A VIRTUAL SCIENCE2LIFE EXPERIENCE

An interactive event designed by Science2Life to encourage children to:

- discover the amazing world of science and engineering
- perform engaging activities that show how science is at work in their everyday lives.

"Effect change, achieve results and make science fun!"

Susan Carvell BSc Hons PGCE CEd DASE MEd FInstP

Susan Carvell, fondly known as 'Scientific Sue,' is an energetic and inventive science communicator whose expertise and passion bring science2Life for audiences around the world. A graduate of Queen's University Belfast with a degree in Physics and Applied Mathematics, Sue initially spent a decade teaching Physics, Chemistry, and Drama, where her flair for engaging storytelling began to shine. She went on to become Senior Manager for Educational Programmes on the start-up team of Northern Ireland's now-iconic science centre, whowhatwherewhenwhy W5.

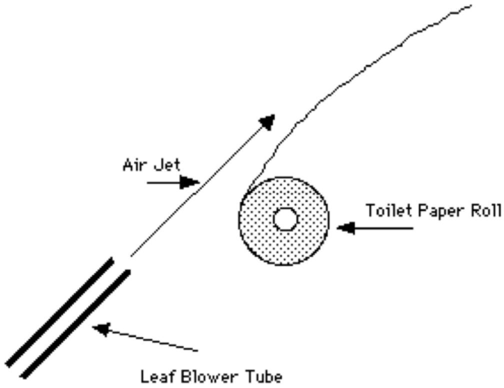
As the founding director of Science2Life, Sue has created a platform dedicated to sharing STEAM (science, technology, engineering, art, and mathematics) in a way that is accessible, entertaining, and always packed with excitement. Combining her science expertise with her background in drama and a keen commercial acumen, she develops interactive educational experiences that have captivated students, families, and teachers in Ireland, Great Britain, Switzerland, Lebanon, Nigeria, Qatar, the Kingdom of Saudi Arabia, and the UAE.

A published author and Fellow of the Institute of Physics, Sue's work has reached beyond the stage and classroom. She has contributed to leading science publications such as *Science Spin* and *Physics Education* (where she served on the editorial board) and has had extensive television exposure across Ireland.

Through every medium, her mission is clear: **"Effect change, achieve results and make science fun!"**

In 2015, Sue set a Guinness World Record for the largest practical science lesson, joining forces with the Royal Society of Chemistry and the Northern Ireland Science Festival to inspire over 1,300 students. A passionate reader, Sue draws inspiration from books to make science thrilling and relatable. Her *Science of Dragons* show, inspired by *How to Train Your Dragon*, delves into the captivating science behind dragon fire, unique abilities, fire types, and the inventive engineering feats of young Vikings. Get ready for an unforgettable experience as Sue unveils how Cressida Cowell might just be more than a brilliant author—perhaps a 'secret scientist' as well!

Flying Toilet Roll



Nuts & Bolts

- Leaf blower (or hair dryer)
- Paint roller (or broom handle)
- Toilet roll
- Beach Ball (optional)

Secrets for Success

Push the toilet roll on to the paint roller (or stick); have one person hold the roller.

Allow another volunteer to hold the leaf blower, get them to hold it so that one hand (their strongest) holds the handle and the other places a hand underneath the airflow nozzle (see photo above). Switch on the leaf blower.

Place the toilet roll in to the stream of air, allowing the air to flow over the top of the toilet roll and watch the paper take off!

Experiment a bit with the right angle and distance from the paper to get the maximum elevation and speed of the toilet paper.

Now try placing a beach ball in the stream of air.

Science in a Nutshell

Bernoulli's Principle shows us that when air moves faster, it creates lower pressure compared to slower-moving air. You can see this in action with an airplane wing or a floating beach ball in an airstream.
Here's how it works with airplanes: the shape of the wing makes air travel faster over the top than underneath. When air moves quickly, its molecules spread out more, so there's less pressure pushing on the wing from above. The slower air underneath the wing has more pressure because its molecules are closer together. This difference in pressure creates lift, which is what helps the airplane rise into the air.

It's similar with a floating beach ball in a stream of air— the fast-moving air on either side of the ball creates a low-pressure area that keeps the ball stable in the airstream.

Stormfly's Spectrum

The Science Behind Colour and Camouflage

What you have:

- Dried Red Cabbage
- pH Colour Chart
- Citric Acid
- Baking Soda

What you need:

- 500 ml Warm Water
- 500 ml Jug
- 2 Clear Beakers
- 2 Stirrers
- 2 small sauce pots (optional)
- Measuring Spoons
- Safety Glasses x 2

You may also wish to gather:

- Washing soda
- Lemon juice
- Toothpaste
- Vinegar
- Ammonia
- Baking powder
- Cucumber

SAFETY:

Safety glasses to be worn by volunteers when mixing the 2 solutions together to prevent any splashes going into their eyes.

