e- Bug IDL Project- Early/ First Level

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?

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

What are the 3 different types of microbes?

Task- Pick out and note down 5 other interesting pieces of information from the PowerPoint. Choose to either-

- Use them to create a short information leaflet about microbes. Use clear, eye catching writing and add pictures.

Or

- Copy out these sentences and fill in the blanks.

The three types of microbes are- b……, v……. and f……

Some useful bacteria help us to make ch…… and y……

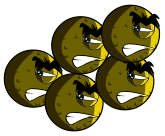
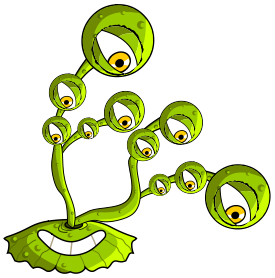
Ch……. and the f…….. are caused by viruses.

The largest type of microbes are f…….

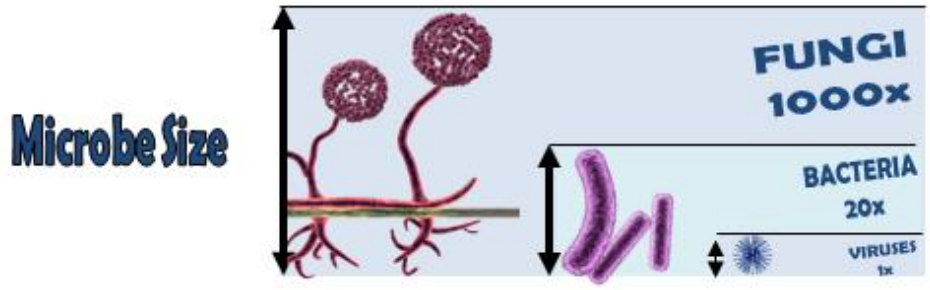
The three different shapes of bacteria are- s……., r……. and b…….

M……. which can grow on bread is a type of f……



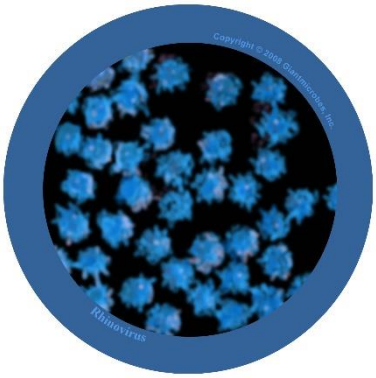
Activity 2- Micro-organisms/ Microbes

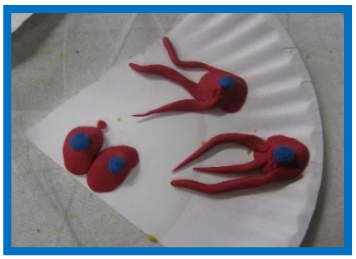


How big are microbes and what do they look like?

You can see that fungi are the largest microbes, bacteria are in the middle and viruses are the smallest.

Task- Can you create your own microbes models using playdough? Use the PowerPoint to help you see the shapes of the microbes. Decide which type of microbes you are going to make. Are they a viruses, bacteria or fungi? Label your microbes creations. Take a photo and blog it!





Bonus task- Complete the task named "**Identifying microbes second level**" on the page below.

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.

Read the instructions carefully and remember to record your findings every day. Here is an example of a simple table which you could use-

Name of experiment-	Date-	What I have noticed-	Drawing of my experiment-
Microbe Garden	04/03/21	The cheese has little white lines on it. The apple looks brown and slimy. The carrot looks the same as yesterday.	

Other ways you could record your results are- **drawings, photographs, writing a journal or blog posts.** Remember to write the date each day so that your findings are in chronological order.

At the end of your experiment look back to your prediction. Were you correct or incorrect? Write a few sentences explaining your findings.

Activity 4- Useful Microbes

It is really important to know that microbes can be both **useful** and **harmful.**

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 in the dough mix and uses it as **energy.** The yeast produces **gas bubbles** which causes the dough to **rise.** The more sugar it has the faster it will rise.

