KEY STAGE 3 - LESSON 1

Mic-organisms: Introduction to Microbes

Students learn about the different types of microbes – bacteria, viruses and fungi. They learn that microbes have different shapes and that they are found everywhere.

Curriculum Links

Science

- Working scientifically
- Scientific attitudes
- Experimental skills and investigations

Biology

- Structure and function of living organism,
- Cells and organisation

Genetics and Evolution

- Inheritance
- Chromosomes
- DNA and genes

PSHE/RSHE

- Health and prevention

English

- Reading
- Writing

Key Words

Bacteria, Cell, Disease, Fungi, Germ, Microbe, Microscope, Pathogen, Virus

Learning Outcomes

All students will:

- Understand there are three different types of microbe.
- Understand that microbes are found everywhere.
- Understand that useful bacteria are found in our body.
- Understand that microbes come in different sizes.

Most students will:

- Understand the key differences between the three main types of microbe.

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e-bug.eu/eng/KS3/lesson/Introduction-to-Microbes

Resources Required

Introduction
Per student

- [ ] Copy of SH1

Main Activity: Microbe Mayhem
Per group

- [ ] Copy of SH2
- [ ] Copy of SH3
- [ ] Copy of SH4
- [ ] Copy of SH5

Extension Activity: Posters
Per student

- [ ] Pens/pencils
- [ ] Paper

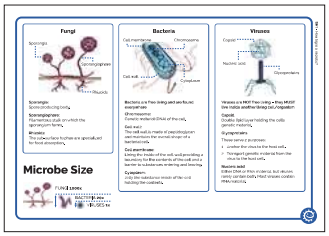
Extension Activity: Intro to Microbes Quiz
Per group

- [ ] Copy of SW1

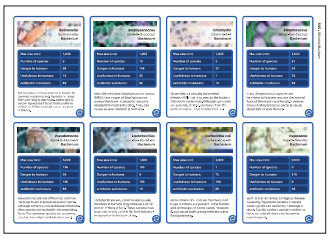
Advance Preparation

Cut out and laminate a set of playing cards (SH2 – SH5) for each group.

Supporting Materials



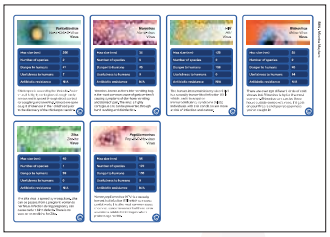
SH1 How Big is a Microbe?



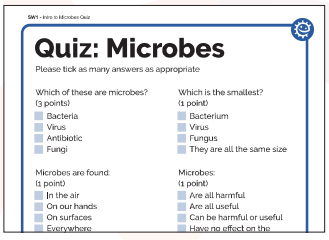
SH2 Microbe Mayhem

SH3 Microbe Mayhem

SH4 Microbe Mayhem



SH5 Microbe Mayhem



SW1 Quiz

Lesson Plan

Introduction

1. Begin the lesson by asking students what they already know about micro-organisms. Explain that micro-organisms, sometimes called microbes, germs or bugs, are living things but are too small to be seen with our eyes; they can only be seen through a microscope.

2. Explain that microbes are the smallest living creatures on Earth and that the word micro-organism literally translates into micro: small and organism: life. Microbes are so small they cannot be seen without the use of a microscope. Antonie van Leeuwenhoek created the first microscope in 1676. He used it to examine various items around his home and termed the living creatures (bacteria) he found on scrapings from his teeth 'animalcules'.

3. Tell the class that we will focus on three different types of microbe: bacteria, viruses and fungi. Use the factsheet (SH1) to demonstrate how these three microbes vary in shape and structure.

4. Emphasise that although microbes cause disease, there are also useful microbes. Ask students to identify some benefits of useful microbes. If they cannot, provide examples for them e.g. *Lactobacillus* in yoghurt, probiotic bacteria in our gut which aid digestion and the fungus *Penicillium* which produces the antibiotic penicillin.

5. Highlight to the class that microbes can be found EVERYWHERE – floating around in the air we breathe, on the food we eat, in the water we drink and on the surface of and in our bodies. Emphasise that although there are harmful microbes that can make us ill, there are many more useful microbes that we can use.