None of the chemicals are for human consumption.

If any splashes land on your volunteer's hands, make sure they wash their hands thoroughly after the demonstration.

Nuts & Bolts

Divide most of the 500 ml of cabbage juice between two smaller beakers, leaving about 1 cm of juice in the larger beaker – this will be used in Activity 3.

Adding citric acid to the purple juice will turn it red—what mood might this colour represent?

When baking soda is added to the cabbage juice, it turns blue—what mood might this colour represent?

Secrets for Success

For fresh cabbage:

- Chop up the red cabbage, place it in a saucepan
- Add enough water to cover it.
- Bring the water to the boil, and simmer for about 15 minutes.
- Pour the water through a sieve. This purple water is your indicator dye – store in a clear plastic drinks bottle.

Can't find purple cabbages in the shops? You will find it in our online store!

Science in a Nutshell

Red Cabbage (Brassica Oleracea L.) Powder

Whether or not you like to eat red cabbage, you are going to love experimenting with it. This dried cabbage powder will allow you to make your own **red cabbage pH indicator**.

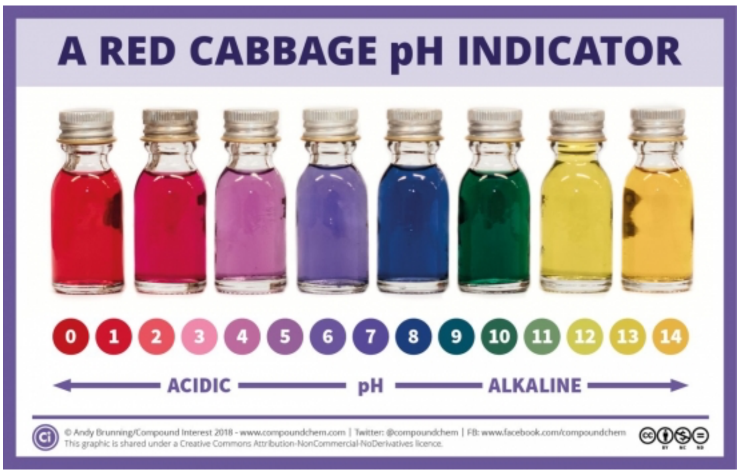
Making a red cabbage indicator is a fantastic STEAM activity to introduce children to acid/base chemistry.

What is red cabbage?

Red cabbage is a cruciferous vegetable of firmly packed dark red-purple leaves. It belongs to the brassica group of vegetables along with Brussels sprouts and kale, and has a peppery taste and crunch when eaten raw, and becomes sweeter and softer in texture when cooked.

The purple colour in the red cabbage comes from a class of pigments called anthocyanins; this pigment is also found in the skin of red apples, grapes, plums and is the pigment in leaves which turn red in the autumn.

Red cabbage has a good mix of vitamins and minerals, especially *folate*, which is essential during pregnancy and also helps the body to *produce red blood cells*. It also contains *vitamin C*, which helps protect our cells by *acting as an antioxidant*, and *potassium*, which we need for a *healthy heart*.



A *2019 study* indicates growing evidence that anthocyanins play a positive role in cardiovascular health and that those who eat foods with anthocyanins have a lower risk of heart attacks and heart disease-related death.

Activity 3: Science Showdown

Neutralising a Changewing's Acidic Spit

What you have:

- Dried Cabbage Power 10g
- pH Colour Card
- Baking Soda 125g
- Citric Acid 125g

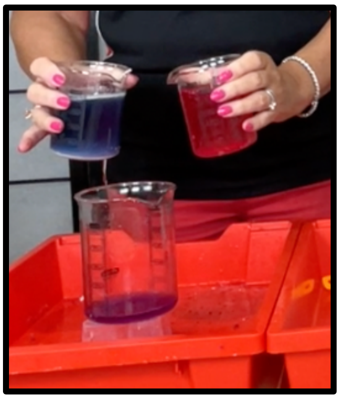
What you need:

- 500 ml Jug/Beaker with a small amount of cabbage juice from Activity 2
- 2 smaller Jugs/Beakers from Activity 2
- Safety Glasses
- Splash tray

SAFETY:

Safety glasses are to be worn to prevent any splashes in the eyes.

Hands must be washed after handling chemicals



Nuts & Bolts

Set up the demonstration by placing the 500 ml beaker with a small amount of purple cabbage juice (from activity 2) in the center of the splash tray. Position this beaker on top of another beaker or cup to raise it, ensuring everyone in the class can see clearly. The purple colour indicates a pH of 7, or a neutral solution.

