Science at home

Simple experiments for children

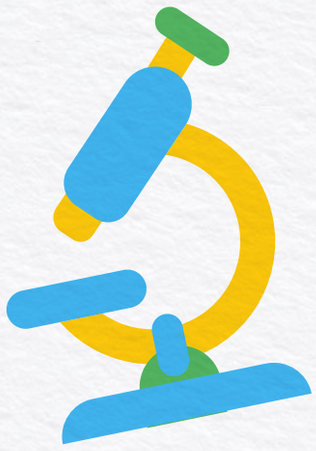
(and curious grownups)

BROUGHT TO YOU BY HAVAS LYNX GROUP SCIENCE

LOCKED DOWN, WORK TO DO, CHILDREN AT HOME NEED SCHOOLING OR ENTERTAINING?

Suitable for **ALL AGES** Plus a **RANGE OF DIFFICULTIES**

Don't worry - help is at hand! Your friendly neighbourhood Science team have come up with an assortment of fabulous and fun experiments, guaranteed to engage and enthrall the smallest and biggest of kids.
All of these are safe (ish)* to do at home with everyday things you'll have around the house. What could possibly go wrong?



01 **How clean are your hands?**

02 **Fizzy drinks vs. teeth: who will win?**

03 **Extracting DNA from kiwis**

04 **Make your own lava lamp**

05 **The boat race**

06 **Make your own slime**

07 **Do you want to build a snowman?**

08 **Make your own magnet**

09 **Floating rice in a bottle**

Post your pics of science family mayhem using the hashtags **#LYNXLife #HomeScience #HavasHomeSchool #HavasFromHome**

PLEASE NOTE

* Vernon says he's done much more dangerous things with his children and no one was scarred or seriously injured. And Neil said something about "no liability insurance", but then Teams cut out...

How clean are your hands?

Subject:	Biology
Age Range:	4+ years, and yes Dan Weaden that does mean WITH adult supervision
Difficulty:	★
Messiness:	Slight chance of crumbs
How long will it take?	30 mins to prepare + 1 week of waiting to see what grows!

What's this all about?

Coronavirus panic got you washing your hands every two mins? No? Just us? Well maybe you should be...
Washing your hands is important. Like really important. Even if your hands don't look dirty, they could be covered in invisible bugs called microbes. Washing your hands helps remove these microbes, keeping you happy and healthy.

You will need:

- Sliced bread
- Resealable bags (x3)
- A cool dark place to store the bags for 1 week

INSTRUCTIONS:

1. Label each of the three resealable bags: one 'control', one 'dirty', and one 'clean'
2. Place one slice of bread in the 'control' bag without touching it (you can use washing-up gloves or a plastic bag to avoid touching the bread)
3. Press your unwashed hand firmly into the second slice of bread. Place this in the bag labelled 'dirty'
4. Wash your other hand thoroughly with soap and warm water. Dry it off and then press it firmly into the third slice of bread. Place this in the bag labelled 'clean'
5. Place all three bags in a cool, dry place
6. Check on the bags every day for a week
7. Can you spot a difference in what grows?

After 1 week, microbes from your hands will be visibly growing on the bread. Very little should grow on the 'clean' or 'control' bread, and lots should grow on the 'dirty' bread. This shows how many microbes are on your hands when you haven't washed them!

TOP TIP:

Microbes growing on the 'clean' bread?
Wash your hands for longer and with more soap!
Click **here** for a hand washing tutorial

Fizzy drinks vs. teeth: who will win?

Subject:	Biology
Age Range:	4+ years
Difficulty:	★★☆☆☆
Messiness:	Risk of sticky spills
How long will it take?	15 mins to prepare + 1 week of waiting for the most dramatic results!

What's this all about?

Fizzy drinks taste great but are TERRIBLE for your teeth – this experiment shows you exactly why.

Instead of using your actual teeth for this experiment (because that would be madness), we are using eggs. Eggs are made up of calcium carbonate, which is similar to what our teeth are made from.

When you put an egg into a fizzy drink the acid from the drink breaks the shell apart, releasing carbon dioxide gas and calcium. This essentially dissolves the shell. The same happens to your teeth when you drink fizzy drinks. Pretty disgusting right? Sadly, not disgusting enough to put us off drinking them...

