VOLUME 1

SCIENCE ON YOUR DOORSTEP

FAMILY ACTIVITY PACK

LOOK INSIDE!

Welcome to the Crick's family activity pack – free, fun science you can do at home!

Do you know how many scientists work at the Crick? We have more than 1,000! Have some of our scientists visited your school? Maybe you've come to the Crick and been a scientist in our Discovery Lab?

Science doesn't just happen at school or in a lab...look inside for activities and fun 'kitchen' science experiments!

From everyone at the Crick

Win science equipment for your school!

Tell us what you think of this activity pack. Fill in this quick survey by 3 March 2021, and the Camden Primary State school with the highest proportional number of responses will be offered £250 worth of science equipment!

https://www.surveymonkey.co.uk/r/Crick_Activity_Pack_School_Version

The Crick is a research institute in King's Cross, which works to expand what we know about how life works, and finding out how we can treat, diagnose and prevent human diseases.

THE FRANCIS CRICK INSTITUTE

TAKE THE TASTE BUD TEST!

HOME ACTIVITY

We are all scientists. Using our five senses, we do experiments every day to understand how things work. But we don't use our senses one at a time – they often work together to help us investigate our world.

Can you tell the flavour of a sweet by just using your sense of taste? Let's find out!

Make sure you do this test with an adult. The adult in charge is responsible for ensuring children don't eat any sweets they are allergic to.

Nathan Hanna/Unsplash

Amalia Bastianovic/Unsplash

You'll need:

- **A packet of sweets that are all the same shape, but have different flavours e.g. starbursts, maoams, or jelly babies**
- **Blind fold or scarf**
- **A few friends or family to make it more fun!**

TOP TIP

Try holding half a lemon near someone's nose as they try out the experiment. Is it more tricky? Sometimes this confuses them more, because other things in our environment can make it harder to notice flavours!

1 Find a few friends or family willing to take part in the experiment. Ask them to close their eyes and to put the blindfold/scarf over their eyes

2 Ask them to take a sweet from the packet. Make sure they don't peek!

3 Tell them to unwrap the sweet, pinch their nose closed and then put the sweet in their mouth

4 Keeping their nose pinched, ask them to describe what they can taste. Can they work out the flavour?

5 Tell them to un-pinch their nose so that they can smell again. Is it easier to work out the flavour?

Around 80% of people cannot work out the flavour of sweets just by using their taste buds. Knowing what the sweet looks and smells like gives our brain lots more information about what we're eating.

So, without your nose and eyes, you may not be able to tell the difference between foods — especially if the foods all have the same texture!

We run lots of free family events at the Crick, which we'll be starting again soon

Sign up for our What's On Newsletter to hear more! crick.ac.uk/news/newsletters

SCIENCE SCAVENGER HUNT

Science is all around us, not just at school or in a laboratory. Try doing this scavenger hunt at home and then again next time you go outside. What science can you spot? Take photos or draw what you find!

Share your finds with us on Instagram
@TheFrancisCrickInstitute
#ScienceScavengerHunt
#EveryoneIsAScientist

OUTDOOR ACTIVITY

Examples of water where it is a solid, liquid or gas	**Something that floats in water. Something that sinks in water**. Do the shapes or weights of the objects make a difference? See if you can change them!	**A shadow that is 30 centimetres long.** Can you only measure it at a certain time of day?
Three different types of rocks used to make buildings. Why do you think they were used?	**A mammal interacting with its environment**	**Three examples of an irreversible change** (that's where a change is made chemically and can't go back to its original ingredients). ***HINT: There are lots of examples when we're cooking!***
An animal that is in the adult stage of its life cycle	**Food that contains calcium.** Why is it important for our body?	**A machine using a motor**
Five different sources of light	**Three materials that are magnetic**	**A metal that isn't magnetic**

MAKE A CELL CUPCAKE!

HOME ACTIVITY

Our bodies are made up of trillions of building blocks called cells. Each block is like a tiny factory producing energy for you to live, move and keep your body running.

Cells are filled with different structures or organelles with different jobs – we're using sweets to create our own cells...to eat!

Your body is made up of lots of different cells with different functions, such as brain cells, lung cells, liver cells and even skin cells! The Francis Crick Institute studies all types of cells to better understand how the human body works both when healthy and during disease.