Now, invite your Viking volunteer to take the two beakers from Activity 2—one with the red acidic solution and the other with the blue alkaline solution—and slowly pour both into the raised beaker with the cabbage juice.

As the solutions mix, the colour will shift back to purple, indicating neutralisation. But be ready for a show! The reaction will release plenty of gas, causing the mixture to bubble vigorously and overflow the beaker!

Secrets for Success

The word acid comes from a Latin word meaning sharp or biting to the taste. You would have experienced this sensation if you have ever sucked a lemon!

When the vinegar (ethanoic acid) or citric acid is mixed with the baking soda (sodium hydrogen carbonate) a chemical reaction takes place. Lots of carbon dioxide bubbles are formed in a very short period of time.

This experiment is an example of a reaction between an acid and a base. Such reactions typically form a “salt” and water.

ACID + BASE → SALT + WATER

If using vinegar, the acid component in this experiment is ethanoic acid, it allows the production of one of the products to be sodium ethanoate. That is the stuff referred to as the “salt.” In this experiment, the base has a **carbonate component; hence carbon dioxide is also formed.**

Acids and Alkalis in Nature

Wasp sting venom is alkaline and so its effects can be neutralized with vinegar or another weak acid and this neutralisation then reduces the pain.

Bee sting venom is acidic and so its effects can be neutralized with bicarbonate of soda or another weak base or alkali solution and this reaction also reduces the pain.

One unusual wasp repellent is sliced cucumber! This vegetable has a chemical property which wasps just don’t like. Use your purple cabbage to juice to find out what it is!

Wasps naturally prey on other animals. They feed insects and other arthropods to their young, which develop in the nest. They are beneficial because they prey on caterpillars, flies, crickets and other insects which are considered to be pests.

During late summer and autumn, as queen wasps stop laying eggs and their nests decline, wasps change their food gathering priorities and are more interested in collecting sweets and other carbohydrates. Some wasps may become aggressive scavengers around human food and are commonly found around outdoor activities where food or drinks are served.

Bees feed only on nectar (carbohydrates) and pollen (protein) from flowers. Honey bees sometimes visit rubbish bins and soft-drink containers to feed on sugary foods.

Activity Sheet Name: ____________________________

Neutralisation Date: _____________________________

In the 'Science of Dragon Show' Scientific Sue used the juice from purple cabbages to produce the colours: Yellow, Green, Blue, Purple, Pink/Red

Can you remember why purple cabbages are labelled as RED cabbages in the shops?

Bee and wasp stings can be both painful and itchy, but with a little chemistry know-how, we can neutralise the toxins from these stings. Wasp toxins are generally alkaline, so an acid, like vinegar, should be applied to neutralise them and relieve the pain. Bee stings, however, contain acidic toxins, so an alkaline solution should be used to neutralise them. Baking soda mixed with cold water is typically the most effective way to create an alkaline solution.

Chemical	**Colour change with purple cabbage juice**	**Acid**	**Alkaline**
Vinegar	**Red**	**Yes**	**No**
Bicarbonate of Soda	**Blue/Green**	**No**	**Yes**
Honey			
Toothpaste			
Lemon			
Onion			
Cucumber			

Whole Class Activities:

1 Make your own pH paper

Soak filter paper (or coffee filters) in a concentrated solution of red cabbage juice. After a few hours remove the paper and allow it to dry. Cut the filter into strips and use them to test the pH of a selection of solutions made from, for example, fruit and vegetable juices, toothpaste, Alka-Seltzer tablets, vitamin C tablets, surface cleaners and soap.

2 Invisible writing

Mix equal parts of water and baking soda and, using a cotton bud or paint brush, write a message or draw a diagram onto a sheet of white paper using the baking soda solution as ink. Allow the message to dry.

Pour some of your concentrated red cabbage solution into a small spray bottle (obtainable from a garden centre). Spray this solution over the message. The message will appear in a different colour.

Visit these websites:

http://www.halton.gov.uk/schintranet/science/Gases.pdf
This site gives you four investigations including teachers notes and worksheets.
http://www.echalk.co.uk/Science/chemistry/universalIndicator/universalIndicator.html
This resource helps pupils learn the pH of different household products. Pupils use a universal indictor and colour chart in order to estimate the pH of different solutions. (Macromedia flash).
http://www.4to40.com/activities/artcraft/index.asp?article=activities_artcraft_vinegarvolcano

Everything is made of chemicals. And all chemicals are made of tiny particles called atoms. During a chemical reaction, one group of atoms are shuffled and taken a part, they get mixed with the other atoms to form a different group and make a new chemical. Similarly, when Vinegar is mixed with Bicarbonate of soda (baking soda) one of the new chemicals formed is a gas. The bubbles of this gas can be made to make a volcano fizz.

