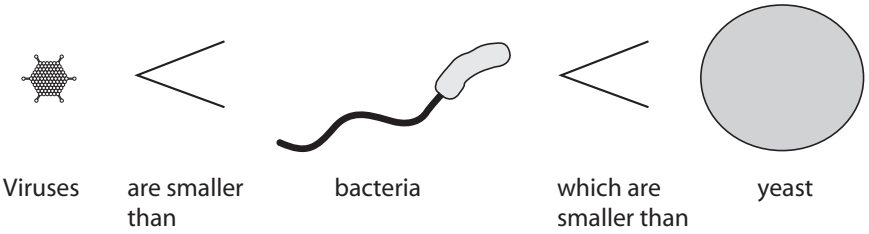
Microbes

Microbes, or **micro-organisms**, can only be seen using a microscope. There are three main types of microbes: **viruses**, **bacteria** and **fungi**. The most common fungus microbes are **yeasts**.



Viruses are usually not considered to be living because they do not carry out any of the seven life processes for themselves.

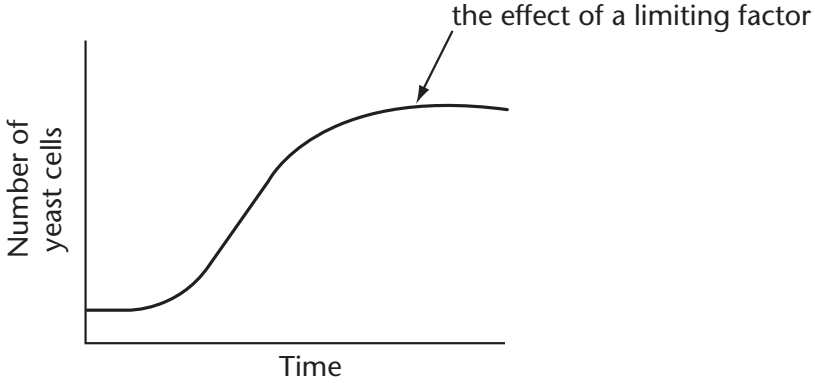
Bacteria and yeasts are important in making some foods and drinks. Yeasts are used to make bread dough rise. The cells use oxygen, from the air found in pockets in the dough, for **aerobic respiration**. This process produces carbon dioxide, which makes the bread rise.

glucose + oxygen ⟶ carbon dioxide + water

Yeast cells are also used to make beer and wine. In this case there is no air and so the yeast cells use **anaerobic respiration**. When yeasts cells use **anaerobic** respiration it is called **fermentation**. The ethanol is a waste product of this reaction.

glucose ⟶ carbon dioxide + ethanol
(a sugar)

The number of an organism in an area is called a **population**. In good conditions (warm, moist, plenty of sugar) a population of yeast cells will grow rapidly. The population stops growing if something runs out (e.g. sugar). The thing that stops the population growing is called a **limiting factor**.



Summary Sheets (continued)

Diseases

Some microbes cause **infectious diseases** (diseases that can be spread from person to person). The microbes are said to **infect** you. The effects the microbes have on your body are known as **symptoms**. A doctor observes symptoms to come up with a **diagnosis**. Microbes can be spread by the air, water, touch, food, animals and sex.

Disease	Microbe that causes it	Symptoms	How it is spread
colds and flu	virus	sore throat, running nose, fever	air
food poisoning	bacteria	vomiting, diarrhoea	food
cholera	bacteria	vomiting, diarrhoea	water
athlete's foot	fungus	sore cracked skin between the toes	touch

Some ways that diseases can be stopped from spreading are:

- making sure sewage is treated and disposed of properly
- adding chlorine to water to kill bacteria
- drying, freezing or refrigerating foods
- **pasteurising** milk
- using **disinfectants**, **antiseptics** and soaps
- i**mmunising** people with **vaccines**.

Your body has **natural defences** to stop microbes getting in (e.g. skin, **mucus** in the trachea and nose, **ciliated epithelial cells** to sweep mucus away). Your body also has ways of destroying microbes. These include:

- a chemical in tears that kills some bacteria
- acid in the stomach that kills some bacteria
- white blood cells that **engulf** microbes
- other white blood cells that make **antibodies** to help destroy microbes.

Babies do not have fully developed immune systems. Antibodies can pass through the placenta and are found in breast milk. These help the baby to fight infections.

For many diseases, once you have had the disease (or been immunised) you will not get it again (e.g. chickenpox). This is because the antibodies against these microbes stay in the blood.

Some diseases can be cured using **antibiotics**. These are **medicines** that kill off bacteria. Some bacteria, however, are unaffected by antibiotics – they are **resistant** to them. Using too many antibiotics only leaves behind the resistant bacteria, which then cause diseases that are difficult to treat.