	Statement	Guidance
2.1.U1	Atoms contain a positively charged dense nucleus composed of protons and neutrons (nucleons)	
2.1.U2	Negatively charged electrons occupy the space outside the nucleus.	
2.1.U3	The mass spectrometer is used to determine the relative atomic mass of an element from its isotopic composition	
2.2.U4	Emission spectra are produced when photons are emitted from atoms as excited electrons return to a lower energy level.	
2.2.U5	The line emission spectrum of hydrogen provides evidence for the existence of electrons in discrete energy levels, which converge at higher energies	
2.2.U6	The main energy level or shell is given an integer number, n, and can hold a maximum number of electrons, $2n^2$.	
2.2.U7	A more detailed model of the atom describes the division of the main energy level into s, p, d and f sub-levels of successively higher energies	Full electron configurations (eg $1s^2 2s^2 2p^6 3s^2 3p^4$) and condensed electron configurations (eg [Ne] $3s^2 3p^4$) should be covered
2.2.U8	Sub-levels contain a fixed number of orbitals, regions of space where there is a high probability of finding an electron	The electron configurations of Cr and Cu as exceptions should be covered
2.2.U9	Each orbital has a defined energy state for a given electronic configuration and chemical environment and can hold two electrons of opposite spin	Orbital diagrams should be used to represent the character and relative energy of orbitals. Orbital diagrams refer to arrow-in-box diagrams.
12.1.U10	In an emission spectrum, the limit of convergence at higher frequency corresponds to the first ionization energy.	
12.1.U11	Trends in first ionization energy across periods account for the existence of main energy levels and sub-levels in atoms.	
12.1.U12	Successive ionization energy data for an element give information that shows relations to electron configurations.	