



Micro-organisms: Harmful Microbes

Close examination of various illnesses illustrates to students how and where in the body harmful microbes cause disease. Students test their knowledge of harmful microbes by completing a crossword puzzle, wordsearch and quiz.

Curriculum Links

Science

Working scientifically

PSHE/RSHE

Health and prevention

English

Reading and comprehension

Key Words

Bacteria, Fungi, Germs, Infection,
Pathogens, Virus

@ Weblink

[e-bug.eu/eng/KS2/lesson/
Harmful-Microbes](http://e-bug.eu/eng/KS2/lesson/Harmful-Microbes)

Learning Outcomes

All students will:

- Understand that sometimes microbes can make us ill.
- Understand that harmful microbes can pass from person to person.
- Understand that not all illnesses are caused by harmful microbes.



Resources Required

Starter Activity: Class discussion

Per class

- ☐ Copy of TS1
- ☐ Copy of SH1
- ☐ Copy of SH2

Main Activity: Mould bread experiment

Per group

- ☐ 3 slices of bread
- ☐ Water
- ☐ Marker
- ☐ 3 resealable plastic bags

Extension Activity 1: Most Wanted Poster

Per student

- ☐ A4 paper
- ☐ Colouring pens/pencils

Extension Activity 2: Bad Bug Challenge

Per student

- ☐ Copy of SW1

Extension Activity 3: True or False Flashcards

Per student

- ☐ Copy of SH3

Extension Activity 4: Harmful Microbes Quiz

Per student

- ☐ Copy of SW2

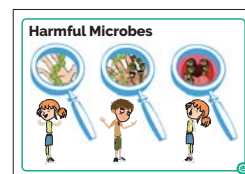
Health and Safety

Bags must not be opened to provide a closer look at the surface of the bread; this could release fungal spores which could be inhaled and cause respiratory distress. The three bags should be placed, unopened, in the normal waste or in a food waste recycling collection.

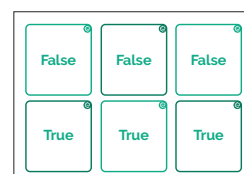
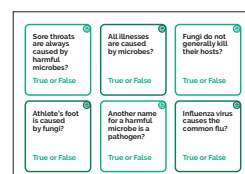
Supporting Materials



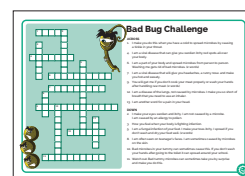
TS1 Class Discussion Teaching Points



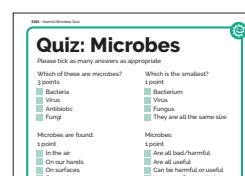
SH1 & SH2 Class Discussion: Picture Scenarios



SH3 Harmful Microbes True/False Flashcards



SW1 Harmful Microbes Crossword and Wordsearch



SW2 Harmful Microbes Quiz

Lesson Plan



Introduction

1. Begin the lesson by explaining to the class that sometimes microbes can be harmful to humans. Ask them if they know what makes them ill. Find out how many different words they have for microbes – germs, bugs, etc.
2. Explain to the class that a pathogen is a word that refers to the bacteria, viruses and fungi that make you sick. Discuss the various microbes with the class and the illnesses they can cause.
3. Highlight to the class that microbes have adapted to live everywhere, such as in our classrooms, houses, bedrooms, all over our body and on food.
4. Tell the class that harmful disease causing microbes can spread easily from one person to another and are called infectious diseases because they can cause an infection.
5. Some good news – tell the class that our bodies have our own 'useful' microbes that try to stop the harmful pathogens from causing an infectious disease.

Discussion

a. What causes an infection?

An infection happens when harmful microbes get inside your body and replicate, causing the infected person to get ill. This can happen very quickly or can take a long time.

Check for understanding by asking the students the following questions:

b. Are sore throats always caused by harmful microbes?

Not all sore throats are caused by harmful microbes, sometimes coughing or having a toothache can cause our throats to become red and sore too.

c. Are all illnesses caused by microbes?

Illnesses caused by microbes are known as infectious diseases. There are also illnesses, such as asthma and hay fever, that are not caused by microbes. These are known as non-infectious diseases.

d. Can you think of any infections caused by harmful microbes?

