

This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.

Microscopes are essential tools for studying cells and sub-cellular structures.

Required Practical: Preparing and observing stained specimens under a light microscope.

- Light microscope: max $\times 1500$, resolution $\sim 200\text{nm}$, can view living cells
- Electron microscope: much higher magnification and resolution, samples must be dead
- Magnification = image size \div actual size
- $1\text{ mm} = 1000\ \mu\text{m}$ — always convert units before calculating
- Staining (iodine, methylene blue) makes cell structures more visible

Key Terms

Magnification	How much larger the image appears compared to the actual object
Resolution	Ability to distinguish two separate points as distinct

■ **Exam Tip:** Show all working in magnification calculations. State units in your answer. Common error: forgetting to convert mm to μm .