFE



European Timeline of the Elements



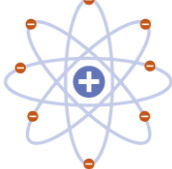
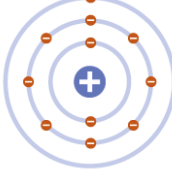






TOPIC: What are the elements that scientists think that make up matter in the different historical periods?

FINLAND	SWEDEN	PORTUGAL	SPAIN
Ancient History	Medieval Period	The Renaissance	Modern and Contemporary period


THE ELEMENTS IN THE CONTEMPORARY PERIOD:

A HISTORY OF THE ATOM: THEORIES AND MODELS

How have our ideas about atoms changed over the years? This graphic looks at atomic models and how they developed.

SOLID SPHERE MODEL	PLUM PUDDING MODEL	NUCLEAR MODEL	PLANETARY MODEL	QUANTUM MODEL
				
JOHN DALTON	J. J. THOMSON	ERNEST RUTHERFORD	NIELS BOHR	ERWIN SCHRÖDINGER
 1803	 1904	 1911	 1913	 1926
Dalton drew upon the Ancient Greek idea of atoms (the word 'atom' comes from the Greek 'atomos' meaning indivisible). His theory stated that atoms are indivisible, those of a given element are identical, and compounds are combinations of different types of atoms.	Thomson discovered electrons (which he called 'corpuscles') in atoms in 1897, for which he won a Nobel Prize. He subsequently produced the 'plum pudding' model of the atom. It shows the atom as composed of electrons scattered throughout a spherical cloud of positive charge.	Rutherford fired positively charged alpha particles at a thin sheet of gold foil. Most passed through with little deflection, but some deflected at large angles. This was only possible if the atom was mostly empty space, with the positive charge concentrated in the centre: the nucleus.	Bohr modified Rutherford's model of the atom by stating that electrons moved around the nucleus in orbits of fixed sizes and energies. Electron energy in this model was quantised; electrons could not occupy values of energy between the fixed energy levels.	Schrödinger stated that electrons do not move in set paths around the nucleus, but in waves. It is impossible to know the exact location of the electrons; instead, we have 'clouds of probability' called orbitals, in which we are more likely to find an electron.
+ RECOGNISED ATOMS OF A PARTICULAR ELEMENT DIFFER FROM OTHER ELEMENTS	+ RECOGNISED ELECTRONS AS COMPONENTS OF ATOMS	+ REALISED POSITIVE CHARGE WAS LOCALISED IN THE NUCLEUS OF AN ATOM	+ PROPOSED STABLE ELECTRON ORBITS; EXPLAINED THE EMISSION SPECTRA OF SOME ELEMENTS	+ SHOWS ELECTRONS DON'T MOVE AROUND THE NUCLEUS IN ORBITS, BUT IN CLOUDS WHERE THEIR POSITION IS UNCERTAIN
- ATOMS AREN'T INDIVISIBLE - THEY'RE COMPOSED FROM SUBATOMIC PARTICLES	- NO NUCLEUS; DIDN'T EXPLAIN LATER EXPERIMENTAL OBSERVATIONS	- DID NOT EXPLAIN WHY ELECTRONS REMAIN IN ORBIT AROUND THE NUCLEUS	- MOVING ELECTRONS SHOULD EMIT ENERGY AND COLLAPSE INTO THE NUCLEUS; MODEL DID NOT WORK WELL FOR HEAVIER ATOMS	+ STILL WIDELY ACCEPTED AS THE MOST ACCURATE MODEL OF THE ATOM

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DO A RESEARCH OF EACH MODEL (IN GROUPS):

1. Who is/are the author/s? (biography)
Find some letters/arguments between scientists of that time to find out if we can give credit to other authors (women, minorities, etc).
2. What scientific evidence/experiment allows them to propose the model?
3. How can we represent the model?
Postulates, explanations, representations.
4. Model limitations
What postulates were not accurate and created the need for a new model?
5. In what situations is the model still valid? (For example, Dalton model is still represented in the description of the kinetic theory of matter- that says that matter consists of many small particles which are constantly moving).
6. Make a final product to present your research: video or presentation.

CREATE A TIMELINE OF THE ELEMENTS:

Add all the relevant dates and information from your research to our [European Timeline of the Elements](#) (on a shared Padlet).