You will need:

- *Raw eggs (x4)*
- *3 different fizzy drinks*
- *Tap water*
- *Glasses (x4)*
- *Sticky labels*
- *A toothbrush*

Instructions

1. Select three fizzy drinks
2. Label three glasses with the name of each fizzy drink
3. Label the fourth glass 'water'
4. Pour each drink into the corresponding labelled glass
5. Place an egg into each glass (make sure the drink completely covers the egg)
6. Leave the glasses for about a week
7. Once the time is up, carefully remove each egg and examine the shell
8. Rub gently with a toothbrush to re-create the effect of brushing your teeth.

Notice how the eggshell easily breaks off in the first three glasses of fizzy drink but not in the water? This is what happens to your teeth after drinking fizzy drinks!

Extracting DNA from kiwis

Subject:	Biology
Age Range:	10+ years
Difficulty:	★★★★★
Messiness:	Risk of sticky spills
How long will it take?	2 hours

REQUIRES ADULT SUPERVISION

What's this all about?

Every living thing has DNA – including us! DNA is like a kind of cookbook that contains all the recipes needed to make us up. You can extract DNA from cells using a few steps which break down fats and proteins in the cell. This experiment lets you get up and close with the DNA of a kiwi!

Exciting stuff, right?! And what's more, this experiment uses rum/vodka... parents... fancy a cocktail? You deserve it!

You will need:

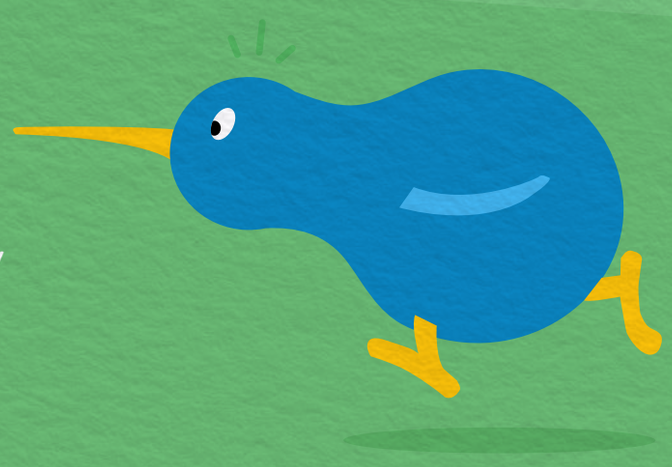
- Kiwis (x2)
- Pineapple juice
- Table salt
- Washing-up liquid
- Cold alcohol (Rum, vodka or surgical spirits work, put in the freezer before you start)
- Glasses (x2)
- Measuring jug
- Sieve
- Bowl
- Tall glass
- Kitchen roll
- Something to stir (wooden spoon, chopstick)
- Knife
- Fork
- Chopping board

WARNING*

Instructions:

Preparations:

1. Fill a glass with 80ml of water
2. Add ½ teaspoon of salt and stir until it dissolves
3. Add 2 teaspoons of washing-up liquid and stir gently
4. Chop up the fruit and place in another glass
5. Mash up the fruit with a fork until it forms a pulp



Let's get extracting!

6. Mix the washing-up liquid mixture with the kiwi pulp and leave at room temperature for 20 minutes
7. Put your sieve over a clean bowl and line the sieve with a few sheets of damp kitchen roll
8. Pour your green mush over the sieve carefully, being careful not to break the kitchen roll
9. Use a fork to gently push the mixture through the sieve
10. The pulp and seeds should be left in the sieve and there should be a greenish liquid in the bowl, transfer this to a tall glass
11. Add pineapple juice to the green liquid (you need one part of pineapple juice for every five parts of the green liquid)
12. Leave at room temperature for about 5 minutes
13. Carefully pour cold alcohol down the side of the glass (you need equal volumes of alcohol and green liquid)
14. After about 10 minutes you should be able to see a mass of white stringy stuff at the top of the glass

This is your kiwi DNA!

* Look we know these experiments might feel tricky at times... but that's no excuse to drink surgical spirits!

Make your own lava lamp

Subject:	Chemistry
Age Range:	6+ years
Difficulty:	★★★☆☆
Messiness:	Risk of sticky spills
How long will it take?	1 hour

What's this all about?

The ability of two liquids to mix depends on the interactions between their molecules.

Water molecules are 'polar' meaning that one end of the molecule carries a slight negative electrical charge, and the other end carries a slight positive electrical charge. The positive and negative ends of water molecules attract each other.

Oil molecules are different: they are 'non-polar', which means they aren't charged.

Water molecules attract each other more strongly than they attract oil molecules, which is why oil and water can't mix. We can watch these interactions live with this experiment!