Athlete's foot, influenza, measles.

Main Activity: Mould Bread Experiment

1 Place 3 slices of bread into separate sealable bags and label 1 to 3

2 Add water to one bag and put it in a dark place

3 Put the second bag in a bright sunny place

4 Put the third bag in the refrigerator

5 Wait at least one week



Starter Activity: Class Discussion with Scenario Prompts

This activity is best suited as a class discussion.

1. Show the class SH1 and SH2 which can be displayed on a whiteboard.
2. Discussion points 1-6 in TS1 match the 6 images displayed in SH1 and SH2 and provide scenarios to prompt discussion.
3. Begin a discussion by asking students to consider the character's actions and how microbes may be affecting them.
4. Continue the discussion by asking if anyone in the class has ever suffered from any of these symptoms and if so, what kind of treatment they had.

Remember: Hand washing, respiratory and food hygiene activities are covered in more detail later in the pack.

Main Activity: Mouldy Bread Experiment

Mould spores just need the right environment to grow and flourish. In this experiment, students will learn the conditions that speed up mould growth on bread.

1. Place a slice of bread in each plastic bag and seal properly. Number each bag with a marker.
2. Add some water to bag 1. Put it in a dark place.
3. Put the second bag in a bright sunny place.
4. Put the third bag in the refrigerator.
5. Check each bag for a week.
6. Examine the slices of bread and ask students what they expect to see.
7. At the end of the week ask students to record their results. Are they what they expected?

At the end of the week, each bag will have a different kind of mould growth. In a bright, sunny place, the temperature is highest which would encourage faster/greater mould growth. In the refrigerator, the low temperature would limit the amount of growth, if at all. The bread stored in the dark, damp conditions should have the most mould growth. Students will learn that mould tends to grow faster in warm, wet conditions. Mould growth could also be intermediate between the slices.

Fascinating Fact

Did you know that there are more microbes on the planet than any other species of living thing?

Extension Activities

Most Wanted Poster Design

Asks students to make a 'Most Wanted' style poster for a harmful micro-organism e.g. Influenza virus, *Campylobacter*, dermatophyte fungi, *Salmonella*.

Posters should include: a drawing of the harmful micro-organism, a description, including how it infects humans, where it can be found and symptoms (if applicable).

True/False Flashcards

SH3 includes a set of questions and true/false answer cards for the students. In groups of 3 or 4 ask students to raise the cards to answer each of the questions.

SH3 Answers:

1. Sore Throats are always caused by harmful microbes?
Answer: False
2. Athlete's Foot is caused by fungus?
Answer: True
3. All illnesses are caused by microbes?
Answer: False
4. Another name for a harmful microbe is a pathogen?
Answer: True
5. Fungi do not generally kill their hosts?
Answer: True
6. Influenza virus causes the common flu?
Answer: True

Bad Bug Challenge

SW1 provides a fun crossword and word search. Students can complete the tasks individually or in pairs to consolidate the lesson. Answers are available on the e-Bug website.

Microbes Quiz

SW2 provides another fun way to consolidate learning. Allocate students to groups of 3 or 4 and provide one sheet per team. The team with the most points wins.

SW2 Answers:

1. Bacteria, virus, fungi
2. Everywhere
3. Cheese, bread and yoghurt
4. Pathogen
5. Virus
6. Can be useful or harmful
7. Pathogen
8. All of the above

Learning Consolidation

At the end of the lesson, ask the class the questions below to check understanding:

- ☐ Some microbes can be harmful to humans and can cause disease.
Provide one example:
- ☐ Which microbe is very small causes coughs, colds, sore throats and flu?
Answer: Viruses
- ☐ Provide two ways that harmful microbes can spread from person to person.



Micro-organisms Harmful Microbes

Teaching Points



1. Eva likes to keep her hands and nails clean. If we look closely at Eva's hands we can see that they are covered in lots of tiny microbes. These microbes are useful microbes that live on our skin and help keep us healthy.



2. Luca is always out playing football and having fun with his friends, however he doesn't worry about washing his hands very often. If we look closely at Luca's hands we can see that they too are covered with lots of tiny microbes although some of these are harmful and could make him very ill if they got inside his body.



