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

The digestive system breaks large, insoluble food molecules into small, soluble molecules that can be absorbed into the bloodstream.

Required Practical: Food tests: testing for starch (iodine — blue-black), reducing sugars (Benedict's — brick red after heating), proteins (biuret — purple), lipids (ethanol emulsion — milky white).

- Mouth: mechanical digestion (chewing, increasing surface area) + salivary amylase breaks starch → sugars.
- Oesophagus: carries food to stomach by peristalsis (muscular contractions). No digestion occurs here.
- Stomach: muscular walls churn food; pepsin (protease) digests proteins; hydrochloric acid (pH 2) kills bacteria and provides acidic pH for pepsin.
- Small intestine: receives bile (from liver via bile duct), amylase and lipase from pancreas. Most digestion and ALL absorption of nutrients happens here.
- Large intestine: absorbs water from undigested material. Remaining material forms faeces.
- Liver: produces bile. Bile emulsifies fats — breaks large fat globules into smaller droplets, increasing surface area for lipase.
- Pancreas: produces amylase, protease and lipase — released into small intestine.
- Villi in small intestine: finger-like projections that massively increase surface area; thin walls (one cell thick); good blood supply → efficient absorption by diffusion and active transport.

■ **Sep** Gall bladder stores bile produced in liver and releases it into the small intestine.

Key Terms

Peristalsis	Wave-like muscular contractions that push food through the digestive system
Bile	Alkaline liquid produced in liver, stored in gall bladder — emulsifies fats, neutralises stomach acid in small intestine
Emulsification	Breaking large fat droplets into smaller ones — increases surface area for lipase
Villus	Finger-like projection in small intestine — increases surface area for absorption

■ **Exam Tip:** Bile is NOT an enzyme — it does not break chemical bonds. It emulsifies (physically breaks up) fat droplets to increase surface area. Examiners often test this distinction.