



STARTER FOR 10!!!

2.1. Development of theories about atomic structure

Our current understanding of atomic structure is a result of the discoveries of several scientists over many years, each scientist adding to the model.

Complete the table below by adding the name of the scientist and the discovery made. Choose from the lists below the table. (9 marks)

Approx. year of discovery	Scientist	Addition made to our current understanding of atomic structure
1803	John Dalton	Proposed that all matter is made up of tiny particles called atoms
1897		
1911		
1915		
1924		
1932		

Scientists:

Ernest Rutherford; Wolfgang Pauli; J. J. Thomson; James Chadwick; Niels Bohr

Discoveries;

Proposed that the electrons orbit around the nucleus in orbits with a set size and energy

Discovered that atoms contain neutral particles called neutrons in their nucleus

Realised that atoms are divisible and contain very tiny, negatively charged particles called electrons

Discovered that an atom is made up of a nucleus and an extra-nuclear part. The central nucleus is positively charged and the negative electrons revolve around this central nucleus.

Proposed the concept of electron spin

BONUS MARK: Which of the scientists listed above was a famous football goalkeeper in his country?



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Chapter 2: Atomic structure answers

2.1. Development of theories about atomic structure

Approx. year of discovery	Scientist	Addition made to our current understanding of atomic structure
1803	John Dalton	Proposed that all matter is made up of tiny particles called atoms
1897	J. J. Thomson	Realised that atoms are divisible and contain very tiny, negatively charged particles called electrons
1911	Ernest Rutherford	Discovered that an atom is made up of a nucleus and an extra-nuclear part. The central nucleus is positively charged and the negative electrons revolve around this central nucleus.
1915	Niels Bohr	Proposed that the electrons orbit around the nucleus in orbits with a set size and energy
1924	Wolfgang Pauli	Proposed the concept of electron spin
1932	James Chadwick	Discovered that atoms contain neutral particles called neutrons in their nucleus

(1 mark for each correct row; 4 marks for the correct order of statements [3 marks if one statement in incorrect position, 2 marks if two statements in incorrect position, 1 mark if any pair of statements follow on correctly from each other])

BONUS MARK: Niels Bohr was indeed a keen football player and was the goalkeeper in the Danish team Akademisk Boldklub. Although Akademisk Boldklub were, at the time, one of the best clubs in Denmark, he never made it to the national team.

2.2. Isoelectronic species

1. helium, He; $1s^2$

Isoelectronic anion; H^-

Isoelectronic cation; Li^+ , Be^{2+}

2. krypton, Kr; $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}, 4p^6$

Isoelectronic anion; Se^{2-} , Br^-

Isoelectronic cation; Rb^+ , Sr^{2+} , In^{3+} , Sn^{4+}

3. calcium ion, Ca^{2+} ; $1s^2, 2s^2, 2p^6, 3s^2, 3p^6$

Isoelectronic anion; S^{2-} , Cl^-

Isoelectronic cation; K^+ , Ga^{3+}