



Welcome to your new IDL project called e-Bug, e-Bug will help you explore the scientific world of Microbes! Need any equipment for your experiments? Phone school to arrange pick up!

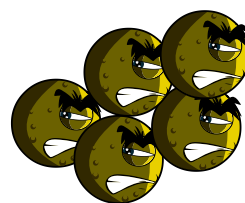
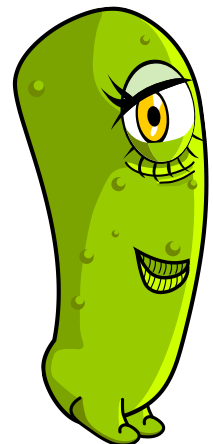
Activity 1- Introduction to Microbes-

What are Microbes? I hear you ask...

First of all, it is important to find out what Microbes actually are. Read through the PowerPoint presentation named **“What are microbes? presentation”** on the learning page.

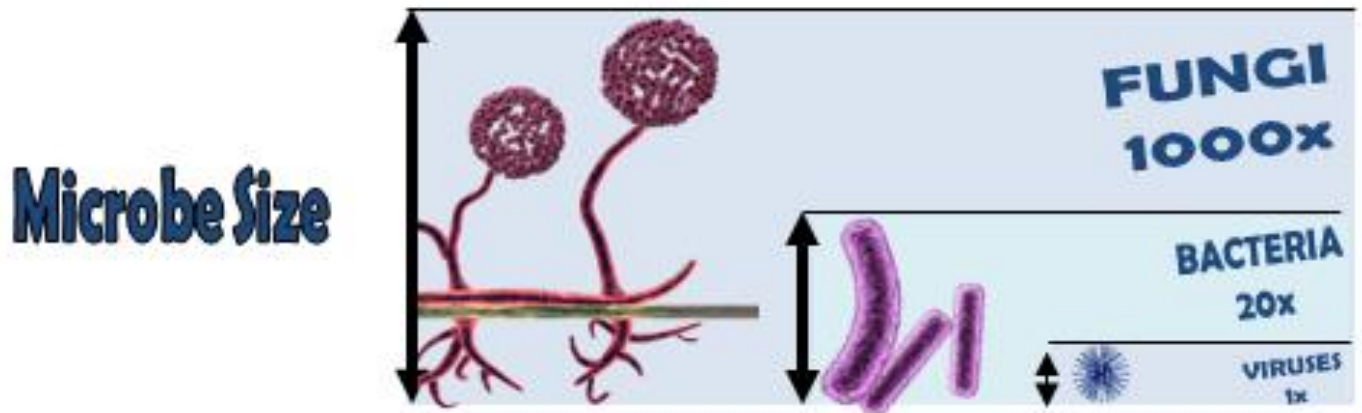
What are the **3** different types of microbes?

Task- Pick out 5 other interesting pieces of information from the PowerPoint. Make a note of them then use them to create a short information leaflet about microbes. Organise your information so that it is clear, easy to read and eye-catching. Use some drawings too.



Activity 2- Micro-organisms/ Microbes

How big are microbes and what do they look like?



You will notice that fungi are the largest microbes, bacteria are in the middle and viruses are the smallest.

Task 1- Find the activity below named- “**Identifying microbes- second level**”. Use the information that you learnt from the PowerPoint to work out for each of the microbes if they are bacteria, virus or fungi.

Task 2- Once you have completed the activity sheet have a go at designing your own microbe. Is it going to be useful or harmful? A hero or a villain? What does your microbe do? Where is your microbe found? Make up a scientific name for your microbe and draw it.

Activity 3- Finding microbes in the kitchen experiments

Try the experiments on the pages below which explore finding microbes in your kitchen.

Kitchen investigators- Where in the kitchen do most microbes live?



Microbe Garden- How many different types of microbes can you find on different foods?



Task- At the beginning of your experiment write down your prediction of what you think will happen.

