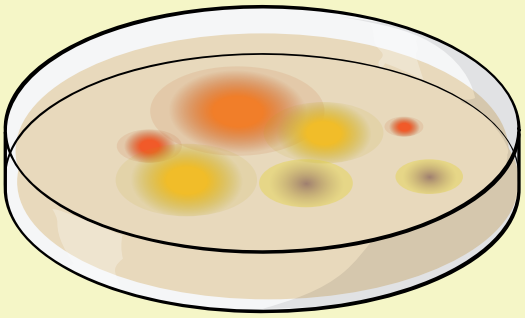
AGAR PLATE CHILDREN'S

ACTIVITY PACK



⚠ Please follow the safety rules in your country for sampling and cultivating microorganisms. Please contact your local school authority for guidance. Any spills should be reported to an adult straight away.

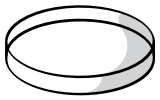
Introduction

Agar plates are jelly-like growth media used by scientists to grow microorganisms in the lab. The agar is usually contained in a Petri dish. In this activity, you will make your own agar plates using equipment that can be found around your house and school. You'll then be able to take samples from around your environment and see which microorganisms can grow there.

YOU WILL NEED

1 pack of agar-agar

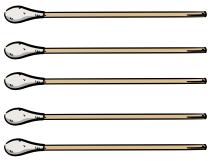
you can purchase this from health food stores or Asian supermarkets



*8 small containers to act as Petri dishes

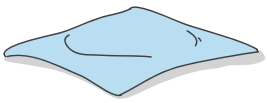
1 large heatproof bowl

(with a capacity of at least 1 litre)



Cotton swabs

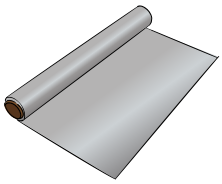
Waterproof markers



Kitchen towels

Kitchen scales

Tablespoons and teaspoons for measuring



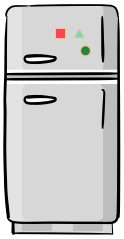
Aluminium foil

Adhesive tape

5 cubes of beef bouillon

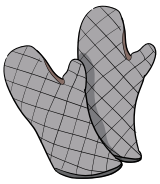
1 litre of just-boiled water
(in a kettle or a pan)

Spatula

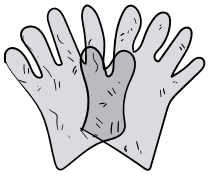


Access to a refrigerator

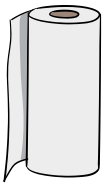
Thermometer



Oven gloves



Plastic gloves



Paper towels

Disinfectant

*The containers will be used instead of Petri dishes if you don't have access to real Petri dishes that are used in the lab. You can buy these from online shops like Amazon if you like but small tupperware containers will do. There are a few features of the container that are important:

1.

Small volumes are best, something that will hold aprroximately 100 ml of liquid in a layer no thicker than 1 cm.

2.

Wide and shallow containers are needed. It is important that you will be able to reach the surface of the agar easily with your finger or a cotton swab.

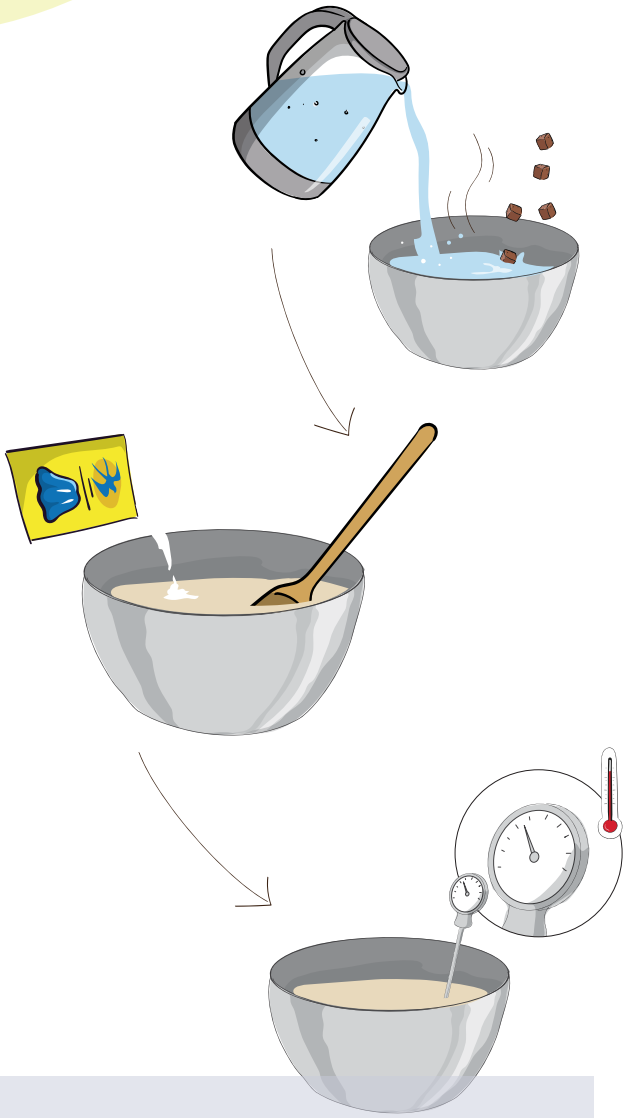
3.

