

**The Photoelectric Effect****Checklist statement**

✓

I can define the threshold frequency.

☐

I can explain the threshold frequency using the photon model.

☐I can define the work function, ϕ .☐

I can define stopping potential.

☐I can apply $hf = \phi + E_k(\text{max})$, define all terms and know their standard units.☐I can explain that $E_k(\text{max})$ is the maximum kinetic energy of the photoelectrons.☐

Collisions of Electrons with Atoms**Checklist statement**

✓

I can explain ionisation and excitation of atoms.

☐

I can describe ionisation and excitation in a fluorescent tube.

☐

I can define the electron volt (eV).

☐

I can convert between electron volts (eV) and joules (J).

☐

Energy Levels and Photon Emission**Checklist statement**

✓

I can explain how line spectra (e.g. hydrogen) provide evidence for transitions between discrete energy levels in atoms.

☐I can apply $hf = E_1 - E_2$, define all terms and know their standard units.☐

I know that energy levels may be given in joules (J) or electron volts (eV).

☐

Wave-Particle Duality

Checklist statement

✓

I can explain how electron diffraction provides evidence that particles have wave properties.

☐

I can explain how the photoelectric effect provides evidence that electromagnetic waves have a particle nature.

☐

I can apply the de Broglie wavelength equation $\lambda = \frac{h}{mv}$, define all terms and know their standard units.

☐

I can explain how and why the amount of diffraction changes when the momentum of a particle changes.

☐

I can describe how scientific understanding of the nature of matter changes over time.

☐

I can explain the role of peer review and the scientific community in validating new ideas.

☐