Whack oil and water in a bottle, throw in some fizzy tablets and food colouring and… kaboom like magic… you get a bubbling lava lamp. **This is educational AND pretty to look at – what more could you want?**

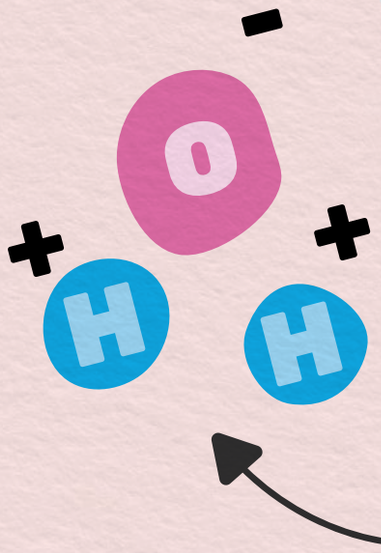
You will need:

- *A tall, open container (either a plastic drinks bottle or a glass)*
- *Cooking oil*
- *Water*
- *Food colouring*
- *Fizzy vitamin tablet*

Instructions

1. **Fill the container to about a third of the way up with water**
2. **Pour cooking oil on top of the water until the container is nearly full**
3. **Wait for the oil and water to separate**
4. **Add a few drops of food colouring and wait for the water to become coloured**
5. **Break the fizzy vitamin tablet in half and drop the half into the container**
6. **Watch the lava lamp do its thing!**
7. **Add more pieces of the tablet to keep the reaction going**

Notice how the liquids don't mix?



This is the interaction between the positive and negative charges in a water molecule!

The boat race

What's this all about?

Water molecules experience strong forces between one another, known as 'hydrogen bonds'. At the surface, the water molecules don't have any molecules above them to bond with, and so they bond even more strongly to the ones next to and beneath them. This extra-strong force creates a kind of 'film' of tension at the surface. This is called 'surface tension'.

Soaps such as washing-up liquid reduce the surface tension of the water. Floating objects are pulled closer to areas of higher surface tension and propelled away from areas of lower surface tension.

This experiment shows surface tension in real time and also throws a bit of healthy competition in the mix! Who will win?

Subject:	Chemistry
Age Range:	6+ years
Difficulty:	★★★☆☆
Messiness:	Water might go everywhere!
How long will it take?	1 hour

INSTRUCTIONS:

1. Cut a 2cm by 3cm rectangle out of the bottle so that you have a flat piece of material that floats on water (this is the boat, but you can make it whatever shape you like!)
2. Fill the tray with water
3. Place the boat on the water at one end of the tray
4. Dip the matchstick (or cocktail stick) into the washing-up liquid
5. Dip the soapy end of the matchstick into the water behind the back of the boat
6. The boat should be pulled away from the point where you add the washing-up liquid

How fast can your boat go? Try racing boats!

The effect will stop working after a few goes. When this happens, change the water in the tray

You will need:

- *A plastic bottle*
- *Scissors*
- *Shallow baking tray or similar*
- *Cold water*
- *Matchstick or cocktail stick*
- *Washing-up liquid*

Make your own SLIME

Subject:	Chemistry
Age Range:	5+ years
Difficulty:	★★★☆☆
Messiness:	Risk of sticky spills
How long will it take?	1 hour

What's this all about?

PVA (a chemical found in glue) is made up of long, spaghetti-like strands called 'polymers'. PVA polymers are surrounded by water and so can slide past one another with ease.

BUT you can change the structure of PVA by adding boric acid (a chemical found in contact lens solution). This causes a chemical reaction, which forms bridges between the PVA polymer strands, preventing them from sliding past each other so easily. This makes the mixture stiffer. The more boric acid that is mixed in, the stiffer it becomes.

If you get the proportions right, you can make the perfect slime! The possibilities are endless... Slime = awesome. You can shape it. You can make bracelets from it.
Maybe even make a skipping rope with it? Why not show us your creations using the hashtags **#LYNXLife #HomeScience #HavasHomeSchool**

You will need:

- PVA glue
- Bicarbonate of soda
- Contact lens solution
- Food colouring
- Large mixing bowl
- Spoon

INSTRUCTIONS:

1. Tip about 200ml of PVA glue into a large mixing bowl
2. Add a few drops of food colouring and stir well
3. Gradually add one tablespoon of contact lens solution while stirring. You may not need all the contact lens solution, so add slowly and stop when the slime starts to thicken
4. Keep mixing until the mixture starts to come away from the edges of the bowl, then turn out onto a clean work surface and knead until it reaches a slimy consistency

Notice how the mixture starts to feel different as the contact lens solution is added?