The containers should be sealable. Tupperware containers are good for this but the seal doesn't have to be tight, you could also seal an open container with a loose fitting tin foil covering if you like. Tight seals will restrict the flow of air which may affect microbial growth. The reason we cover agar plates is so that unwanted microorganisms from the air don't land on them and so that they don't dry out.

WHAT TO DO

STEP 1

Making your agar mix



Take 1 litre of recently boiled water and add it to the heatproof bowl, add the 5 beef bouillon cubes and dissolve them completely. For safety, make sure that an adult is supervising this step.

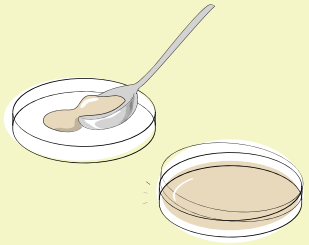
Once the bouillon is dissolved, add 15 g of Agar-Agar and mix until dissolved.

Allow the mixture to cool to around 50°C using a thermometer to monitor the temperature.

Why do we heat the mixture to 90°C	
Why do we need the agar to be at 50°C?	

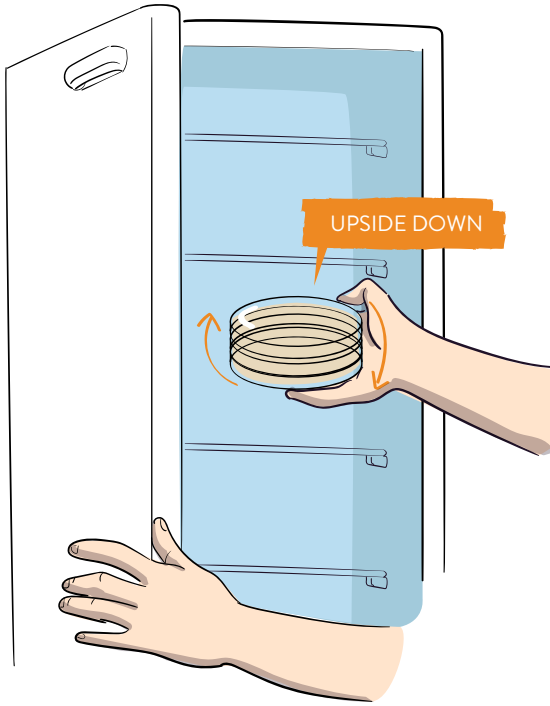
STEP 2

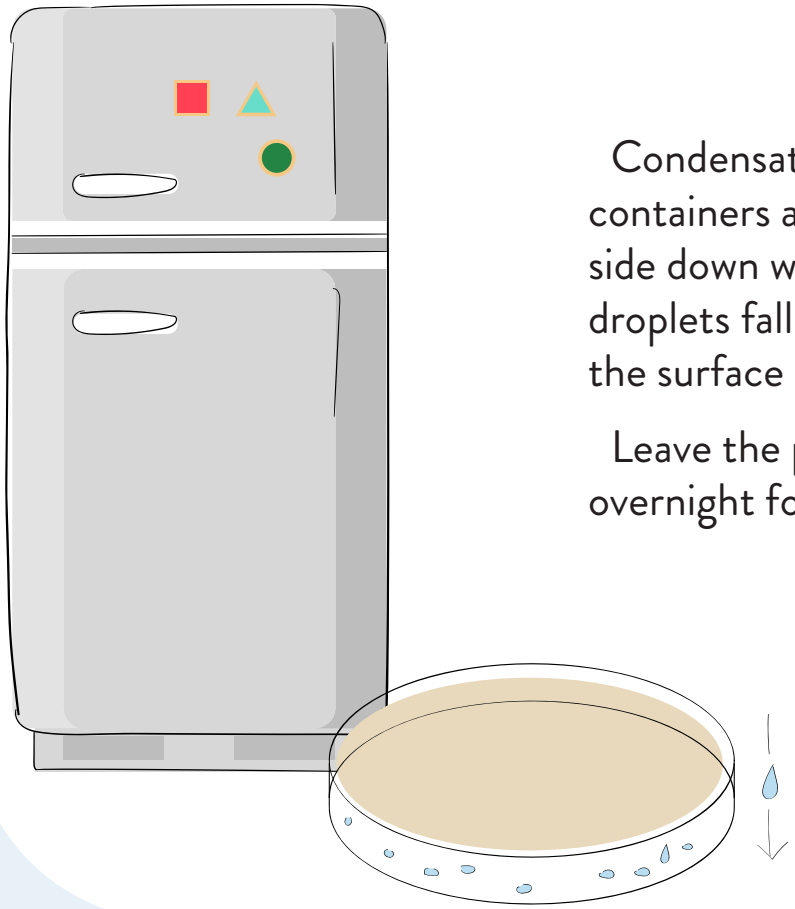
Pouring the agar



With everything dissolved, gently and smoothly pour the agar mix into your containers. Place the lids on the containers loosely to prevent contamination and debris from falling into the mix. Do not seal the containers tightly while the agar mixture is still hot.

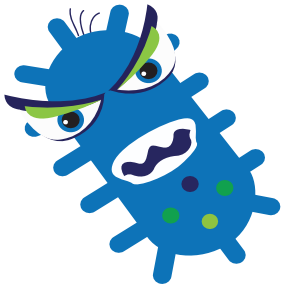