You'll need:

- **Plain cupcakes (make your own or buy them in the shop)**
- **Butter cream icing**
- **Chocolate buttons or Haribo fried eggs**
- **Jelly beans**
- **Rainbow wands (chopped up)**
- **Strawberry laces**
- **Haribo rings and/or cherries**
- **Smarties**
- **Coloured icing tubes (optional)**

Make sure you do this activity with an adult - the adult in charge is responsible for ensuring children don't eat anything they are allergic to.

1 Get your cupcake ready

2 Prepare your sweets – you'll need to chop up your rainbow wands. Be careful and have adult supervision if you're using scissors!

3 Get your buttercream icing and spread it on the cupcake using a knife or the back of a spoon. You've just added the cytosol – this is the fluid within the cell

4 Now for the fun part! You'll be using the sweets to represent different structures of the cells – the organelles

WHAT SWEET IS WHAT ORGANELLE?

Icing = cytosol

Choc buttons / fried egg = nucleus

Strawberry laces / coloured icing = cell membrane

Jelly beans = mitochondria

Haribo rings and/or cherries = vesicle

Smarties = lysosome

Rainbow wands = Golgi apparatus

TOP TIPS

You can either make the cakes and icing yourself or use shop-bought ones.

Don't worry if you can't get the exact sweets we recommend – look for ones that look similar!

YouTube

Watch Bake Off star and Crick scientist Yan create her own cell cupcakes **https://youtu.be/DrDrUvQq1zs**

WHAT DO THE ORGANELLES DO?

Cytosol: each cell is filled with a fluid called the cytosol.

Nucleus: like the brain of the cell. It holds all the instructions for the cell and decides what it does.

Cell membrane: the cell lies within a cell wall called a cell membrane. It keeps the inside of the cell separate from the outside of the cell.

Mitochondria: the powerhouse of the cell and creates the cell's energy.

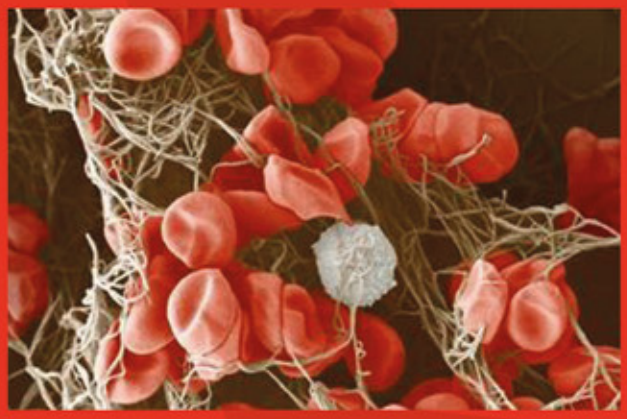
Vesicles: store and move materials around the cell.

Lysosomes: like a stomach, they break down materials or old parts of the cell.

Golgi apparatus: important in moving proteins in and out of the cell.

MAGICAL MICROSCOPES

Take a look at the picture below... what do you think it is? How do you think this picture was taken?