3. Eva isn't very well, she has a really sore throat. Sometimes sore throats are caused by coughing and a runny nose, which can make the throat swell up and become quite painful. If this happens then Eva should drink lots of fluids and take painkillers. Sometimes, however, bacteria (e.g. *Streptococcus*) and viruses can also cause us to have a sore throat.



4. In this picture, do you think that Luca is ill because of microbes? The answer is no, Luca has a condition known as asthma which causes him to get out of breath very easily. Asthma is a disease of the lungs and airways but is not caused by microbes. It is important to remember that not all illnesses are caused by microbes.



5. What do you think is wrong with Luca in this picture? Poor Luca has eaten undercooked chicken at a BBQ and has now got food poisoning caused by *Campylobacter*. There are lots of microbes on meat, which although they don't harm the animal can make us very ill. It is important to cook food properly to kill any harmful microbes which may be present.

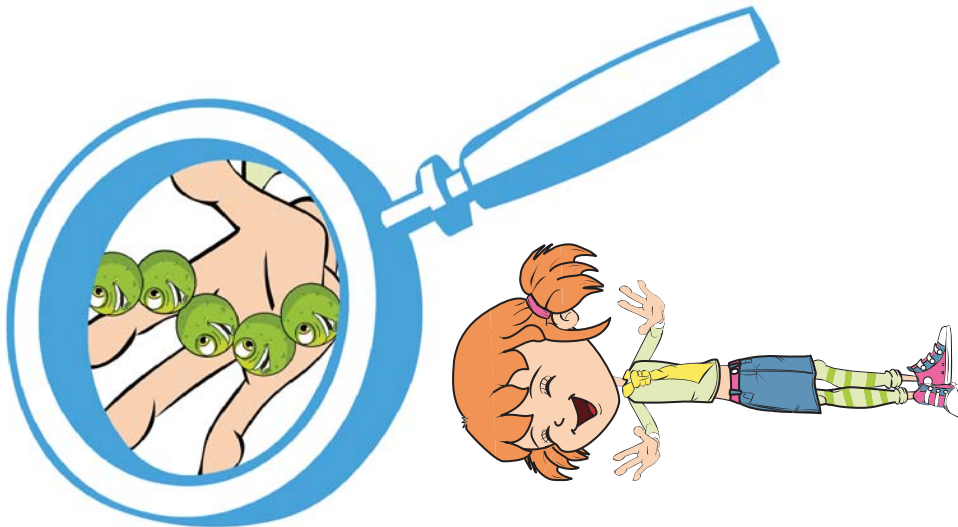
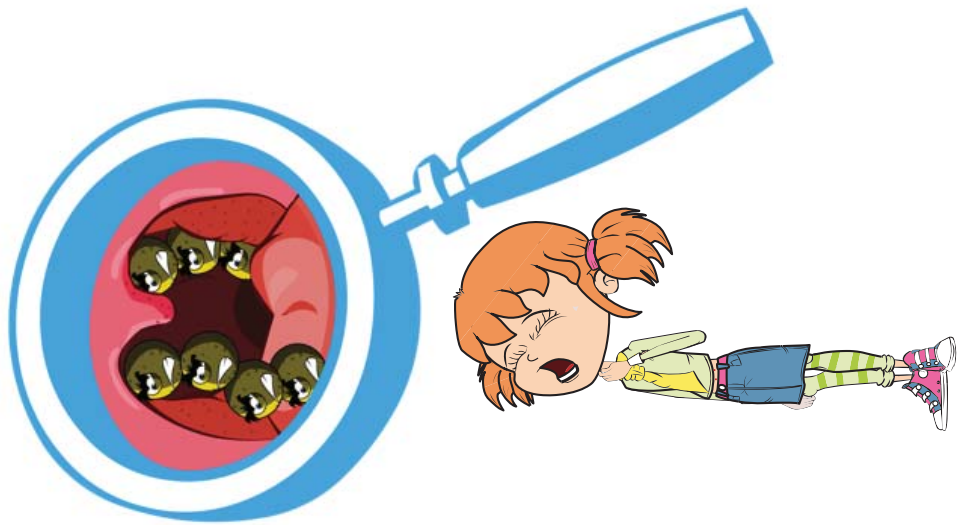


6. Eva plays tennis and she has sweaty, smelly feet. She is always in a hurry so she doesn't wash or dry her feet properly. Her feet smell and are also very itchy and swollen in between her toes. This is because fungi known as dermatophytes like to live between the toes, especially if they are damp. They cause a disease known as athlete's foot which causes your toes to swell up, the skin between them to crack and become VERY itchy and sometimes smelly.