Follow the instructions carefully and make sure that you record your results every day. Remember to date your findings so that they are organised in chronological order. Some ways that you could record your findings each day-

- Drawings
- Photographs
- Writing notes
- Keeping a journal
- Using a table
- Writing bullet points
- Blog posts

At the end of your experiment write a short report which shows your findings and results. Was your initial prediction correct or incorrect?

Activity 4- Useful Microbes

It is really important to know that microbes can be both **useful** and **harmful**. Do you know of any beneficial or “**friendly**” bacteria?

Some foods contain “friendly” bacteria which is good for our guts. For example- probiotic yoghurt, sauerkraut, kimchi and sourdough bread.

Microbes can be helpful in the breakdown of dead plants or animals, in helping animals and humans to digest food and in turning milk into butter, yoghurt or cheese.

Task- Yeast races

One common helpful fungi which helps us to make bread is **yeast**. Yeast helps the bread dough rise up in a process called **fermentation**. Yeast eats up any **sugar** which is present in the dough mix and uses it as **energy**. The yeast produces **gas bubbles** which causes the dough to **rise**.

Try out the **Yeast Races Experiment**. It will help you see how the useful microbes (yeast) make the bread rise. You will find the **instructions sheet** and **recording sheet** on the pages below.

Take some action photos of your yeast samples as they are growing. Can you turn them into a stop motion animation?

Once you have finished your experiment answer the 4 conclusion questions on the **recording sheet** in full sentences. Share you results and findings with us!



Bonus task- Yeast Balloon experiment- <https://e-bug.eu/language%20packs/english/homeSciencePDFs/Yeast%20Balloon.pdf>

Activity 5- Harmful Microbes

Unfortunately, some microbes can be harmful and dangerous to humans and animals. We usually call harmful microbes **germs or bugs**. These germs or bugs can make us unwell.

Harmful microbes are often called **infections** and can be easily passed from person to person. Sometimes we can catch harmful microbes from food or drink which has gone bad.

Not all illnesses are caused by microbes however. For example- hay fever and asthma are not caused by microbes.

Task- Have a go at the Bad Bug Challenge **Wordsearch** and **Crossword** on the pages below. How many of the bad bugs have you already heard of?

Bonus task- Answer these questions.

1. What causes an infection?
2. Are sore throats always caused by harmful microbes?
3. Are all illnesses caused by microbes?
4. Can you think of any infections which are caused by harmful microbes?



Identifying Microbes- Second Level-



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Microbe Mania

There are 3 different types of microbe – bacteria, viruses and fungi.

From the pictures and descriptions, can you work out which microbe is which?

Hint

Remember there are three different types of bacteria

- rods
- spirals
- balls



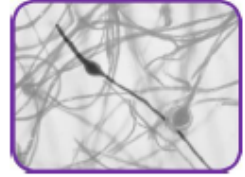
My name is *Staphylococcus*. I am round in shape and I like to live in your nose or armpit! If I live on your skin I can give you spots. If I get into your bloodstream I can make you ill! What am I?

Staphylococcus is a:



My name is *Lactobacillus*. People call me 'friendly' because I change milk into yogurt! When you eat me in yogurt I live in your guts and help you digest other food. What am I?

Lactobacillus is a:



I'm called a *Dermatophyte* and I like to live on your skin. I especially like living in damp places like between the toes on sweaty feet! When I live there I give people athlete's foot! What am I?

Dermatophytes are:



My name is *Influenza* but my friends call me the 'flu'. I'm very generous; I like to give people headaches and fever. I easily spread from person to person through coughing and sneezing. What am I?

Influenza is a:



My name is *Penicillium* and you'll find me growing on old oranges or stale bread making them look mouldy. Humans use me to make an antibiotic known as Penicillin which can make them better, but only from bacterial infections! What am I?

Penicillium is a:



My name is *Campylobacter*. I have a pretty spiral shape and I like to live in chickens but if I get into your tummy I make you very ill – I can give you diarrhoea! What am I?