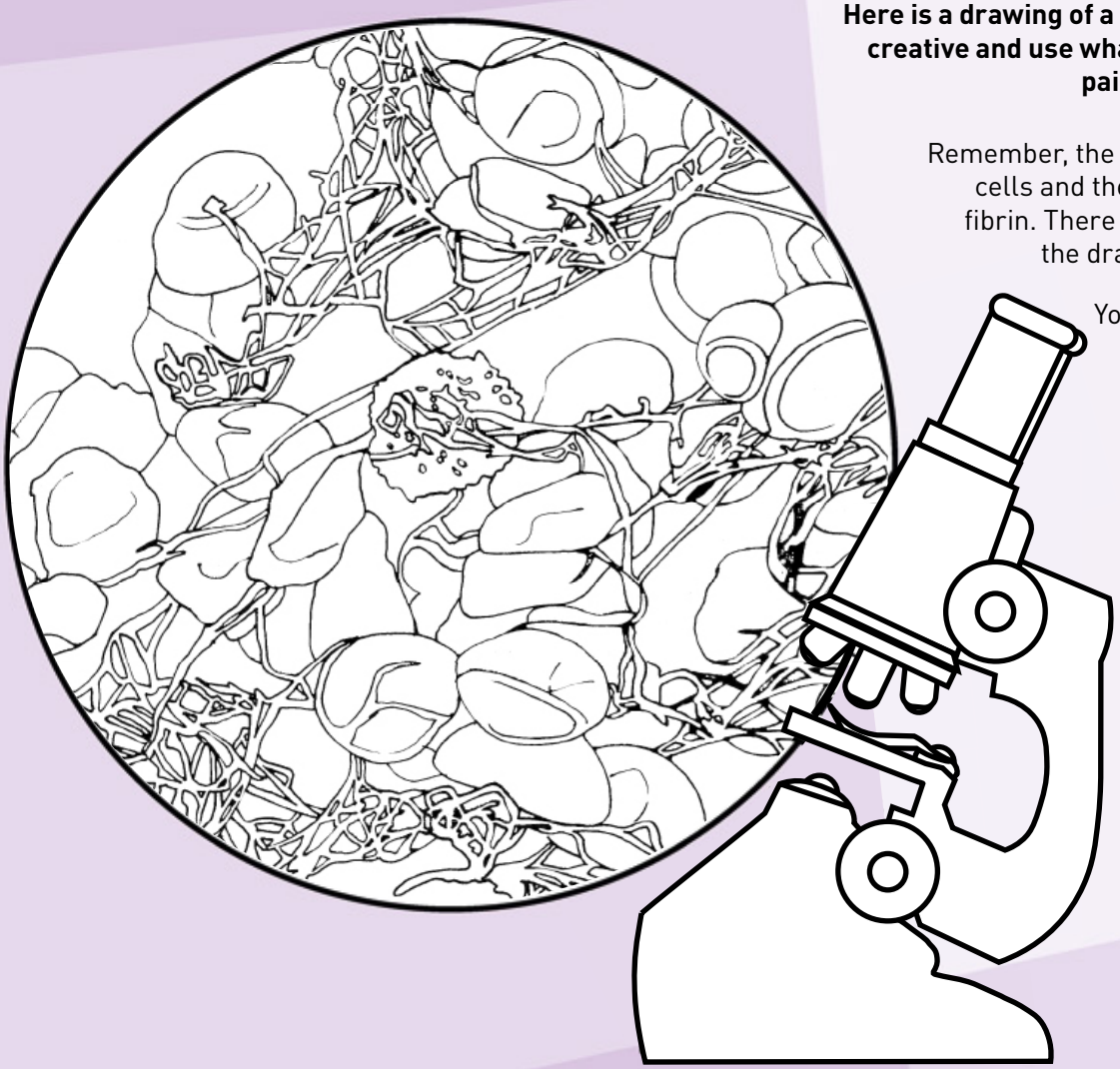
Are you ready for the answer? It's a scab!

When you cut yourself, special blood cells called platelets stick together, plugging the hole. This clot is held together by other things like fibrin (the string-like stuff you can see), red blood cells (the red disc-like things) and white blood cells that fight germs (the white thing you can see in the middle). When clots dry out they get harder, turning into a scab. It stops germs getting into your body, and underneath new skin cells are being made to repair your skin.

This picture was taken by Anne who works at the Crick. She works in our Electron Microscopy team, taking pictures to help our scientists. Electron microscopes are amazing machines that are really powerful and mean we can see really tiny things, like cells and even viruses.

COLOURFUL CELLS!

HOME ACTIVITY



Here is a drawing of a scab for you to colour in. Get creative and use whatever you can find - pencils, paint, glue, anything you'd like!

Remember, the disc-like things are red blood cells and the stuff that looks like string is fibrin. There is only one white blood cell in the drawing, it has a spikey surface.

You can use Anne's photo above to help you work out what the different parts are and what colours they should be.

Share your colourful creation with us on Instagram via **@TheFrancisCrickInstitute #EveryoneIsAScientist #MicroscopicArt**

Don't forget to ask an adult to fill in the survey on the first page, for a chance to win science equipment for your school!

MAKE A STAR VIEWER!

HOME ACTIVITY

Scientists are always looking for patterns to help us understand our world. Sometimes they look for patterns in really small things likes the cells that make up your body; sometimes in much bigger things like the stars that make up the night sky.

When you look up at night, how many stars can you see?

Remember to make sure you have an adult with you while you're doing this activity.

Did you know?

For thousands of years, people from different cultures all over the world have looked up, seen patterns in the stars, and made incredible stories from them. These groups of stars are called constellations.

Even though constellations are made up patterns, they have helped people track time, sail across seas, and record amazing events like comets. Today astronomers, who are scientists that study space, use constellations to spot which stars are which.

What stories have you and your grown-ups heard that have come from constellations?