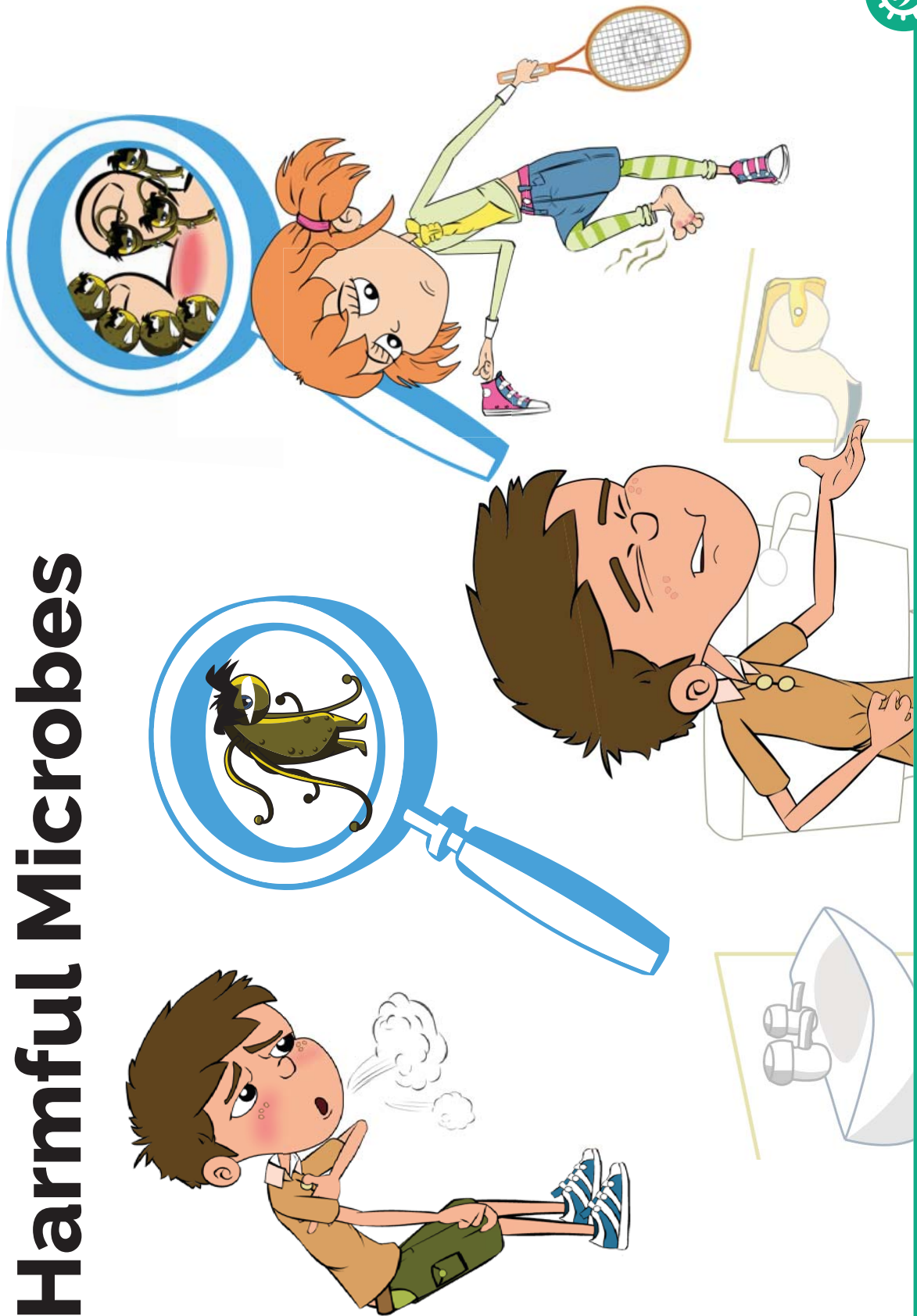


Harmful Microbes





Harmful Microbes





Fungi do not generally kill their hosts?