Leave the containers for at least 30 minutes and then check by touching the outside check if they are approaching room temperature. Once the mixture has cooled to room temperature you can seal the plates fully. The agar should be completely set. Turn the containers upside down and put them in the fridge.





Condensation will form in the containers and turning them up-side down will ensure that the water droplets fall on the lid and not on the surface of your agar.

Leave the plates in the fridge overnight for use the next day.

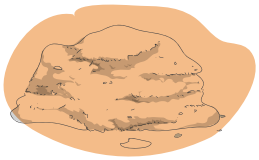


STEP 3

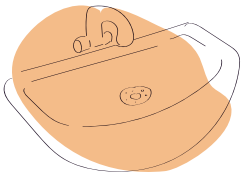
Sampling

Now it's time to grow some bacteria. Where are some interesting bacteria growing that you would like to cultivate?

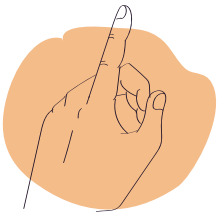
Here are some examples:



Dirt in your garden



Your sink plughole

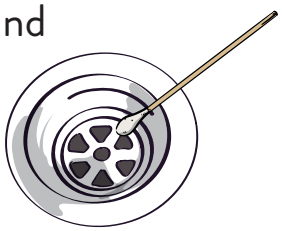


Your fingertips

Can you think of anywhere else:

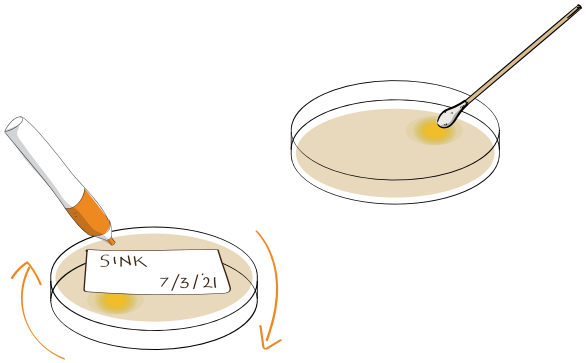
[LIST PLACES HERE]

Take a cotton swab and move it around the area that you would like to sample and keep it in contact with the surface for at least 10 seconds. For example if you are sampling your plughold, run the swab around all parts of the plughole for 10 seconds. If the surface is very dry, moisten the swab with some clean water.