You'll need:

- **A cardboard tube (like one you find in the middle of a kitchen towel roll or toilet paper roll)**
- **Things to decorate your cardboard, such as paint, coloured paper, stickers, felt tip pens, crayons, glitter – the possibilities are endless!**
- **Your constellation cutouts (on the next page)**
- **Scissors**
- **A pin or a sharp pencil**
- **A rubber band or hairband**

1 Decorate the outside of your cardboard tube however you like – with stars? Planets? Maybe something completely different!

2 Use scissors to cut out each of the constellation patterns.

3 On each constellation pattern, use a pin/sharp pencil to poke a small hole where each star is – ask a grown up to help you for this bit

4 Put your pattern on top of your tube, fold the paper down and hold it in place with a rubber/hair band.

To use your star viewer, hold it to your eye and look at the light coming through the holes. You will see the outline of each star pattern as it would appear in a clear sky at night.

TOP TIP

You can also shine a light through the constellation to shine the pattern of the stars on the wall of a dark room. Why not cut out some blank circles and make your own constellations?

THE SCIENCE

Some scientists use telescopes to help them investigate far away patterns in the night sky.

Scientists at the Francis Crick Institute use equipment like microscopes to help them look for patterns in things that are too small to see with the naked eye, like cells, bacteria and viruses.

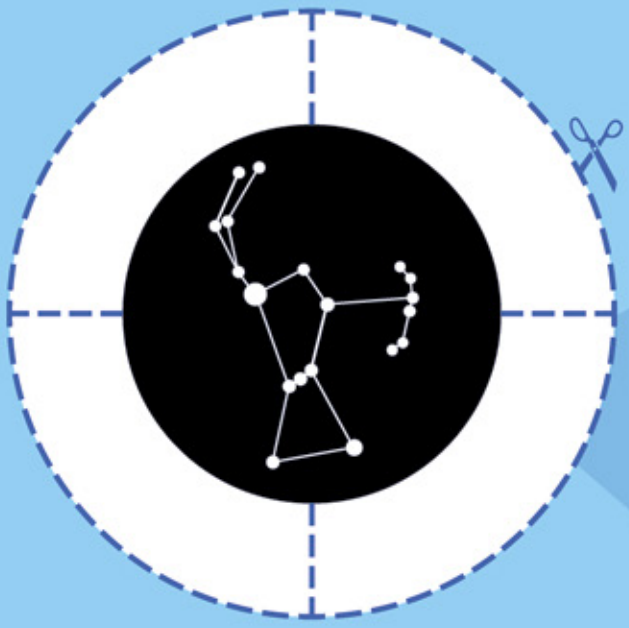
CRICK SCIENTISTS HELPING TO FIGHT CORONAVIRUS

We're doing all we can to help tackle the COVID-19 pandemic. We've used our equipment and expertise to set up a testing service so local hospitals and care homes can remain open and safe. Many of our scientists are studying the virus to understand more about it, as well as finding new treatments and better tests. We have also opened up our public space as a COVID-19 vaccination centre.

Photo: Wil Stewart/Unsplash

YOUR STAR CUTOUTS

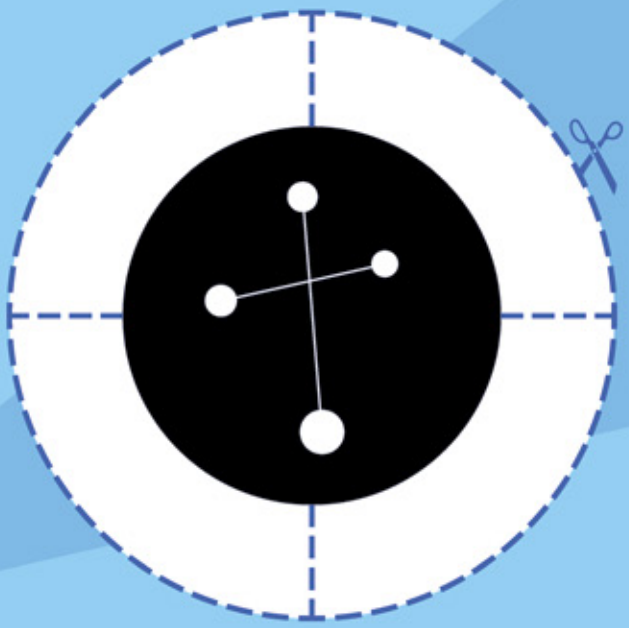
Remember to make sure you have an adult with you while you're doing this activity.
Cut out each circle along the outer dotted line and then cut along the four short dotted lines to make 4 flaps on each. Look at 'Make a star viewer!' on the previous page to find the full instructions.