Remember: Once you're done, wash the surfaces well and put the slime safely in the bin!

Do you want to build a snowman?

Subject:	Chemistry
Age Range:	5+ years
Difficulty:	★
Messiness:	Risk of spills
How long will it take?	1 hour

What's this all about?

Chemical reactions can be 'exothermic' which means they give off energy into the surroundings (an example of this is fire!). Chemical reactions can also be 'endothermic' which means they take in energy (and decrease the temperature) of the surroundings. An example of this is the reaction shown below between bicarbonate of soda and shaving foam – which forms a chilly snowy powder.

This whole isolation thing feels like Christmas holidays anyway...

Why not pop FROZEN on TV and have a snowman building competition?

You will need:

- Bicarbonate of soda
- Shaving foam
- Mixing bowl

INSTRUCTIONS:

1. Mix the bicarbonate of soda and shaving foam together in a mixing bowl until you get a powdery consistency
2. Feel the temperature of the powder - does it feel cold?
3. Can you make any shapes with the snow?

The reaction between bicarbonate of soda and shaving foam should feel cold - this is an 'endothermic' reaction in action!

Subject: Physics

Age Range: 12+ years

Difficulty: ★★★★★

Messiness: Lots of materials required

How long will it take? 1 hour

MAKE YOUR OWN MAGNET

What's this all about?

Electromagnets are only magnetic when electricity is passed through them. They rely on the movement of charged particles (in this case, electrons) to create a magnetic field. Create your own electromagnet with this experiment! Pretty please don't electrocute yourselves though... parents I'm talking to you too...

You will need:

- About 1 meter of insulated wire (you can get this from an unused power cable or phone charger)
- Scissors
- Stainless steel dessert spoon or fork
- Tape
- Battery (size AA, AAA or C will work)
- Paperclips (or drawing pins)

REQUIRES ADULT SUPERVISION

This is especially true if your name is Tapas

INSTRUCTIONS:

1. Strip about 2cm of the insulation off both ends of the wire using scissors
2. Twist each uninsulated end of the wire firmly to bring together any loose fine wires, making a thick braid of wire. Fold this in half and twist it into a flat loop at each end (this will make it easier to get a good contact with the battery terminals)
3. Starting about 10cm from one end of the wire, coil the wire tightly around the handle of your spoon or fork. Do not overlap the coils, and leave about 10cm of uncoiled wire at the other end . This one's quite tricky, so if you need help, click **here** to see a handy video of the experiment done with a nail instead of a spoon
4. Wrap sticky tape around the coils of wire to hold them in place
5. Using the thumb and finger of one hand, press each end of the wire against opposite ends of the battery
6. Using your other hand, hold the spoon or fork and use it to magnetically pick up paperclips or drawing pins

You've successfully made your electromagnet - you can use the spoon or fork to pick up the paperclips!

This means electricity from the battery has turned the spoon or fork into a magnet!

Floating rice in a bottle

Subject: Physics

Age Range: 6+ years

Difficulty: ★☆☆☆☆

Messiness: Risk of rice spills – get the hoover ready!

How long will it take? 1 hour

What's this all about?

Want to feel like a magician? This experiment is for you!

It's all about friction, which is a force of resistance between two objects when they move past each other.

When you pour rice into a bottle, it will arrange itself with lots of gaps. When you insert a pencil, you push the rice down making it more compact or 'dense'. The more you do this, the greater the surface area of rice that comes into contact with the pencil. This gives a greater force of friction. The force can become so strong that it doesn't let the pencil slip past, and so the rice-filled bottle moves with the pencil as you lift it!

FUN FACT

Friction is also how quicksand traps things!

You will need:

- *Empty water bottle*
- *Uncooked rice*
- *Piece of paper*
- *Pencil*

INSTRUCTIONS:

1. Take the lid off the water bottle and fill it with the rice (use a piece of paper as a funnel to stop the rice going everywhere)
2. Push the pencil halfway into the bottle and take it back out again
3. Push it back and take it back out. Repeat this about 10 times
4. Eventually, when you pull the pencil to take it out, the bottle will lift up with it. This is friction preventing the pencil from escaping!

Don't miss the next exciting instalment!

We'll be entertaining tricky teenagers by showing you how to embarrass them senseless on TikTok with your best science songs, converting a standard family car to run on food waste, plus a collectable pull-out 'How to make an Indiana Jones style trap for your garden or flat'...

Well, maybe...