Unmask the Gas

Discovering a New Dragon Firetype!

What you have:

- Citric Acid
- Baking Soda
- Candle

What you need:

- Vinegar – optional
- Clear glass beaker to place the candle into – optional
- 100 ml Water if using citric acid
- Funnel
- Safety Glasses
- 500 ml Bottle
- Balloon
- Lighter or matches
- Tongs to hold the inflated balloon with
- 2 Spoons

SAFETY:

Safety glasses must be worn.

Hands must be washed after handling chemicals

When lighting the match strike away from your body. Store matches out of sight and reach from children

When the candle is lit avoid drafts, vents or air currents. Never leave the burning candle unattended.

Nuts & Bolts

- Baking soda – Chemical name sodium hydrogen carbonate (bicarbonate of soda) with formula $NaHCO_3$
- Citric acid with formula $C_6H_8O_7$
- Vinegar – a dilute solution of ethanoic acid in water with the formula CH_3COOH

Secrets for Success

- Using the funnel add 1 tablespoonful of baking soda to the balloon.
- Add 1/2 tablespoon of citric acid to 100 ml of warm water.
- Slowly add the water and citric acid solution to the 500 ml bottle.
- Carefully stretch the opening of the balloon over the mouth of the bottle without allowing any of the powder to enter the bottle.
- Hand this bottle back to the volunteer – they will be asked by Sue to gently lift the balloon holding the powder up – allowing the powder to drop on to the liquid in the bottle.
- At this stage lots of carbon dioxide gas will be made and the balloon will inflate – much to the joy of the class.

- The bottle will be handed back to you for you to remove the balloon and tie it off.

- Hand the balloon back to the volunteer – they are to hold it using the tongs (or a peg secured to a stick)
- You will then be asked to light the candle.
- The volunteer will then lower the balloon onto the flame – the balloon will burst but will not burst into flames! The volunteer will then be asked to go back to their seat.
- Place the candle into a small glass. This will help prevent any drafts from blowing the gas you will pour over the flame.
- Pour the invisible gas (carbon dioxide) carefully from the bottle over the candle. Pour it as though it were water or some other liquid.

Because carbon dioxide is heavier that air, it will pour out of the vessel and over the candle and extinguish the flame.

Science in a Nutshell

The fancy shorthand symbols used by scientists to represent our reaction are:

CH_3COOH + $NaHCO_3$ → $NaC_2H_3O_2$ +

Ethanoic acid + sodium hydrogen carbonate ***makes*** sodium ethanoate + carbonic acid.
(vinegar) (baking soda)

The $NaC_2H_3O_2$ is the salt called sodium ethanoate. The $NaC_2H_3O_2$ (carbonic acid) then breaks down into water and carbon dioxide:

$NaC_2H_3O_2$ → H_2O + CO_2 This break down is rapid and the balloon expands quickly.

Carbon dioxide is also the gas responsible for the fizz in soft drinks and can be frozen under pressure to make dry ice, which sublimates directly from solid to gas under normal atmospheric pressure. There is a lot of chemistry behind the simple lighting of a flame. In this experiment we are going to relight a fire using an invisible gas called oxygen.

Meet the fire triangle!

The fire triangle, or combustion triangle, is composed of the three ingredients needed to ignite and sustain a fire: Heat, Fuel and Oxygen.

If just one of these components is removed, the fire triangle will collapse and the fire will be extinguished.

Blast Off!

Training Meatlug to Hit the Target

What you have:

- Citric Acid 125g
- Baking Soda 125g
- Tube with Spring Lid

SAFETY:

Ensure the rocket canister is pointed away from people, and keep everyone at a safe distance during the launch process.

If conducting this experiment indoors, promptly clean up any spilled liquid from the floor to prevent slips.

Watch out for low ceilings! The lids launch at high speeds and can bounce off surfaces unexpectedly.

Note: In the lids of these canisters, there is a cardboard disk and under that are little beads – silica gel crystals. Before using these canisters for an experiment, you should remove the cardboard disc and dispose those little beads in to the bin.

What you need:

- Tube of Effervescent tablets
- Pot of extra lids (optional)
- Water
- Target (bin or box)
- Safety glasses
- Protractor (optional)

Nuts & Bolts

As shown in the teaching video, this demonstration works well with the citric acid and baking soda – but the reaction is very fast and your volunteer will need to have the skill set to push the lid on to the tube containing the water and reacting chemicals really fast.