Try out the **Yeast Races Experiment** on the pages below.

Create a simple table like this one for recording your yeast races or use the more detailed **recording sheet** on the pages below.

Time	Yeast on its own	Yeast and sugar
	Volume of dough in ml	Volume of dough in ml
0 mins		
5 mins		
10 mins		
15 mins		
20 mins		
25 mins		
30 mins		

Take photos of your yeast experiments and share them with us on the blog.

When you have finished your experiment answer these two questions-

1. What is the name of the process which made the dough rise?
2. Why did the dough in container B moved faster than container A?

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.

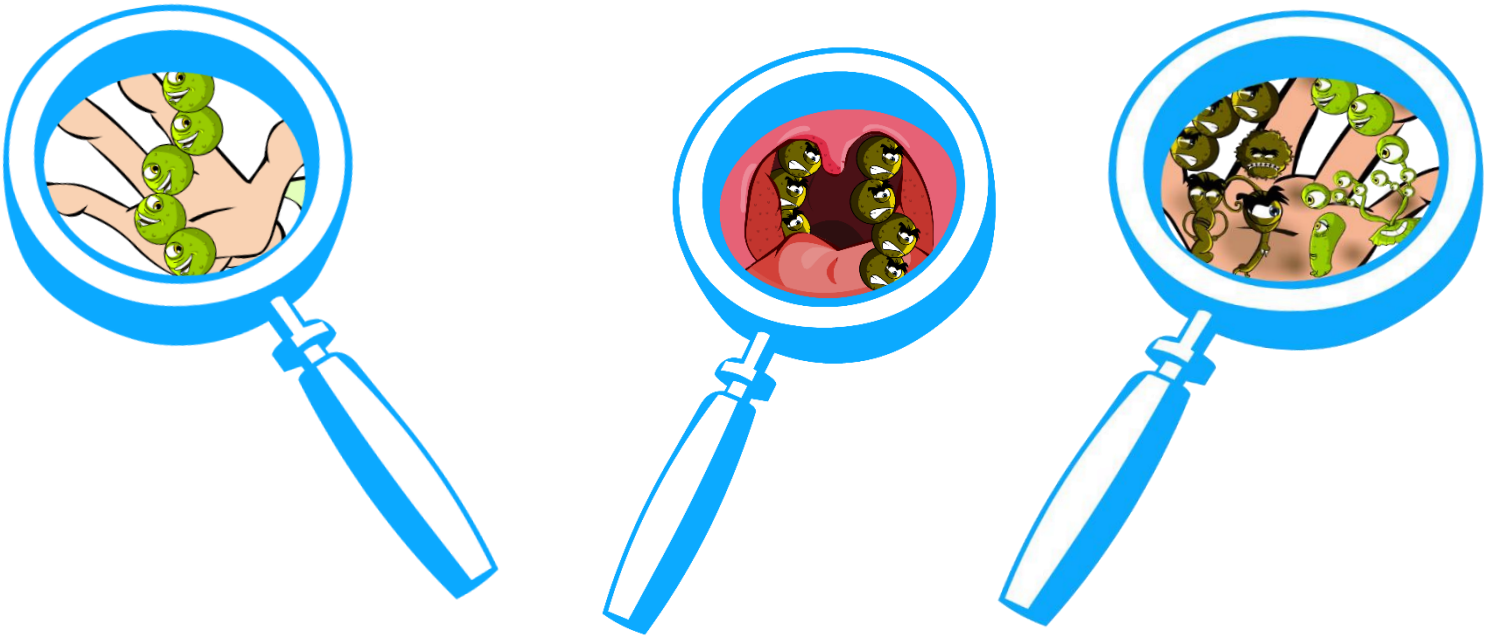
Harmful microbes are often called **infections** and can be easily passed from person to person. Sometimes we can catch harmful microbes from food or drink which has gone bad.

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

Task- Look at the pictures on the activity sheets on the pages below named **"Harmful microbes- pictures"**.

