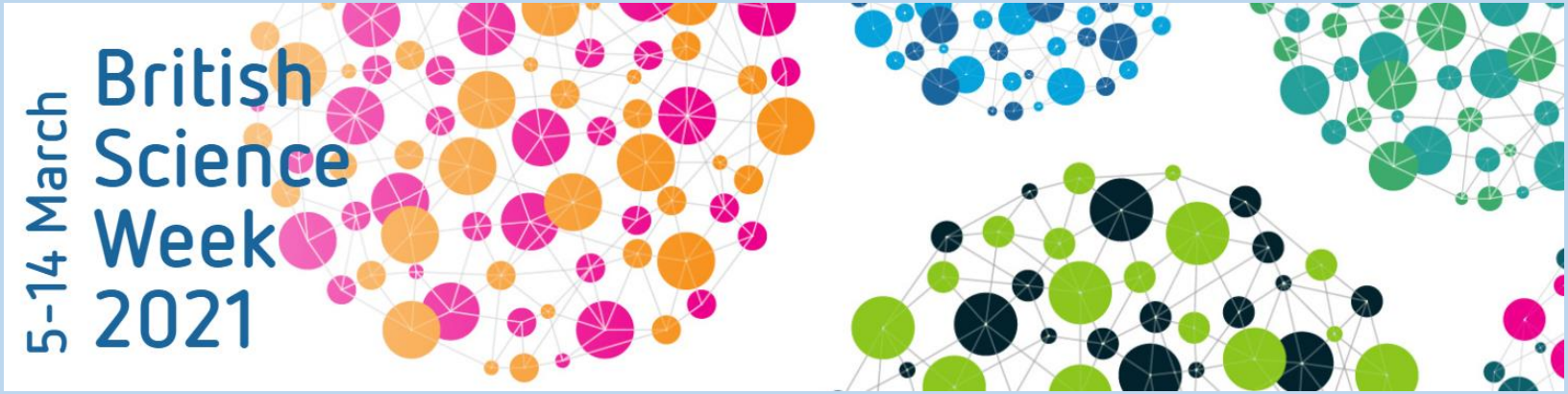
Science at Home



Science @ St Christopher's

British Science Week

04 March 2021

Big Question for today:

How can you carry out some science experiments at home?

Science @ St Christopher's

If you have finished all the other activities you have been set, why not try some of these science experiments?

ALWAYS COMPLETE THESE ACTIVITIES WITH A RESPONSIBLE ADULT.

We would **LOVE** for you to take some pictures/videos of your investigations and send them to us.

Bonus points if you can explain the science behind your experiments!

Experiment 1: Skittles Chromatography

Method

Step 1: Place your skittles onto your plate, around the edges to begin with. Try alternating the colours or making a pattern. (You could explore with different patterns and also double rows of skittles!)

Step 2: Slowly and carefully pour water (or whatever safe liquid an adult has allowed you to use) onto the plate.

Step 3: Observe what happens!

Step 4: Watch this short YouTube video for inspiration! https://www.youtube.com/watch?v=IStmGui33vk&feature=emb_title

Step 5: Experiment with different liquids and different starting patterns for the skittles. Maybe you could try this with a different sweet altogether and see what happens!

Step 6: Send your science teacher a photo or video of your discoveries!

You will need:

- Skittles
- A white plate
- Water
- Any safe to use liquids that you wish to investigate (lemonade, white vinegar, milk)

Don't eat the Skittles after – get some fresh ones ☺

The Science

Skittles are coated in food colouring and sugar. When you pour water over the skittles the coloured coating dissolves spreading through the water by diffusion.

The colour and sugar dissolve into the water and then **diffuse** through the water, making it the colour of the skittle.

Can you give the full definition of diffusion and link it to what you have learnt about whilst in school?

Questions to think about….

Why do you think the colours don't mix?

Can you find the 's' from the skittles? What happens to it?

How could you speed up the reaction?

Can you time how long the colours take to reach the centre of the plate using cold and then warm water? Which do you think will be faster?

Can you find any other sweets which behave in the same/similar way?

Skittles Chromatography

Experiment 2- Exploring Density

Method

Step 1: Place the orange into a glass of water and record whether or not it sinks or floats.

Step 2: Try peeling the orange and doing this again! Does this change whether or not the orange can float?

