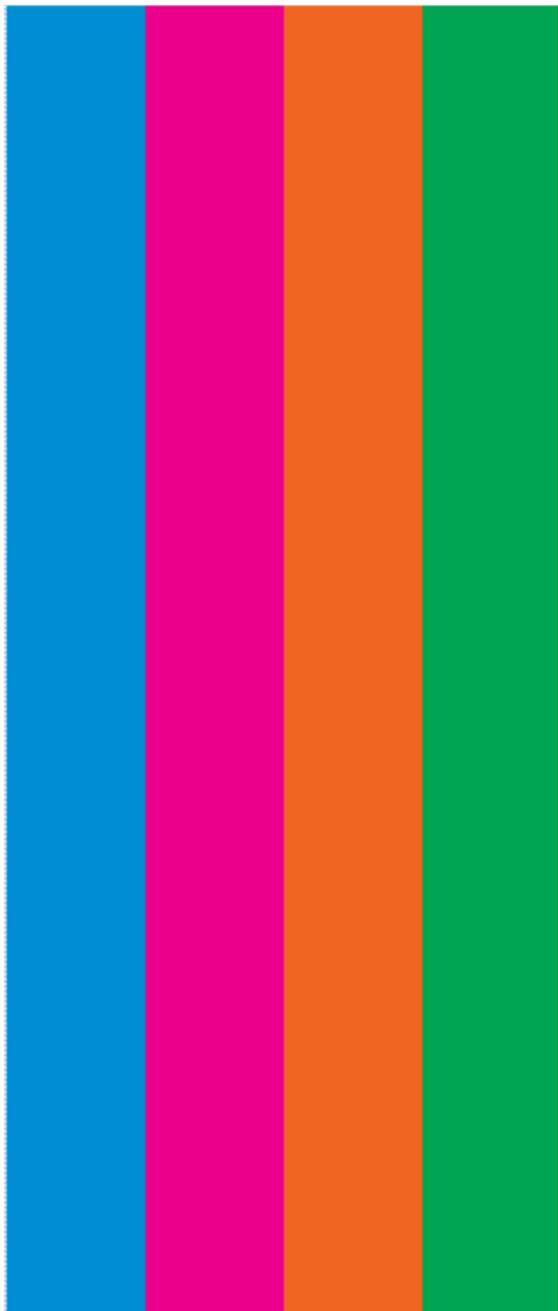
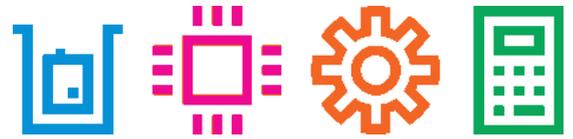


PRIMARY RESOURCE PACK



Glasgow Science Festival
6th-16th June 2019

www.glasgowsciencefestival.org.uk
@GlasgowSciFest

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Contents

Launched in 2007, Glasgow Science Festival (GSF) has grown to be one of the largest science festivals in the UK. The theme for this years Glasgow Science Festival is Glasgow Imagines.

A copy of the programme can be found here:

www.glasgowsciencefestival.org.uk

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**GLASGOW
SCIENCE
FESTIVAL**

Resources:

- Balloons/Plastic tubs
- Figures
- Water
- Hammers
- Jugs
- Brushes
- Salt



About:

Water freezes and becomes solid ice at 0° C. Water expands as it freezes which causes ice to float on water due to it having less density. When materials are cooled their molecules vibrate less and become more compacted. If heat is applied the molecules absorb the energy from the heat source (e.g. hands) and begin to vibrate more therefore causing the ice to melt.

Ice Age

What to do:

1. Fill the balloons/ plastic tubs with water about 1/2 way up and put a plastic figure in. some warm water to do so.
2. Once this is frozen top up the balloons/plastic tub with water. This will ensure the figure is not floating at the top.
3. Remove the ice from the balloon/ plastic tub. You may need to use
4. Leave a variety of tools, water and materials that could help release the figure.
5. Predict what will help release the plastic figure first.
6. Using the different tools and materials explore the various ways in which to release the plastic figure.

Safety First

Do not freeze glass containers or those that have lids.

Use a tray or a large tub to hold the ice so that when it melts it does not create a slipping hazard on the floor.



Rotating Rainbow

Resources:

- Card
- Spinner template
- Scissors
- Coloured pens/pencils
- Compass
- Pencil



About:

White light consists of the 7 colours of the rainbow: ROYGBIV. As seen in rainbows and prisms the light can be split into these 7 colours. White light can also be made by mixing the 7 colours. When the disc is spinning quickly the eyes see all the colours together and therefore it appears white.

What to do:

1. Stick the spinner template onto card.
2. Colour the spinners using ROYGBV colours.
3. Cut out the spinners.
4. Pierce a hole with a compass.
5. Place a pencil through the hole.
6. Predict what colour the spinner will show when spun.
7. Spin the pencil.
8. What colour does the disc make when spun?
9. Why did it make this colour?