Campylobacter is a:





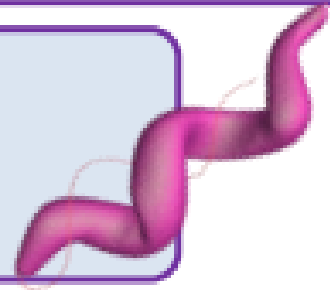
Kitchen Investigator

Where in the kitchen do most microbes live?

This is a cool experiment to find out where all the microbes are hiding in your kitchen. But remember, not all microbes are harmful, most of the microbes you will find are completely harmless to us. Have fun playing microbe detective!

Ingredients

- 4 Slices of Bread
- 4 Small sealable plastic bags (sandwich bags are fine)
- A Sprinkle of water
- A Magnifying Glass
- A Marker Pen
- A Notebook
- A Camera (optional)



Method



Take **1** slice of **bread** and put into a plastic bag. Seal the bag and **label** as **control**.



Add a **sprinkling of water** to the rest of the **bread** slices. Be careful and try not to soak the bread.



Take **1 slice** of bread from **step 2** and carefully **rub** it across your **kitchen floor**; try not to break up the bread. Put it into a bag, seal it and **label** the bag **floor**.



Repeat step 3 but for different kitchen surfaces, e.g. a shelf in the fridge or the kitchen sink until all the bread is used. Each time **seal the bag** and **label** with the surface name.



Place all the bags in a **cupboard**, and leave them for at least **1 week**. Take notes/photos of any changes you see to the bread every day. **Never** open the bags.

Results Explained

The control slice of bread was used to give you something to compare all the other pieces of bread to. Fewer microbes would have grown on it because it was not sprinkled with water.

On the other slices you should see lots of different types of microbes, like fungi and bacteria, growing on the bread. This shows that different areas of the kitchen have different numbers and types of microbes living on them.

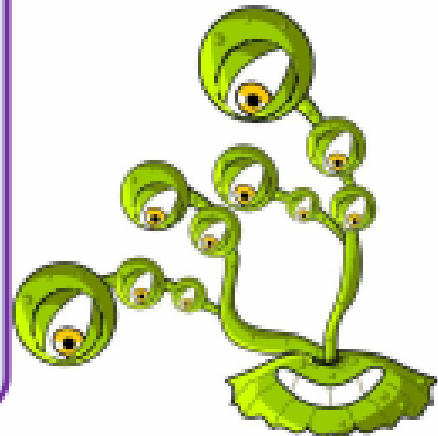


Microbe Garden

How many different types of microbe can you find on different foods?

Ingredients

- 2 Empty, clean and dry jars (jam jars would be perfect!)
- 2 Pieces of bread
- 2 Pieces of cheese
- 2 Pieces of apple
- 2 Pieces of cucumber
- 2 Pieces of carrot
- A Little water
- A Pen
- A Notebook
- A Camera (optional)
- 2 Labels or paper and sticky tape



Method



1 Label one jar 'water' and the other 'control'. Put one of each type of food into each jar.



2 Add a sprinkling of water to the jar labelled 'water'. Do not add water to the jar.



3 Put the lids on the jars and place the jars on a counter top out of direct sunlight. Leave them for two weeks.



4 Record the changes in the jars everyday. Sketch or photograph what you can see. Do not remove the lid.



5 After 2 weeks compare your pictures from the experiment. Ask an adult to dispose of the jars and their contents.

Explanation

You should have had more microbe growth in the jar with water in it, as a lot of microbes prefer damp conditions in order to grow and multiply. You should be able to count a number of different microbes on different foods in the jar, because microbes prefer different environments and certain microbes are more likely to be found on some foods rather than others.



Yeast Races



Label one of your plastic cups **A** and one **B**



Add **4 dessert spoons of flour** to each of your cups



Add enough **yeast solution** to plastic **cup A** until it has the consistency of a thick milkshake.



Add enough **yeast and sugar solution** to plastic **cup B** until it has the consistency of a thick milkshake.