Step 3: If you have other fruits at home you could try investigating whether or not they have the same effect.

You will need:

- Orange
- Glass of water
- Other fruits

The Science

An orange with a peel is heavier than an orange without a peel. So why does the orange with the peel (the heavier one) float and the orange with the peel (the lighter one) sink?
The secret to this experiment is density! **Density** is a measure of the mass per unit volume of a substance. Water has a density of 1 g/mL (g/cm3). Objects will float in water if their density is less than 1 g/mL. Objects will sink in water if their density is greater than 1 g/mL.

The orange with the peel floats because the peel is porous and filled with tiny air pockets. These pockets of air help increase the **buoyancy** of the orange. This increase in buoyancy helps the orange become less dense than the water, so the orange will float in the water. Think of the pockets of air in the orange peel are like tiny floatation devices for the orange. On the other hand, when you remove the peel from the orange, you are in fact making it lighter, but you are also removing those tiny air pocket floatation devices. Therefore, the orange without the peel is denser than water and it sinks.

Experiment 3 – Blast Off

Method

1. Attach three straws or sticks around the bottle with tape so it can stand, with the help of step 2.
2. Find three straws or something larger than the sticks to make as a stand for the 'rocket', this should be outside.
3. Add around 100ml of vinegar (look on the side of the bottle)
4. THIS HAPPENS QUICKLY Add a table spoon of bicarbonate and quickly add you cork and place the rocket in the holder and STAND BACK
5. Can you change any variables and explore what happens when you do so? E.g., does white vinegar work the same as malt vinegar? What happens if you add 2 tablespoons of bicarb? What about if you used lemon juice instead of vinegar? You could try and predict what you think will happen first!

You will need:

- Drinking straws (try reusing some if you can)
- Sticky tape
- 500ml empty plastic bottle
- Cork to fit the bottle
- Kitchen roll
- 1 tablespoon of bicarbonate of soda
- Vinegar
- LOTS OF SPACE
- Responsible adult

Acknowledgement
file:///C:/Users/11506head/Downloads/Science_Fun_at_Home_13_Rocket_Science.pdf

The Science

3 WHAT IS THE SCIENCE?

A chemical reaction takes place between the vinegar and bicarbonate of soda which produces a gas called carbon dioxide. This builds up inside the plastic bottle. When the pressure of the gas in the bottle is high enough the cork is forced out. The downward force of escaping gas causes an upward force on the bottle, making it shoot up into the air. This is an example of Newton's Third Law of Motion: **for every action there is an equal and opposite reaction.** The balloon rocket works on the same principle. The air rushing out of the balloon (the action) causes the balloon to move forward (the reaction).

Experiment 4 – Lava Lamps

Method

Step 1: Fill the bottle most of the way with vegetable oil.

Step 2: Fill the rest of the flask with water. ...

Step 3: Add a few drops of food colouring; your choice of colour.

Step 4: Break an Alka-Seltzer tablet/ vitamin tablet into a few small pieces, and drop them in the flask one at a time.

Step 5: Watch your lava lamp erupt into activity! For added effect turn the lights off and place the bottle on top of a mobile phone (only with an adult).

You will need:

- Clear bottle or drinking glass
- Vegetable oil
- Fizzy vitamin tablet or Alka Seltzer tablet
- Food colouring
- Water
- Mobile phone with flash light or torch

The Science

The oil floats on top of the water because it is less dense or lighter than water. The food colouring has the same density as the water so it sink through the oil and mixes with the water. When you add the tablet it sinks to the bottom then starts to dissolve. As it dissolves it makes gas, carbon dioxide. Gas or air, is lighter than water so it floats to the top. The air bubbles bring some coloured water with them to the top. When the air comes out of the coloured water blob, the water gets heavy again and sinks. It does this over and over again until the tablet is completely dissolved.

What happens if you put the cap on after dropping the fizzy tablet in?

What if you drop a whole tablet in? When it stops bubbling, try sprinkling some salt into your lava lamp. What happens?

Experiment 5 – Grow a Rainbow

Method

Step 1: Fold over a piece of paper towel (so you have 2 pieces on top of each other). Trim the length to be 7.5 inches (any longer and the rainbow may not connect fully).

Step 2: Draw rectangles of the rainbow colours on each end. See the diagram below to help.