Discuss what you think is wrong with the boy and girl in each picture. How are they unwell and what do you think is making them unwell?

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



Identifying Microbes- Second Level

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?

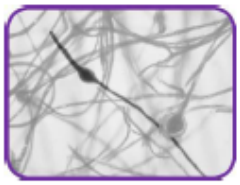
Staphylococcus is a:

_____

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?

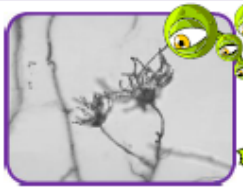
Dermatophytes are:

_____

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:

_____

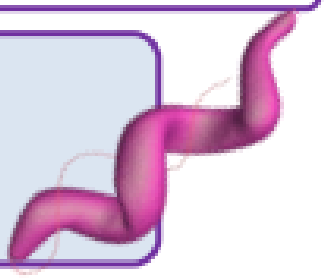
Kitchen Investigator

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

1. Take **1** slice of **bread** and put into a plastic bag. Seal the bag and **label** as **control**.
2. Add a **sprinkling of water** to the rest of the **bread** slices. Be careful and try not to soak the bread.
3. 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**.
4. **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.
5. **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.

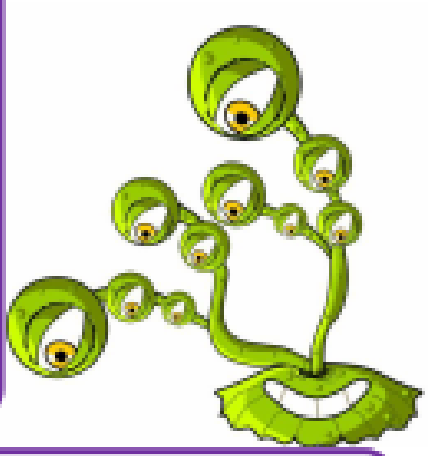
On the other slices you should see lots of different types of microbes, like fungi and bacteria, growing on the bread. This shows that different areas of the kitchen have different numbers and types of microbes living on them.

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

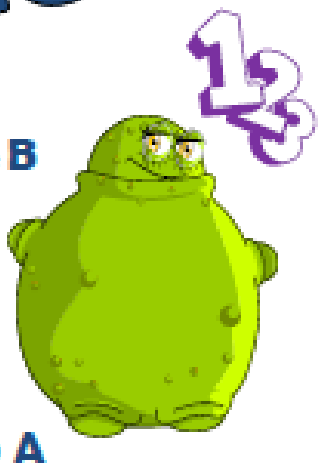


Method

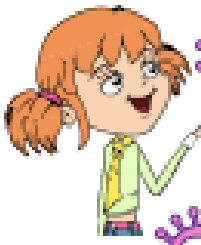
1. **Label** one **jar** '**water**' and the other '**control**'. Put one of each type of food into each jar.
2. **Add** a **sprinkling** of **water** to the jar labelled 'water'. **Do not** add water to the **jar.**
3. **Put** the **lids** on the **jars** and the place the jars on a counter top out 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



1. **Label** one of your plastic cups **A** and one **B**
2. Add **4 dessert spoons** of **flour** to each of your cups
3. Add enough **yeast solution** to plastic **cup A** until it has the consistency of a thick milkshake.
4. Add enough **yeast and sugar solution** to plastic **cup B** until it has the consistency of a thick milkshake.



5. Pour the contents of **cup A into graduated cylinder A** until it reaches about **30ml**
6. Pour the contents of **cup B into graduated cylinder B** until it reaches about **30ml**
7. **Record** the exact **height** of the dough in each

8. **Place** both measuring cylinders into a **basin** of hot water
9. **Measure** the height of the dough every **5 minutes** for 30 minutes

USE SH1

Yeast Races

e-Bug

Procedure

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?

