IndusTRY AT HOME!

About this activity

In this activity you will find out how mould can be useful in the medicines industry. You will investigate to find out the best conditions for mould growth. 'Conditions' means what a place is like to be in, such as hot/cold, dark/light etc. Just like scientists in industry, you will carry out a fair test, make careful observations and report your findings.

Kit List

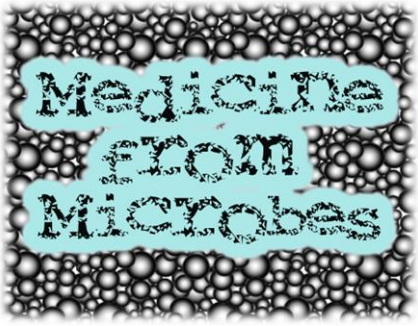
- ☑ 6 freezer bags (must be see through and sealable)
- ☑ 3 slices of fresh bread
- ☑ A cup of water
- ☑ Permanent marker

Time: 30 minutes to set up

(+ 10 minutes daily observation for 2-3 weeks)

Watch out!

- Some microorganisms which cause food to decompose are not visible so keep bread samples sealed inside plastic bags at all times.
- Be aware of any allergens when choosing bread or any other items for investigation.
- Once the investigation is complete, dispose of all bread samples without opening the sealed plastic bags.



Important words to understand:

- Fair test
- Mould
- Microorganism
- Microbe
- Germ
- Infection
- Bacteria
- Antibiotic
- Extract
- Technology
- Industry
- Medicine

Not sure what they mean? You could use a dictionary to check (paper or online).

The Problem

MediTech, a biotechnology company, have been researching different plants and foods to extract ingredients which might make new medicines. Their latest discovery found that a mould growing on food seemed to stop other microorganisms (germs) growing close by. MediTech think this mould could be used as a medicine because it could stop bacteria, which are microorganisms too, from growing. If they are right, it could be used to make a new anti-biotic medicine to treat things like cuts which often get infected by bacteria and dirt.

Can you help by finding out which conditions produce mould the quickest and which conditions produce the most mould?

OUR METHOD:

- Cut each of your slices of bread in half to give six bread samples – the halves should be used to test opposite pairs of conditions.

Testing Conditions to Compare		
warm/cold	moist/dry	light/dark

- Prepare your samples by sealing the six halves in plastic freezer bags (sprinkle some water on one sample to test the 'moist' condition). Remember, samples **MUST NOT** be reopened again after the investigation begins!
- Decide where you will place your bread samples, choosing locations which are safe to reach and out of the way.
- Using the permanent marker, label each sample with details of the date, location, and test conditions (e.g. 10.06.20 – next to boiler – warm)
- Decide how you will record your results (see page 2 for ideas)
- Place the samples in your chosen locations and revisit them regularly to record results/make observations – approx. 10 minutes each day for 2-3 weeks

Make a Prediction:

Which conditions do you think will produce the most mould?

Which conditions do you think will produce mould the quickest?

Why do you think this?

How to keep your test fair:

To keep your test fair, you will only be changing one thing, where your bread samples are placed. Everything else will need to be kept the same:

Change	Keep the Same	Measure
Conditions the bread samples are kept in	Size of bread samples (half slice) Loaf of bread Types of plastic bag (sealable) Time between observations (24 hours) End of investigation	Amount of mould produced Scale 0-10 Sketch Photo/video diary

Adapted from: http://www.ciec.org.uk/resources/medicines-from-microbes.html

Recording your Results – Try recording your results in one or more of the following ways:

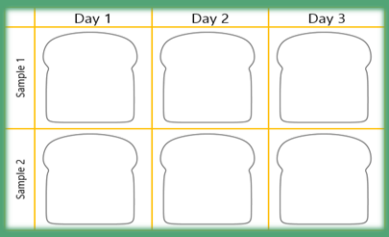
Table of Results (Copy this table out making sure you have enough rows for the number of days your investigation will last.)

Day	Mould covering (1-10)						Other observations
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	
1							
2							
3							
4							
5							

Use a 0-10 scale to describe how mouldy the bread is from no mould (0) to completely covered (10).

	= 0	No mould
	= 5	Quite mouldy
	= 10	Completely covered in mould

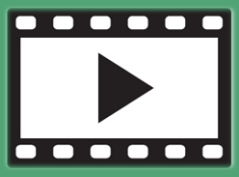
Sketch Diary



Draw the slices of bread and colour the areas of mould that appear. Try using a different colour for each bread sample.

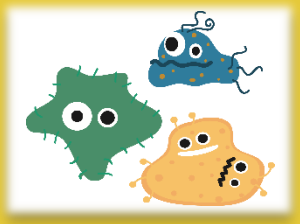
Photo Diary

Video Diary



Reporting Your Results

Once you have completed your observations and recorded your results, it's time to advise the MediTech scientists which conditions are best for growing mould.



THEY WILL WANT TO KNOW...

- How did you test the different growing conditions?
- How did you keep your investigation fair?
- What are your results?
- Which conditions are the best for growing the most mould?
- Which conditions are the best for growing mould the quickest?
- Why do you think these conditions are the best?

Write a short report or make a video to share your results with MediTech

Share it with us @ciecyork

Did You Know?

Living things do not always do what we expect them to. When scientists set up investigations, they usually have some ideas about what they think will happen and use the investigation to check their ideas are correct. It can be really interesting when something unexpected happens! The scientists then have to go back and check their work for mistakes before changing their ideas and setting up a new investigation to see if the same thing happens again.

Follow up investigations and activities:

- Repeat the investigation using a different brand of bread or different bread product like a bagel or crumpet, or combine test conditions like warm and moist versus cold and moist.
- Turn numerical results into a line graph. You will need different colour lines to show the results for different test conditions.
- Find out about other plant materials which have medicinal properties e.g. dock leaves, willow bark or oat grains.
- Research some famous scientists who have made important biological and medical discoveries: Louis Pasteur, Edward Jenner, Dorothy Hodgkin, Rosalind Franklin, Sir Alexander Fleming and Florence Nightingale.

Things to think or talk about:

- Which other foods have you seen growing mould?
- Based on your observations, what conditions do you think might cause mould to grow?
- Where is food usually stored? Is it warm or cold? Moist or dry? Light or dark?
- What different places do you store food in your house? Why do you think those places are used?
- Investigations using living things like microorganisms (e.g. mould) don't always go to plan, why do you think this is?

With special thanks to the Salters' Institute for funding this publication.

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