For this reason, I suggest also having effervescent vitamin C tablets as a replacement as the reaction is much slower but still just as explosive!!

Secrets for Success - Try this before you do it with the children.

1/3 fill your canister with water.
Drop your powders or Vitamin C tablet into the water and quickly push on the lid. Hold the tube at

arm's length, ensuring the lid is pointing towards the ceiling.

The bubbles emitted are trapped inside the tube, which unlike the balloon cannot expand; this means that the pressure will build up due to the many molecules of carbon dioxide gas hitting the sides and the lid.

After a short while the pressure becomes so great the frictional forces keeping the lid on are overcome and the gas pressure forces the lid and the canister to separate. The lid will leave at great speed and could travel up to 5 metres.

If the ceiling in your room is very low your young volunteer will have to point it away from themselves, parallel to where the rest of the students are sitting, otherwise the lid will hit the ceiling and could rebound and hit one of the children!

The lid will travel the greatest distance when the tube is held at an angle of 45 degrees.

Once the lid takes off it can be collected and pushed back onto the tube again. The take-off times increase between each take-off, until no more gas is made and the lid will therefore not fly. At this point gently remove the lid, pointing it away from you and discard the liquid contents.

Do not point it horizontally. If this is done, when the lid leaves the tube all of the liquid will pour onto the floor! **See below for ideas on an investigation and a template for turning the tube into a rocket.**

Science in a Nutshell

When the effervescent tablets dissolves in water, a chemical change takes place and carbon dioxide gas is formed, this causes the fizz. These tablets contain sodium hydrogen carbonate – baking soda ($NaHCO_3$), a base, and citric acid ($C_6H_8O_7$), an acid.

In the solid tablet form the acid and base do not react; the atoms and molecules are tightly bound in a crystalline structure and hence cannot react with each other. But when placed in water the tablet dissolves and the chemicals are free to move around; with the result that the sodium bicarbonate reacts with the citric acid and carbon dioxide gas is formed.

$$NaHCO_3\,(aq) + C_6H_8O_7\,(aq) \rightarrow NaC_6H_7O_7\,(aq) + H_2O\,(l) + CO_2\,(g)$$

By using these symbols scientist cut down on a lot of writing time which ultimately gives them more time to experiment, think and solve problems.
By mastering the scientific language, a whole new world is opened up for you to play in – just like learning Spanish will allow you to enjoy the company of the Spanish speaking communities as well as appreciate their culture and history. More books to read, more songs to sing!

So, let's make some carbon dioxide gas.

- If you choose to do this experiment as a class activity – use the hall or go outside.
- Draw up a safety line that the children have to stand behind.
- Children with sensitive skin are advised to wear gloves.

The tablets can be broken into small pieces, or can even be crushed to become a powder, thus the amount of tablet and particle size can be investigated. The volume of water can also be investigated.

In the closed container, the newly formed CO_2 gas mixes with the air that was already in the canister. The pressure inside the container builds up because more and more gas particles are hitting the sides of the container. This pressure acts in all directions and builds up until the force is large enough to separate the canister from its lid. The gas rushes out, making a whoosh sound.

The lids can be propelled up to heights of about 5 m! – The height reached is dependent on how tightly the lid fits the canister.

This experiment can be used to help illustrate Newton's Third Law of Motion. This law states that **for every action there is an equal and opposite reaction**; the 'rocket' travels upwards with a force that is equal and opposite to the downward force of the propelling the water, gas and lid.

The 'rocket' lids lift off because they are acted upon by an unbalanced force (Newton's 'First Law'). This unbalanced force which causes the lid to blow off is due to the increased pressure due to the gas formed in the canister. The amount of force is directly proportional to the mass of water and gas expelled from the canister and how fast it accelerates (Newton's 'Second Law'). Phew… lots of science here!

Fair Test: If you decide to turn this demonstration into an investigation your assistants will need to ensure they understand they can only change one variable at a time.

Before you do the experiment get them to come up with their own ideas on what they need to change to make the reaction speed up or slow down. Some examples could be (these are the variables):

1. amount of tablet (i.e., all, ¾, ½, ¼)
2. volume of water
3. temperature of water
4. container size
5. particle size (large pieces of tablet or powder samples)

To ensure that they all start the experiment at the same time the tablets are attached to the film canister lids with blu-tac, whilst the water is poured into the canister itself. If powder is used, pour the water in to the canister then place a very thin sheet of tissue paper over the open top; carefully add the powder to the tissue paper making sure none drops into the water. Put on the lid to secure the tissue paper in place.