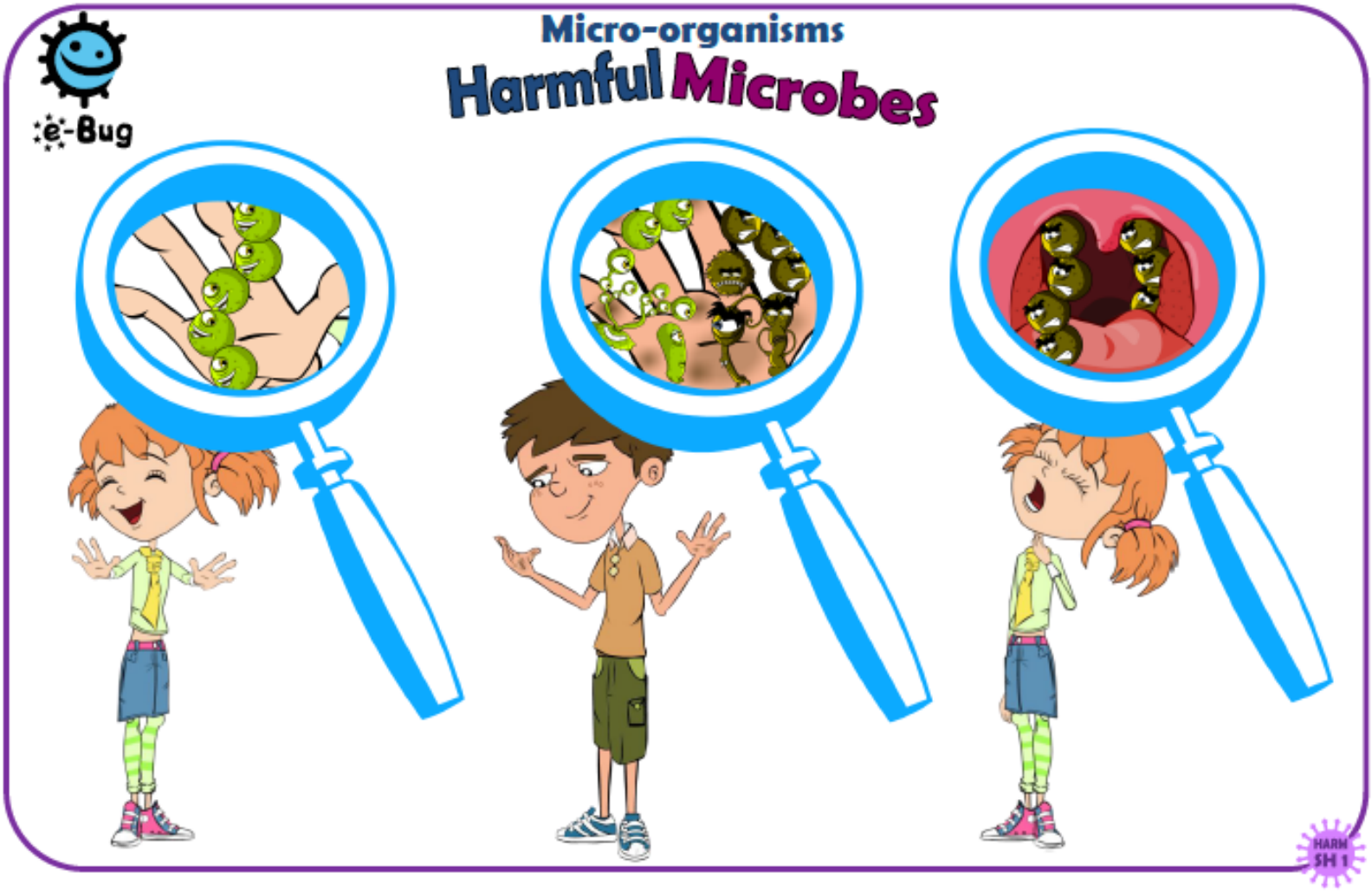
   _____

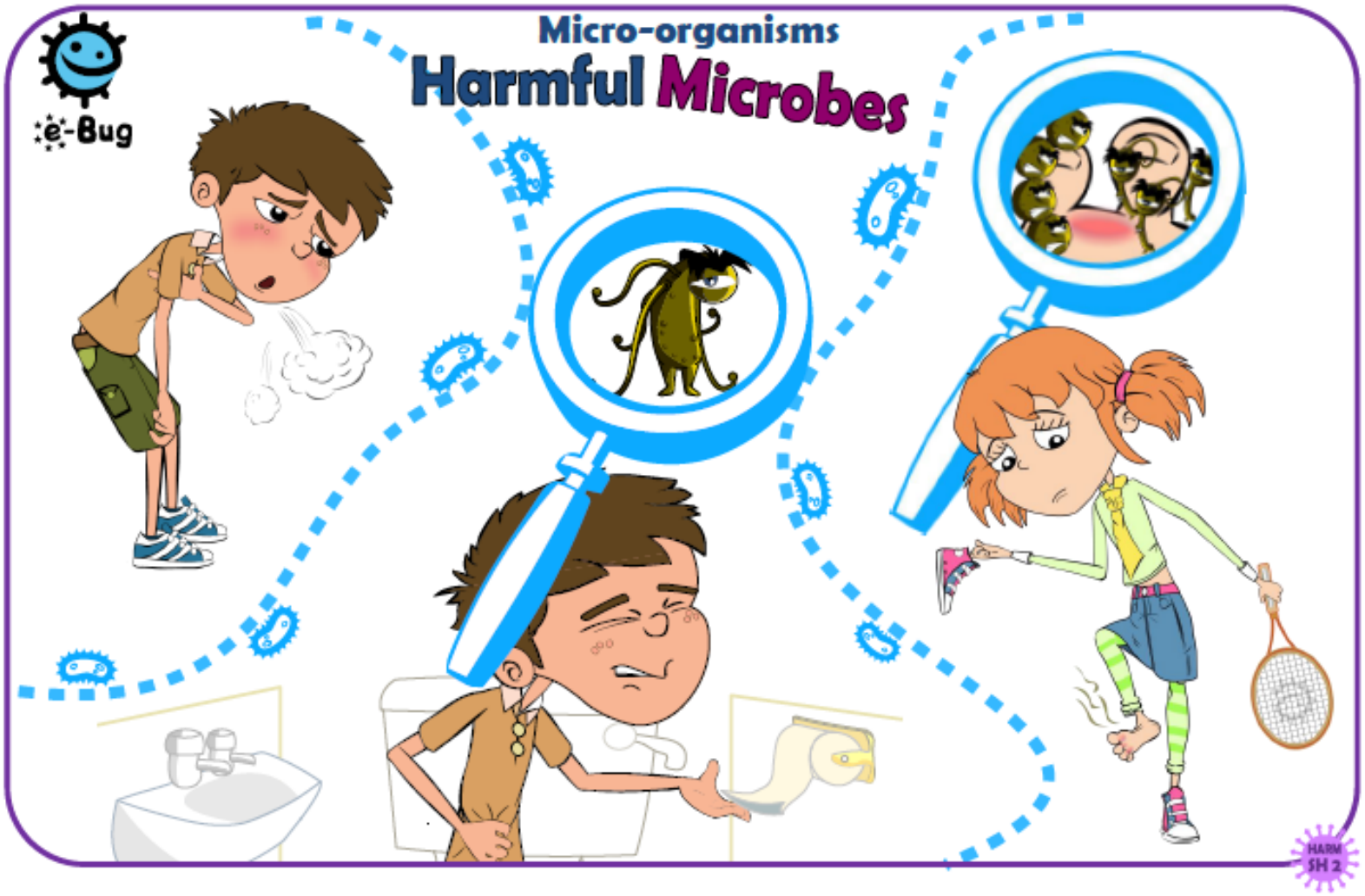
4. What other food products are the result of bacteria or fungi growing and changing substances?

   _____

Fascinating Fact
There are trillions friendly bacteria in the average human gut.

Harmful Microbes- Pictures




e-Bug
Micro-organisms
Harmful Microbes
HARM
SH 2

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