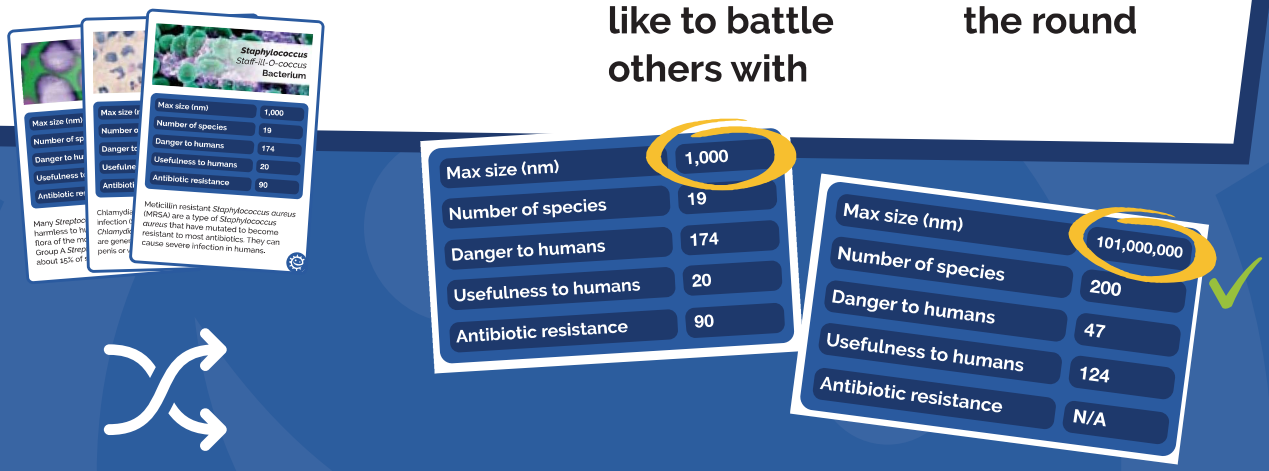
Main Activity: Microbe Mayhem

1 Shuffle the cards and deal cards to players

2 Make sure only you can see your cards

3 Take turns to choose which microbe characteristic you would like to battle others with

4 The player with the highest characteristic score wins the round



Microbe Mayhem

In this activity groups of 3-4 students play a card game which helps them remember some of the technical words relating to microbes as well as familiarising students with a variety of microbial names, the differences in size, capability of causing harm and if antibiotic resistance occurs. Microbe size and number of species are correct at the time of resource development; however as new microbes are continuously being discovered and reclassified, these numbers may be subject to change.

The remaining numbers presented are only to be used as a guide and are illustrative only. There is no formulae to create these and they may also be subject to change i.e. bacterial species may develop resistance to more antibiotics resulting in them having a higher number being more dangerous to humans.

Hand out a set of Microbe Mayhem playing cards SH2 - SH5 to each group. Let the students know that 'nm' on the playing cards stands for nanometres. There are ten million nanometres in a centimetre.

Game rules

1 The dealer should shuffle the cards well and deal all the cards face down to each player. Each player holds their cards face up so that they can see the top card only.

2 The player to the dealer's left starts by reading out the name of the microbe on the top card and chooses an item to read (e.g. Size 50). In a clockwise direction, the other players then read out the same item. The player with the highest value wins, taking the other players top cards and placing them to the bottom of their pile. reads out the name of the microbe on their next card and selects the item to compare.

3 If two or more players have the same top value then all the cards are placed in the middle and the same player chooses again from the next card. The winner then takes the cards in the middle. The person with all the cards at the end is the winner.

Discussion

At the end of the activity, explain to the students that microbes are found everywhere, even on your text books and flashcards. Stress that microbes are found all over our skin, mouths, gut and especially hands. Most are completely harmless that we carry without knowing.

Discuss that the bacteria on our bodies are important as they act as a barrier to stop other more harmful bacteria entering your body and making you ill.

Extension Activities

This activity will give students the opportunity to expand their understanding by undertaking a brief research exercise.

Divide the class into groups of 3 – 4 students. Each group should research and create a poster on one of the following topics:

1 Choose a specific type of bacteria, virus or fungus e.g. *Salmonella*, Influenza or *Penicillium*. The poster should include

   a. Structure of that microbe

   b. The different places they can be found

   c. How they affect humans in either a useful or harmful way

   d. Any specific growth requirements of that group of microbes

2 A timeline poster on the history of microbes. This poster may include:

   a. 1676: van Leeuwenhoek discovers 'animalcules' using homemade microscope

   b. 1796: Jenner discovers smallpox vaccination

   c. 1850: Semmelweis advocated washing hands to stop the spread of disease

   d. 1861: Pasteur publishes germ theory: the concept that germs cause disease

   e. 1892: Ivanovski discovers viruses

   f. 1905: Koch awarded the Nobel Prize in Medicine for his work understanding tuberculosis and its causes

   g. 1929: Fleming discovers antibiotics

Microbes Quiz

SW1 provides a fun way to consolidate learning. Allocate students to groups of 3 or 4 and provide one quiz sheet per team. The team with the most points wins. Answers are available on the e-Bug website.

Learning Consolidation

To consolidate learning you may wish to encourage students to present their poster to the class or consider creating a display in your classroom, or on a common notice board.