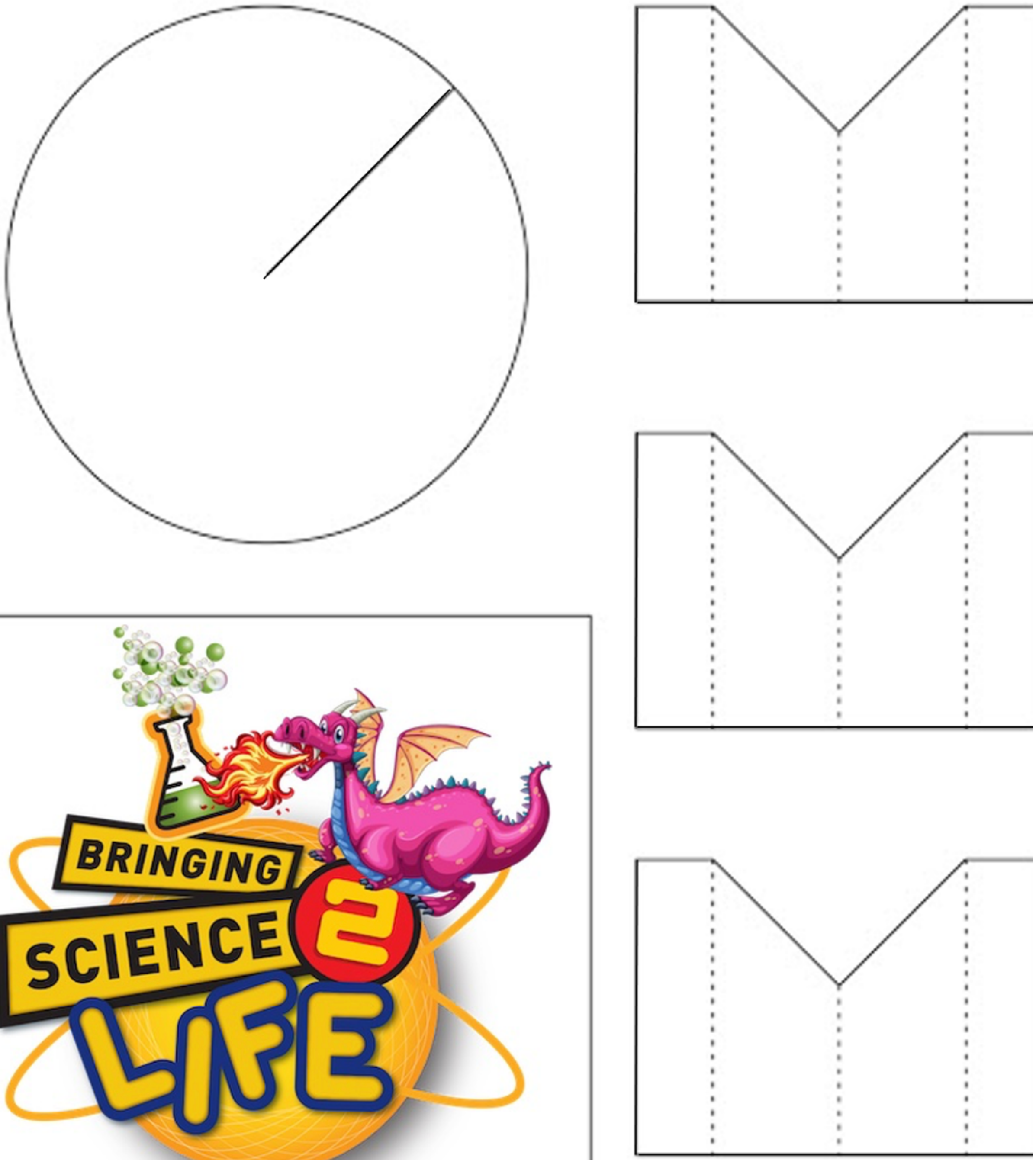
Your young science investigators can work on their own or in small groups. When everyone in the group is ready to start – have one of them do a count down so that they all turn their canisters over at the same time.

Use the template below to design a casing for your canister so that it looks more like a Space Rocket.

3 2 1...Lift off Rocket Template

cut

folc



Train your Dragon

The Science of Balance

What you have:

- 31 x Dragon Templates
- Marker Pen
- 30 x Paper Clips

What you need:

- Scissors
- Colouring and art materials
- Pencil or wooden kebab stick
- 2 coins of the same denomination per child.
- Sellotape

SAFETY:

Care must be taken with scissors

Nuts & Bolts

With the aid of the template train a cardboard Dragon to balance on its nose!

The dragon can be balanced on a pencil tip or wooden kebab stick. Once balanced you can train it to spin by gently blowing it.

The balancing dragons are for the children to keep.

