



Key Stage 3

# Micro-organisms: Introduction to Microbes Teacher Guidance

## Background Information

Micro-organisms are living organisms too small to be seen with the naked eye; they are microscopic. Micro-organisms are found almost everywhere on Earth and can be both useful and harmful to humans. It is important to clarify that microbes are not innately “useful” or “harmful”. Rather, that some microbes can be useful to humans whilst others can be harmful depending on the situation. For example, the mould *Aspergillus* is used to help make chocolate, however can cause harm to humans if inhaled into the lungs. Although extremely small, microbes come in many different shapes and sizes. The three groups of microbes covered in this resource are viruses, bacteria and fungi.

**Viruses** are the smallest of the three and are generally harmful to humans. Viruses cannot survive by themselves. They require a ‘host’ cell in which to live and reproduce. Once inside the host cell, they rapidly multiply destroying the cell in the process. There are over 250 different kinds of virus causing the common cold. One of the most common of these is *Rhinovirus*.

**Bacteria** are single celled organisms that, under the right conditions, can multiply exponentially, on average once every 20 minutes. During their normal growth, some produce substances (toxins) which can be harmful to humans and cause disease (*Staphylococcus aureus*). Some bacteria are completely harmless, and can be extremely useful (such as *Lactobacillus* in the food industry), or even necessary for human life (such as *Rhizobacterium*, which is involved in plant growth). When bacteria are harmless, they are called non-pathogenic, while bacteria that cause harm are known as pathogenic. Over 70% of bacteria are non-pathogenic (harmless) micro-organisms.

Bacteria can be divided into three groups by their shapes – cocci (balls), bacilli (rods) and spirals. Cocci can also be broken down into three shapes -clusters, chains or groups of two. Scientists can use these shapes to help identify the microbes and tell which infection a patient has.

**Fungi** are generally multi-cellular organisms that can be both useful and harmful to humans. Fungi obtain their food by either decomposing dead organic matter or by living as parasites on a host. Fungi range in size from being microscopic to very large and include mould, mushrooms and mildew. While fungi can be harmful by causing an infection or being poisonous to eat; others can be useful or harmless e.g. *Penicillium* produces the antibiotic penicillin and *Agaricus bisporus* can be eaten (the common button mushroom). Fungi spread through the air in small hard seed-like spores. When these spores land on bread or fruit, they can open and grow under the right conditions (such as dampness).

# SW1 Introduction to Microbes Quiz Answers

Which of these are microbes?

- Bacteria
- Virus
- Fungi

Microbes are found:

- Everywhere

Which foods or drinks are produced through the growth of microbes?

- Cheese
- Bread
- Yoghurt
- Fizzy drinks

What is another word for a harmful microbes?

- Pathogen

Which is the smallest?

- Virus

Microbes:

- Can be harmful or useful

Which of these microbes causes the common cold?

- Virus

Which of these are shapes of microbes?

- All of the above