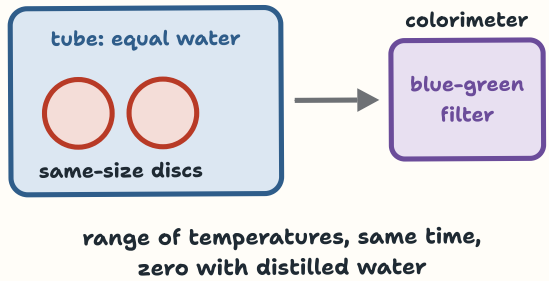
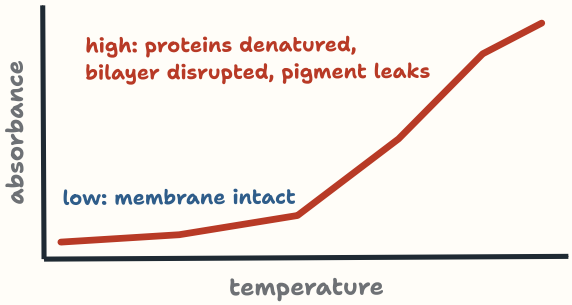
Required Practical 4: Membrane Permeability

Higher temperature damages the membrane, so more betalain pigment leaks and absorbance rises.

Beetroot discs: heat damages the membrane, pigment leaks



range of temperatures, same time, zero with distilled water



Key terms

permeability	how easily substances cross the cell-surface membrane.
betalain pigment	the red pigment held in the beetroot vacuole; it leaks out when membranes are damaged.
colorimeter	measures absorbance: more pigment gives higher absorbance; use a blue-green filter.
calibration	zero the colorimeter with distilled water.
denatured membrane protein	channel and carrier proteins change shape, so the membrane is leaky.
controls	same-size discs, equal volume of water, same time, range of temperatures; repeat and take a mean.

I can...

- [ ] Investigation into the effect of a named variable on the permeability of cell-surface membranes

EXAM TRAP

Do not say "the heat makes pigment come out". Explain: proteins denature and the phospholipid bilayer is disrupted, so permeability increases. Control disc size, volume and time, and use a colorimeter, not the eye.

4 marks: what earns them

1. Cut discs of the same size / surface area (e.g. cork borer, ruler) and rinse to remove pigment already released
   Not: cut beetroot with no mention of equal size
2. Same number of discs in equal volumes of water, at a range of temperatures (water baths), for the same time
   Not: heat the beetroot with no range; no control of volume or time
3. Measure pigment released using a colorimeter (blue-green filter), calibrated / zeroed with distilled water; higher absorbance = more pigment
   Not: see how red it goes by eye only
4. Higher temperature denatures membrane proteins and disrupts the phospholipid bilayer, so permeability increases and more pigment leaks out (accept: low absorbance at low temperatures, rising sharply at high temperatures)
   Not: the heat makes pigment come out with no reason; cells burst with no membrane reference; pigment evaporates

Remember

Same discs, rinse, range of temperatures.
Colorimeter: more pigment, higher absorbance.
Heat damages the membrane.

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