Secrets for Success

1. Cut out the dragon shape. You can colour it in and add decorations if you'd like.
2. Try to balance the dragon on your fingertip. Does it stay? No.
3. Where does it balance? This balancing point, located around the chest area, is called the *centre of mass*.
4. To make the dragon balance on its nose, we need to shift its natural balance point from the chest to the nose by adding weights to the tips of its wings.
5. Suitable weights include paperclips (provided), pennies, or plasticine.
6. The size of the weights needed depends on the thickness of the card you're using. If you need additional templates, you can print one from the teaching notes, glue it to card—such as a cereal box—and cut it out. The number of paperclips required will vary depending on the weight of the card used.
7. Once your dragon is balanced, try blowing it to make it spin.

8. The metal paperclips will be pulled towards a magnet – so you could use the invisible pulling for of a magnet to make it spin also!

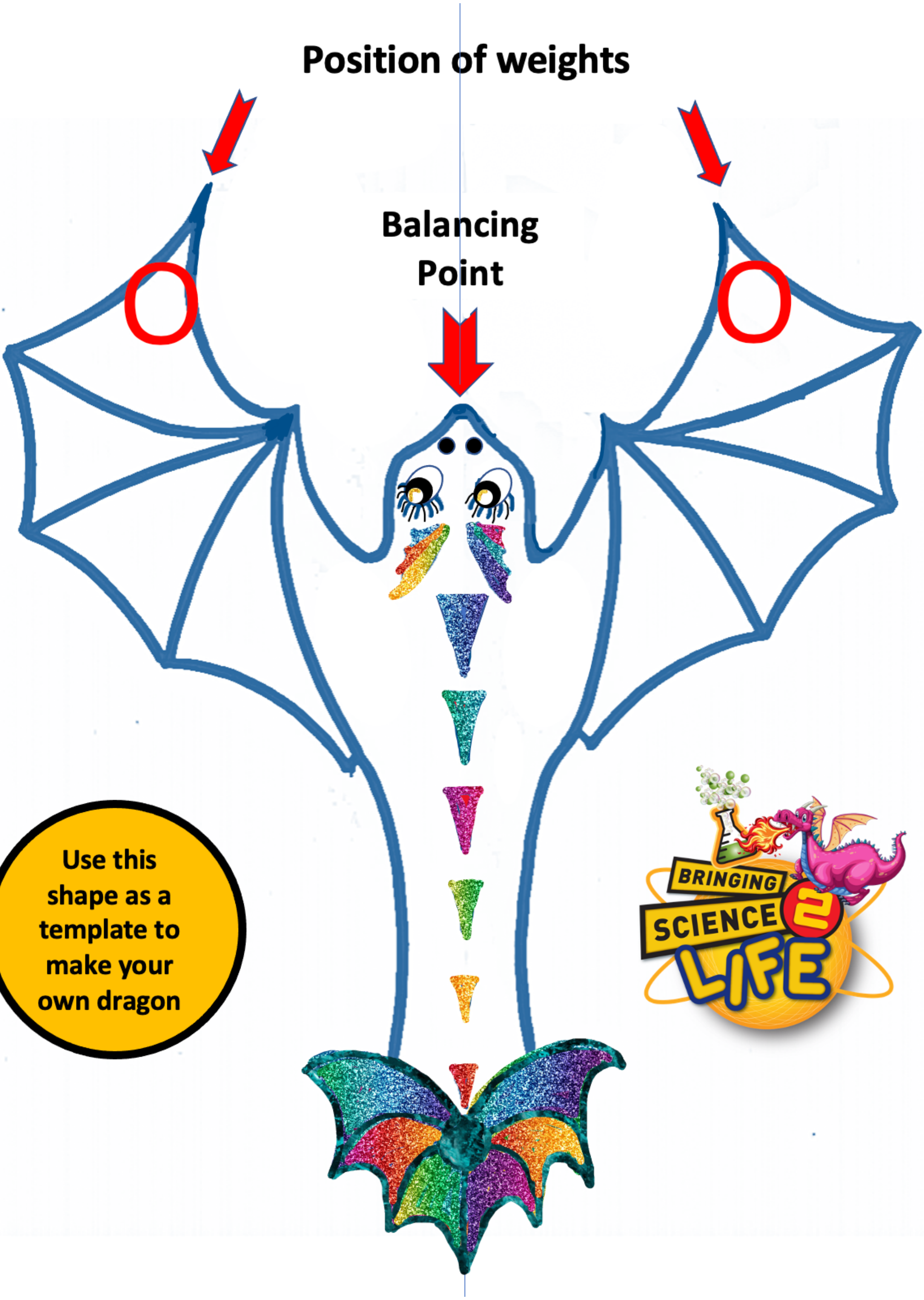
Science in a Nutshell

1. Every object has a balancing point, known as the *centre of mass*. The lower the centre of mass, the more stable the object becomes.
2. The centre of mass is also commonly referred to as the *centre of gravity*.
3. This balancing dragon toy has its centre of gravity located at the tip of its nose. The centre of gravity is a unique point where the weight of the object is perfectly balanced.
4. To position the centre of gravity at the nose, the wings are designed to extend just far enough forward and made heavy enough (by adding paperclips or other weights) to counterbalance the dragon's weight at its nose.
5. For most objects, it's not immediately obvious where the centre of gravity is. If an object has an unusual shape, it's difficult to determine the centre of gravity by sight alone.
6. For objects with uniform shapes, like a pencil or a square, the centre of gravity is easy to locate—it's right in the centre. However, for objects with irregular shapes, the centre of gravity isn't immediately known and must be found by trial and error.
7. To find the centre of gravity in such objects, try balancing it on various points until you find the exact spot where the object remains stable and doesn't tip over.

This point, once found, is the centre of gravity (centre of mass).

Mass is the amount of matter in an object. Mass is measured in kilograms (kg).

Weight is a force due to the pull of gravity on an object's mass. Weight is measured in Newtons (N).



Use this shape as a template to make your own dragon

Pupil Activity Sheet Name: ___________________________

A Catalyst and the Rate of Reaction Date: ____________________________

Making Oxygen

Nuts & Bolts

• 500 ml plastic bottle
• 1 Tablespoon of dried active yeast
• Small beaker
• 10 ml warm water
• Stirrer
• 50 ml 6% Hydrogen Peroxide
• Candle
• lighter
• Wooden splint
• Food colouring
• Washing up liquid
• Safety glasses
• Small tray