Step 3: Place 2 cups of water filled ¾ full. Then place the paper towel into the 2 cups with one end in each.

Step 4: Watch the marker dye slowly make its way up with the water to meet the other side in the centre of the paper towel.

You will need:

- Kitchen roll
- 2 mugs/drinking glasses
- Felt tip pens
- Water


The Science

This science experiment is a great example of chromatography. Chromatography is a way of separating out a mixture of chemicals.
Because the felt tip pens are washable they dissolve into the solvent (in this case the water) and they move up the paper towel with the water.

Could you investigate how different factors affect how quickly the dye moves up the paper towel?

Experiment 6 – Making a Rocket

Method

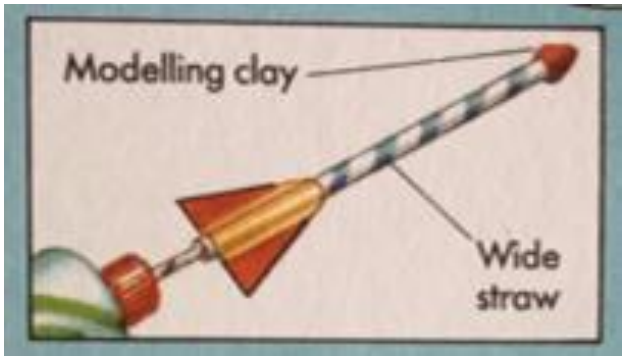
Step 1: Make a hole in the cap of the bottle (get an adult to help with this). Push the smaller straw through and seal the whole with modelling clay/plasticine. This makes the launch pad.

Step 2: Making the rocket. Cut about 10cm off the larger straw. Decorate one end with paper triangles and make a 'nose' for the other end with modelling clay/plasticine.

Step 3: Slide the rocket over the launch pad. Squeeze the plastic bottle firmly and watch the compressed air in the bottle push the rocket into the air.

You will need:

- Soft plastic bottle
- 2 plastic straws (one narrower than the other)
- Modelling clay/blue tac/plasticine
- Glue



The Science

If you pump up your tyre, it begins to fill with air. As you keep pumping, you force in more air. Inside the tyre the air pressure rises, as the air is compressed.

The gas pressure increases as the particles inside the tyre are colliding with the rubber surface of the tyre.

Try compressing some air, so increasing the gas pressure and launching the mini rocket 🚀.

Could you investigate how the length of the straw affects how far the rocket travels? Or how the level of compression on the bottom affects how far your rocket travels?

Experiment 7 – Popping Rockets

You will need:

- Empty film canister (ask your parents if they remember these!) or fizzy vitamin tablets
- Alka-Seltzer tablet
- Ask grandparents for steridient tablets
- Teaspoon
- Water
- Responsible adult

Don't stand over the rocket whilst you are waiting!

The Science

The Alka-Seltzer tablet reacts with the water and produces a gas called carbon dioxide. Pressure builds up in the cannister as more gas is released and the lid is eventually forced off.

Sir Isaac Newton's third law of motion states 'for every action there is an equal and opposite reaction'.

This activity demonstrates this nicely – the lid pushes down against the surface and the cannister pushes upwards in the opposite direction shooting off into the sky.

Questions to investigate

What happens when Alka-Seltzer is added to water in a glass?

Will the temperature of the water affect the reaction time?

How high can you get your rocket to go?

The Science

- Who was Sir Isaac Newton?
  Sir Isaac Newton (1642–1727) was an English scientist.

  He admired a scientist who died shortly before he was born called Galileo Galilei. He believed (like Galileo) that the world was similar to a machine and that a few mathematical laws could explain how it worked.

  Newton is famous for discovering the theory of gravity after watching an apple fall in an orchard (it never really fell on his head!).

- Create your own rocket covering. Be as creative as you like.
- Can you go bigger?
- What else can be used instead of a film canister?
- Measure how far the rocket goes. This will require additional materials:
  empty paper towel roll (the cardboard tube) or a similar size plastic tube, plus duct tape.

  Seal the end of the cardboard tube with several pieces of duct tape or use a plastic tube with one end sealed. Prepare the Alka-Seltzer rocket as normal, but instead of placing the rocket down on the table, slide it (lid first) down the tube. Point the open end of the tube away from yourself and others and wait for the pop. You can now measure how far the rocket went across the room.

