Kingdoms

Organisms are classified into five **kingdoms**. **Viruses** are not living and so are not in a kingdom.

Cell part	Kingdom				
	prokaryotes (all unicellular)	protoctists (mainly unicellular)	fungi (mainly multicellular)	plants (all multicellular)	animals (all multicellular)
cytoplasm	✓	✓	✓	✓	✓
cell membrane	✓	✓	✓	✓	✓
nucleus	×	✓	✓	✓	✓
mitochondria	×	✓	✓	✓	✓
cell wall	✓	×/✓	✓	✓	×
chloroplasts	×	×/✓	×	✓	×

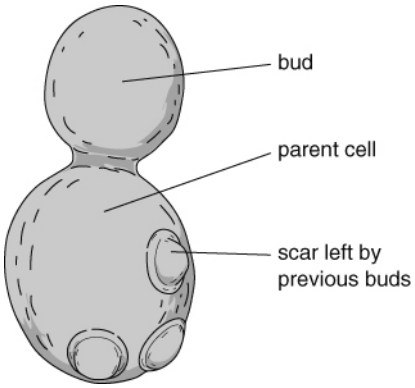
Unicellular organisms can only grow to a certain size. If the organism is too big, it cannot get enough of the substances it needs throughout the cell because diffusion is too slow.

The tissues in multicellular organisms need to have raw materials transported to them because diffusion would be too slow.

Microscopic fungi

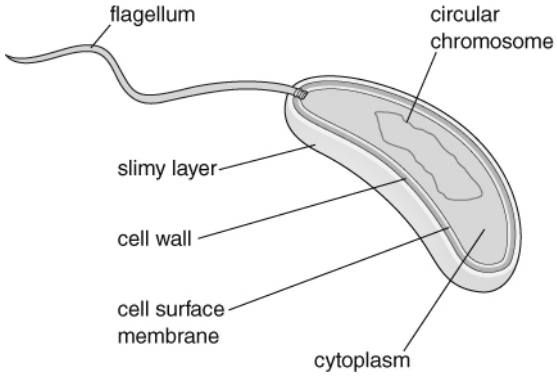
These include, for example, yeast. They:

- reproduce asexually by budding
- can use aerobic respiration, which is important in baking
- can use anaerobic respiration (fermentation), which is important in alcoholic drink manufacture.



glucose → carbon dioxide + ethanol (alcohol)

Bacteria



Parts of a bacterium

Some bacteria are important in making yoghurt and cheese. These bacteria use a type of anaerobic respiration to ferment milk:

glucose → lactic acid

Feeding

Bacteria and fungi feed by releasing **enzymes** into their surroundings to digest large **organic molecules**. The digested molecules are then absorbed.

Protoctists

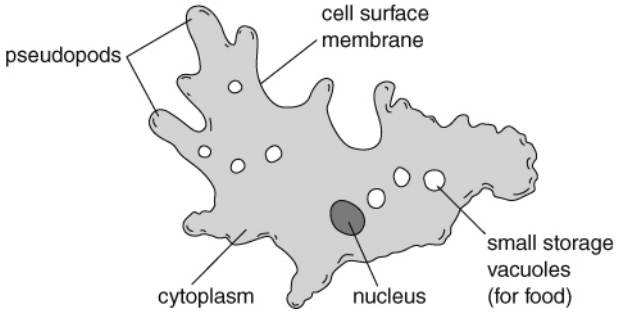
There are many different types of protoctist and some can **photosynthesise**:

carbon dioxide + water → glucose + oxygen

Photosynthesising protoctists are therefore **producers** in a **food chain**, for example:

algae (producer) → pond snail (**consumer**, **herbivore**) → minnow (consumers, **carnivores**, **predators**) → grey heron

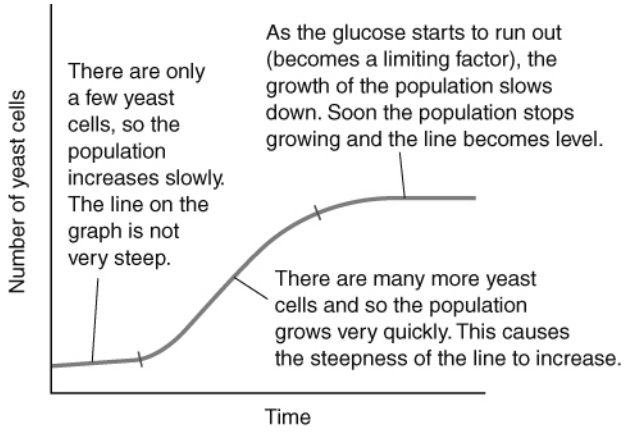
Some protoctists move using **pseudopods**, while others use **cilia** and others use **flagella**.



Parts of an *Amoeba*

Growth

All microorganisms need warmth, food and moisture to grow well. Some need light for photosynthesis. Some need oxygen for aerobic respiration. The increase in a population can be shown on a growth curve. Something that stops a population from increasing further is called a **limiting factor**.



The carbon cycle

Many unicellular microorganisms are **decomposers** and play an important part in the **carbon cycle**.