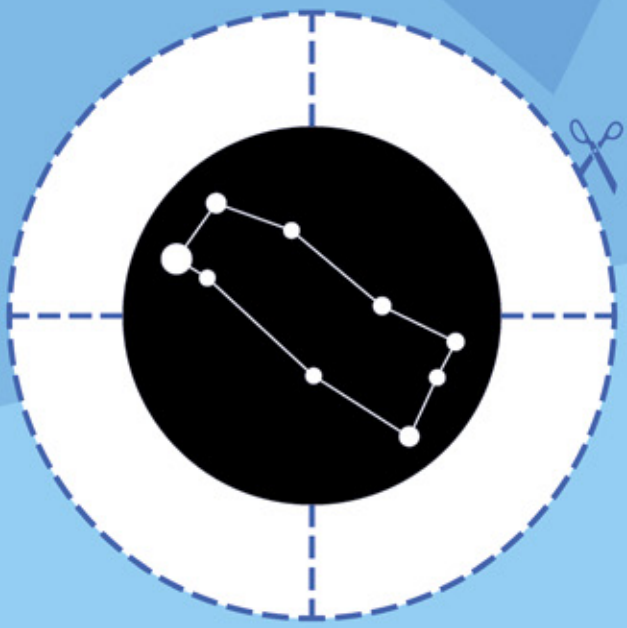
AL-JABBAR (An Arabic constellation that translates to The Giant. Also known as Orion)

BUKDUCHILSEONG (A Korean constellation. Also known as the Seven Stars of the Northern Dipper or Ursa Major)

Put your pattern on top of your tube, with the constellation facing the inside, fold the paper down and hold it in place with a rubber/hair band.



THUTLWA (Named by Sotho, Tswana and Venda speakers in South Africa, this translates to the Male Giraffe. Also known as the Crux)



CITLALTLACHTLI (An Aztec constellation that translates to The Ball Game of the Stars. Uses some of the same stars found in Gemini)

As with all our activities, this experiment should be carried out under the supervision of an adult. The adults in charge are responsible for ensuring children don't use materials that they are allergic to.

HOME ACTIVITY

KITCHEN SCIENCE! CREATE YOUR OWN CHEMICAL REACTION

HALF-TERM FUN ON OUR FAMILY ZONE!

ONLINE ACTIVITY

Visit our online Family Zone this February half-term to discover new activities and to take part in our virtual events. From wonderful experiments to curious quizzes, there's something for all the family to try together!

Check out **www.crick.ac.uk/familyzone** or subscribe to our YouTube channel **@CrickInstitute** to hear about the next sessions and meet our friendly scientists.

YouTube

Watch Ellie from the Crick's education team create her own chemical reaction!
https://youtu.be/ehPtW5h0vAQ

You'll need:

- **Bicarbonate of soda**
- **A powder that looks similar to bicarbonate of soda e.g. flour or icing sugar**
- **Vinegar**
- **A plastic drinks bottle (approx. 500ml)**
- **A balloon or plastic bag**
- **A hair tie (if you're using the plastic bag)**
- **Spoon**

1. Make sure you have adult supervision and pour vinegar into the plastic drinks bottle until it is around 2-3cm full

2. Make a funnel with a piece of paper and use it to put two spoons of bicarbonate of soda into the balloon/ plastic bag

3. Fasten the neck of the balloon around the rim of the drinks bottle, or the plastic bag using the hair tie, careful to not let any of the powder fall into the vinegar yet

4. Upend the balloon/plastic bag quickly to let all of the powder fall into the vinegar, whilst keeping it sealed around the rim of the bottle

5. Watch the balloon start to inflate!

6. Try this experiment again with another powder which look similar to bicarbonate of soda e.g. flour or icing sugar. Does the balloon still inflate?

THE SCIENCE!

Chemical reactions happen when chemicals (e.g. the acid 'vinegar' and the base 'sodium bicarbonate') are changed into something new, in this case a gas – carbon dioxide, which blows up the balloon.

When you swap the sodium bicarbonate with something that looks similar, icing sugar, the reaction doesn't work anymore because the icing sugar doesn't have the same chemical properties as the sodium bicarbonate.