- Real rockets behave in the same way; they just use a different fuel (oxygen and hydrogen).
- When swimming breaststroke you push the water backwards and you go forwards in the opposite direction with just as much force.

Experiment 8 – Flushed away

You will need:

- Clear water bottle.
- A couple of sheets of toilet roll
- A sheet of kitchen roll
- Baby wipe
- Water

Method

Step 1: Fill the water bottle ¾ full of water.

Step 2: Cut the kitchen roll and baby wipe to the same size as the toilet roll sheet.

Step 3: Add the toilet roll sheet only, replace the lid and time how long it takes to disintegrate. Shake as hard as you can. Record the time.

Step 4: Repeat with kitchen roll and baby wipe.

Don't you'll need a strong arm for this!

Option 9 On line research

Using Switch Energy Alliance https://switchon.org/

Use the class token, Year 7; 0imgSc

Year 8; pwS7A5 *register with your school email.*

The first assignment link

https://classroom.switchon.org/assignment/13921/introduction-to-energy/1/1

Your teachers can see your progress, so don't worry about showing evidence for this one.

Option 10 On line talks

AimHi is the nature-first curiosity—powered live interactive online school on a mission to make world-class live learning accessible to everyone.

Pick a ten/ 15 minute lesson from these past streams.

https://www.aimhi.co/paststreams

We recommend Dr Jane Goodall, a personal friend of our school.

Write down some facts and think about what they say.

You could try this…

Tuesday 9th March, 7pm ***What should we do about space junk?***

free event: https://www.eventbrite.co.uk/e/aimhis-march-learning-adventures-tickets-142759187573?aff=erelexpmlt

Option 11 On line Ideas

https://www.sciencefun.org/kidszone/experiments/

https://www.noguiltmom.com/very-simple-science-experiments/

https://fun-science.org.uk/top-5-science-activities-home/

- Download iNaturalist on your phone (with permission, of course)

Explore your garden, park or our school grounds and ID what they find. iNaturalist is a great example of citizen science and LERN (Lancashire Environmental Records Network) which uses iNaturalist records to add to its database.

- Virtual tour of the Natural history display at the Liverpool Museum https://www.liverpoolmuseums.org.uk/dinosaurs-and-natural-world-virtual-tour

- Chester Zoo's youtube channel https://www.youtube.com/user/OfficialChesterZoo

has loads of wildlife talks from their Friday live events. The red pandas are particularly cute!

Future Option 12 Science Talks: *Inspiring young minds*

Have you seen the climate talks by the Science and Industry Museum ?

There's a fantastic one the Tuesday after Science Week about climate change from space. The panel is made up of 5 STEM experts (including 3 women!) including astronauts Tim Peake and Helen Sharman. Here's the link...

https://www.scienceandindustrymuseum.org.uk/whats-on/climate-change-the-view-from-space

A four week course with a £10 discount The AimHi climate course is a live, interactive 4-part course. The link to the eventbrite page is here: https://www.eventbrite.co.uk/e/understand-the-climate-crisis-and-how-to-make-a-difference-tickets-139635530631

promo code: AimHiFriend (£15)

Lesson 1 - Carbon, tipping points and our simplest solutions. (45 mins)

Lesson 2 - Nature, soil and the future of food. (60 mins)

Lesson 3 - Population, pollution and finding a balance. (60 mins)

Lesson 4 - How do we fix this? Making the impossible possible. (75 mins)

One for all the family

We have a free link for this week for St Christopher's for you to enjoy at home.

The 2040 journey began with award-winning director Damon Gameau (That Sugar Film). Motivated by concerns about the planet his 4-year-old daughter would inherit, Damon embarked on a global journey to meet innovators leading the way to a better future. In 2040, Damon speaks to change-makers in the areas of economics, technology, civil society, agriculture, education and sustainability.

2040 is a story of hope that looks at the very real possibility that humanity could reverse global warming and improve the lives of every living thing in the process. It is a positive vision of what 'could be', that will give our students hope for the future.

The link to the film

Link: https://screeners.cinesend.com/view/60401e1d51e812494a74baf5

Password: 2040SOLARSCHOOLS

The Future

We hope you have enjoyed your science day and hope to continue to ask questions, explore and work towards a better future for us all.