True or False



Influenza virus causes the common flu?

True or False



All illnesses are caused by microbes?

True or False



Another name for a harmful microbe is a pathogen?

True or False



Sore throats are always caused by harmful microbes?

True or False



Athlete's foot is caused by fungi?

True or False





False



True



False



True



False



True





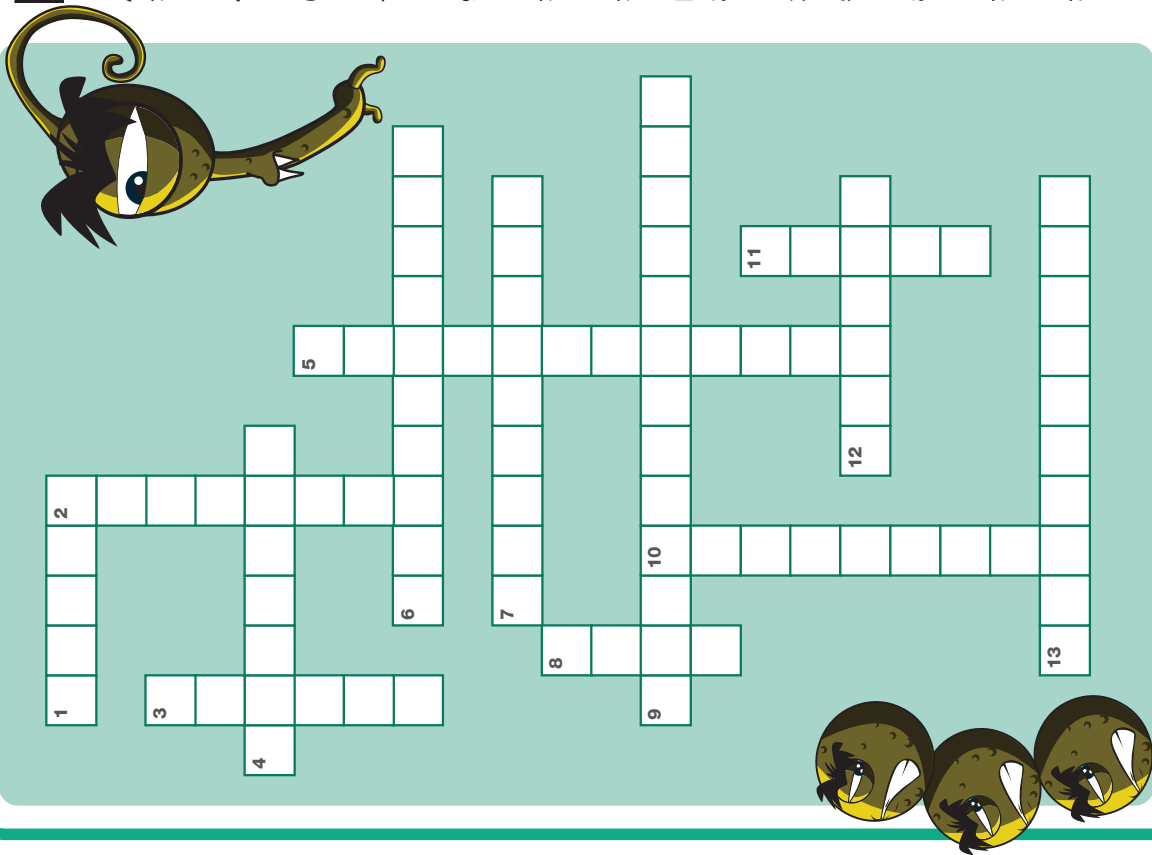
Bad Bug Challenge

ACROSS

1. I make you do this when you have a cold to spread microbes by causing a tickle in your throat.
4. I am a viral disease that can give you swollen itchy red spots all over your body.
6. I am a part of your body and spread microbes from person to person. Washing me gets rid of bad microbes. (2 words)
7. I am a viral disease that will give you headaches, a runny nose and make you hot and sweaty.
9. You will get me if you don't cook your meat properly or wash your hands after handling raw meat. (2 words)
12. I am a disease of the lungs, not caused by microbes. I make you so short of breath that you need to use an inhaler.
13. I am another word for a pain in your head.