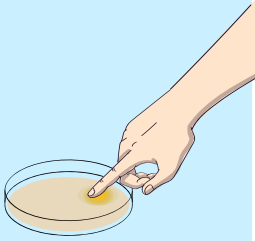


Next, run the swab over the entire surface of one of the agar plates that you made. Imagine that the swab contains paint and you are trying to paint the entire surface of the agar.

Turn your agar plates upside down (your sample won't fall off!). Now label the base of the agar plate with your name, the date and the place that you sampled. Repeat this step for all the areas that you would like to sample.

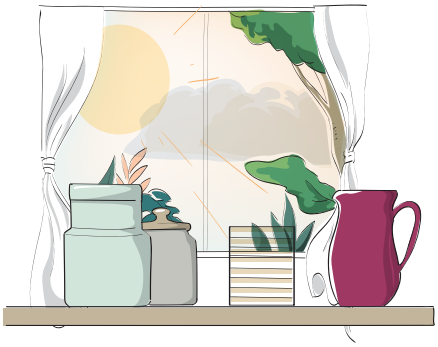


Note that if you want to sample your finger tip, you don't need to use a swab, you can just touch your finger to the surface of the agar.



STEP 4

Growing your microorganisms

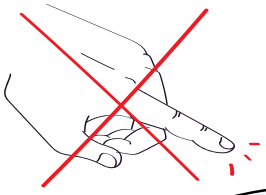


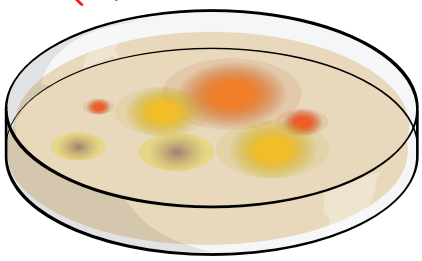
Leave the agar plates in a warm place that you can easily reach.

Leave the agar plates for 2 days.

STEP 5

Analysing your results



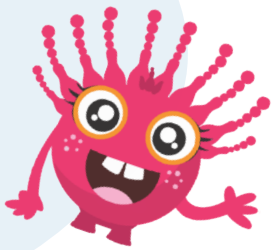


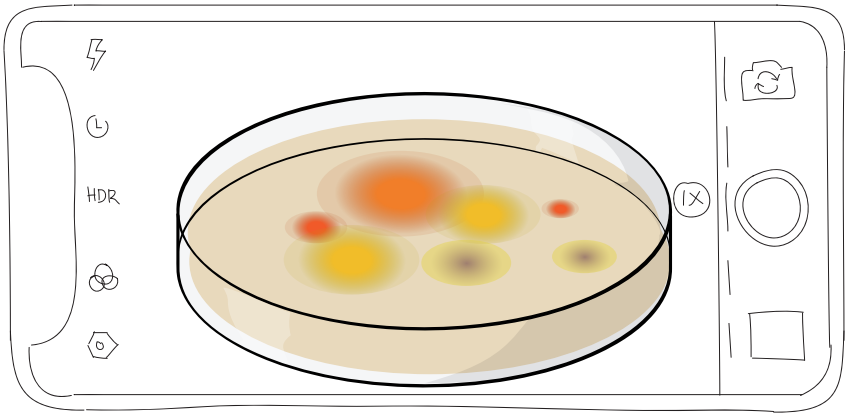
Now it is time to look at the agar plates.

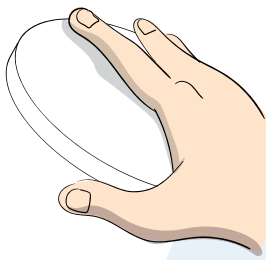
Firstly, remember that now you have grown microorganisms and it is important not to touch the microbial growth on the agar surface.

Carefully take the lid of each plate and take a picture, making sure that you can identify which plate is which in the photograph by writing the label on a piece of paper that can be seen in the photograph.

Sometimes, microorganisms will grow as individual colonies that are most often round. You may see many colonies on your agar plate or just a few. If you have a sample with lots of microorganisms, the colonies can join together to form a "lawn" on your plate. Both outcomes are good.







Look at each of the plates individually and compare them.

Which plate contains the most microorganisms?	Do all the colonies look the same?
If there are differences, what are they?	How many different microorganisms do you think there are in all of your plates?

Draw and colour what you see.