Safety: Hydrogen peroxide can irritate skin and eyes. Safety glasses must be worn. If liquid is accidently spilt on the skin wash with water immediately.

Key Concepts

• A catalyst is a substance that can help the reactants in a chemical reaction react with each other faster.
• A catalyst does not actually become part of the products of the reaction.

Secret for Success

1. Put on Safety glasses.
2. Add 50 ml of 6% hydrogen peroxide H2 O 2 to the 500 ml bottle (or beaker).
3. Mix the yeast and warm water in the small beaker and stir for 20 seconds, then add to the hydrogen peroxide.
4. Bubbles of oxygen will immediately start to be formed. Wait until the bubbles have reached the half way mark then gently shake the bottle to burst a few of the bubbles.
5. Light the splint and let it burn for a few seconds. Lift up the bottle and hold it at a 45-degree angle. Slowly insert the glowing splint into the bottle.
6. Remove the splint when it relights.

When ready repeat the above but this time place the bottle on a small tray; add food colouring and a squirt of washing up liquid to the hydrogen peroxide before you add the yeast. You will not be able to relight a splint this time but the vision of a colourful bubbling foam is awesome!

Science in a Nutshell

Hydrogen Peroxide (H_2O_2) is a reactive molecule that readily decomposes into water (H_2O) and oxygen gas (O_2): In this demonstration, an enzyme in the yeast called catalase, catalyses the decomposition so that it proceeds much more rapidly than normal, producing firstly bubbles of oxygen and in the second demo foam filled with oxygen. In addition to being a nice example of a decomposition reaction and a catalysed reaction, the reaction is exothermic, so heat is produced and can be felt by the students when holding the bottle.

EXPLAIN IT WITH ATOMS & MOLECULES The decomposition of hydrogen peroxide and be written as:

$$2H_2O_2\,(l) \rightarrow 2H_2O(l) + O_2\,(g)$$

hydrogen peroxide → water + oxygen

Which new substances are created when hydrogen peroxide decomposes?

What was used as a catalyst in this experiment?

What does a catalyst do in a chemical reaction?

If the catalyst is involved in the chemical reaction, why isn't it included as a product in the chemical equation?

What clues did you have that a chemical reaction occurred in this activity?

What evidence do you have that hydrogen peroxide decomposed faster when you added the yeast?

We really hoped you enjoyed the show and workshop experience and would love to hear your feedback! Scientificsue@science2life.com

Please also share your experiences with us we would love to see you and your children in action:

@scientificsue

#science2life

Your feedback (short or long) is invaluable in helping us enhance this experience for both you and your students. As this is a relatively new programme, your insights will be essential in shaping future improvements. Please let us know how we can better meet your needs!

Sue - scientificsue@science2life.com

STEAM

SCIENCE-TECHNOLOGY-ENGINEERING-ART-MATHEMATICS

ACADEMY