Pour the contents of **cup A** into **graduated cylinder A** until it reaches about **30ml**



Pour the contents of **cup B** into **graduated cylinder B** until it reaches about **30ml**



Record the exact **height** of the dough in each



Place both measuring cylinders into a **basin** of hot water



Measure the height of the dough every **5 minutes** for 30 minutes





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Yeast Races

Procedure

1
2
3

1. Follow the instructions in the Yeast Races Recipe.

My Results

Time	YEAST ALONE		YEAST AND SUGAR	
	Volume of dough	Change in volume of dough / ml	Volume of dough	Change in volume of dough / ml
0	0	0	0	0
5				
10				
15				
20				
25				
30				



Did you know?

The average adult carries approximately 2kg of good microbes in their guts – the same weight as 2 bags of sugar!

My Conclusions

1. What caused the dough to rise up the container?

2. What is this process called?

3. Why did the dough in container B move faster than container A?

4. What other food products are the result of bacteria or fungi growing and changing substances?



Fascinating Fact

There are trillions of friendly bacteria in the average human gut.





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).



- | | | | |
|----------|-------------|----------------|-------|
| COUGH | HAYFEVER | ATHLETES FOOT | COLD |
| ASTHMA | SLEEPY | FOOD POISONING | SPOT |
| MEASLES | DIRTY HANDS | FLU | VOMIT |
| HEADACHE | INFLUENZA | | |

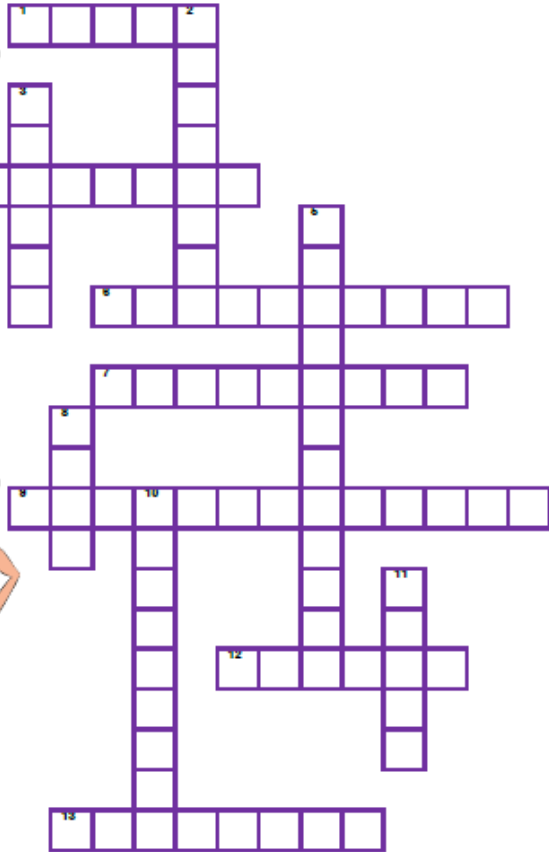




*e-Bug



Bad Bug Challenge!



ACROSS

- I make you do this when you have a cold to spread microbes by causing a tickle in your throat.
- I am a viral disease that can give you swollen itchy red spots all over your body.
- I am a part of your body and spread microbes from person to person. Washing me gets rid of bad microbes (2 words).
- I am a viral disease that will make you hot and sweaty.
- You will get me if you don't cook your meat properly or wash your hands after handling raw meat (2 words).
- 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!
- I am another word for a pain in your head.

DOWN

- I make your eyes swollen and itchy. I am not caused by a microbe. I am caused by flower pollen.
- How you feel when your body is fighting infection.
- 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).
- I am often seen on teenager's faces. I am sometimes caused by microbes on the skin.
- 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.
- Watch out! Bad tummy microbes can sometimes take you by surprise and make you do this.



ANSWERS

INFLUENZA	HAYFEVER	MEASLES	HEADACHE	DIARRHOEA
ASTHMA	ATHLETES FOOT	VOMIT	SPOT	COUGH
SLEEPY	DIRTY HANDS	FOOD POISONING		