DOWN

2. I make your eyes swollen and itchy. I am not caused by a microbe. I am caused by an allergy to pollen.
3. How you feel when your body is fighting infection.
5. I am a fungal infection of your feet. I make your toes itchy. I spread if you don't wash and dry your feet well. (2 words)
8. I am often seen on teenager's faces. I am sometimes caused by microbes on the skin.
10. Bad microbes in your tummy can sometimes cause this. If you don't wash your hands after going to the toilet it can spread around your school.
11. Watch out. Bad tummy microbes can sometimes take you by surprise and make you do this.



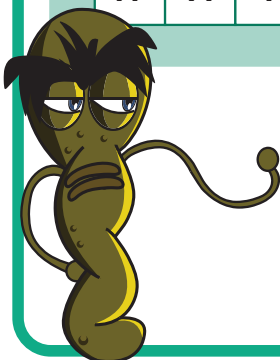


Bad Bug Challenge

Can you find all the words associated with Bad Bugs in the word search below? Remember that the words can be horizontal (across), vertical (down) or diagonal (top left to bottom right).



F	C	E	A	R	T	M	Y	Y	U	A	N	S	D	F
F	O	M	G	B	F	L	U	M	B	H	N	H	J	K
Z	L	O	N	Z	R	W	K	A	Y	E	A	E	A	L
F	D	S	D	H	G	D	A	S	T	H	M	A	T	A
V	B	H	N	P	H	N	J	O	H	D	D	D	G	T
S	V	V	A	C	O	U	G	H	N	C	I	A	B	H
M	S	O	S	X	J	I	D	F	B	G	R	C	G	L
E	T	G	M	Z	U	N	S	A	M	A	T	H	A	E
A	N	M	D	I	A	R	H	O	E	A	Y	E	J	T
S	Z	X	C	V	T	B	G	T	N	D	H	J	H	E
L	R	T	A	Y	U	N	I	A	O	I	A	F	G	S
E	Q	W	E	R	I	N	F	L	U	E	N	Z	A	F
S	P	O	T	I	O	P	L	B	K	J	D	G	G	O
A	S	D	M	S	L	E	E	P	Y	E	S	S	F	O
H	A	Y	F	E	V	E	R	N	F	G	N	H	K	T



COUGH
COLD
FOOD POISONING
DIRTY HANDS
HEADACHE

HAYFEVER
ASTHMA
SPOT
FLU
INFLUENZA

ATHLETES FOOT
SLEEPY
MEASLES
VOMIT





Quiz: Microbes

Please tick as many answers as appropriate

Which of these are microbes?

3 points

- ☐ Bacteria
- ☐ Virus
- ☐ Antibiotic
- ☐ Fungi

Which is the smallest?

1 point

- ☐ Bacterium
- ☐ Virus
- ☐ Fungus
- ☐ They are all the same size

Microbes are found:

1 point

- ☐ In the air
- ☐ On our hands
- ☐ On surfaces
- ☐ Everywhere

Microbes:

1 point

- ☐ Are all bad/harmful
- ☐ Are all useful
- ☐ Can be harmful or useful
- ☐ Have no effect on the human body

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

3 points

- ☐ Cheese
- ☐ Bread
- ☐ Yogurt
- ☐ Fizzy drinks

Which of these microbes causes the common cold?

1 point

- ☐ Bacteria
- ☐ Virus
- ☐ Antibiotic
- ☐ Fungi

What is another word for a harmful microbe?

1 point

- ☐ Infectious
- ☐ Antibiotic
- ☐ Pathogen
- ☐ Flora

Which of these are shapes of microbes?

1 point

- ☐ Rods
- ☐ Balls
- ☐ Spirals
- ☐ All of the above