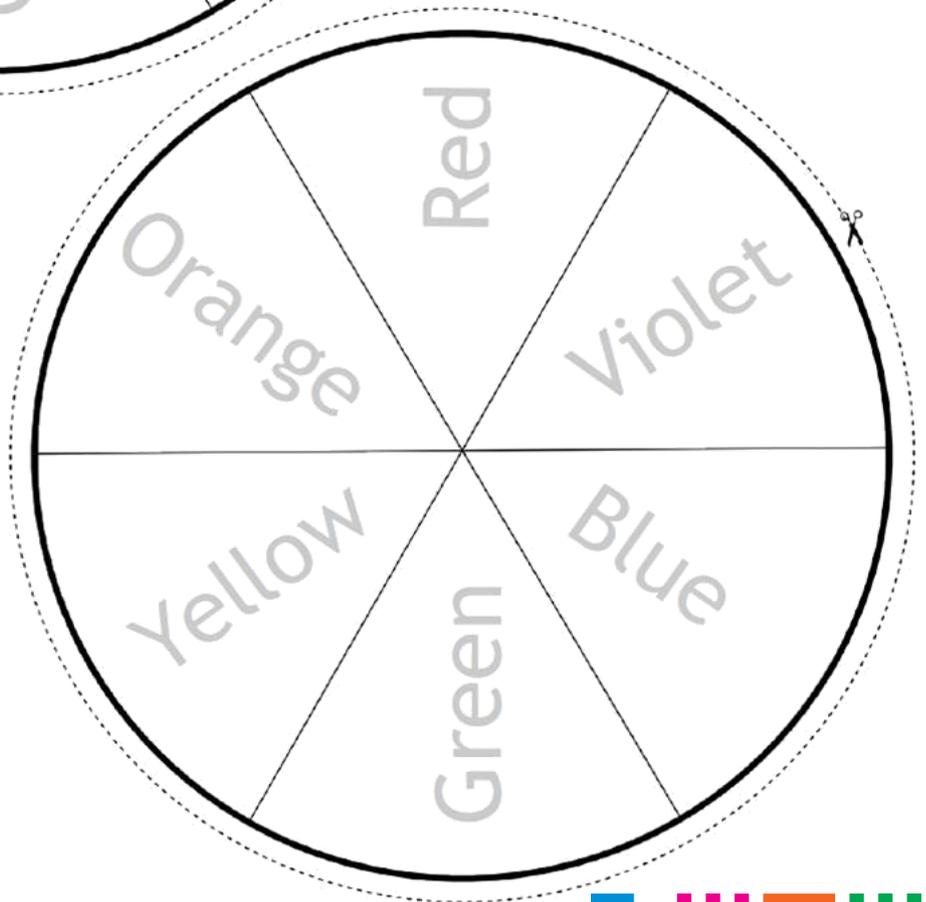
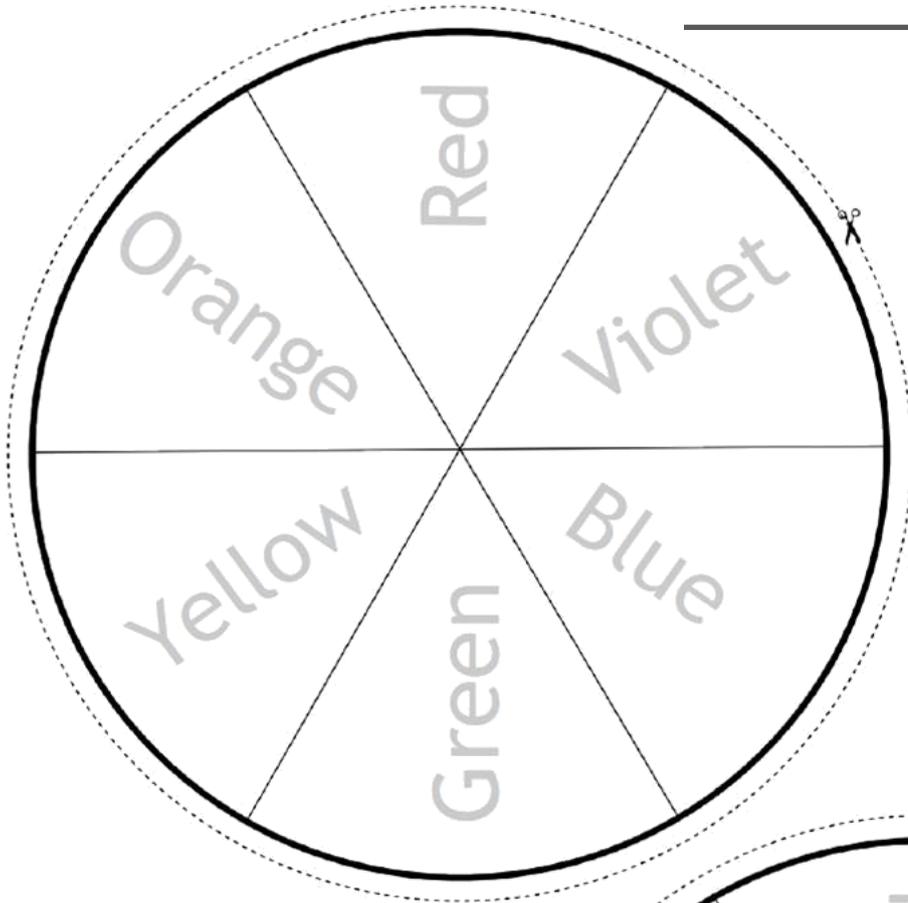
Safety First

Make sure your spinner and pencil is on a sheet of scrap paper so as not to mark the surface of the table.

Be careful when using the compass to create a hole in the spinner.



Rotating Rainbow



Resources:

- Magnets
- Pipe Cleaners
- Cardboard
- Cardboard box/shoe box
- Glue
- Coloured pens/pencils
- Paint
- Books



About:

Magnets create a force around themselves which in turns pulls magnetic materials towards them. Magnets only attract iron, steel (contains iron), cobalt, nickel and some other rare minerals and materials. The area around a magnet where the force can be felt is called the magnetic field.

Magnet Maze

What to do:

1. Draw the outline of a maze on the inside of a cardboard box/shoe box. Make it tricky by adding in dead ends.
2. Cut pieces of cardboard to the length of the maze.
3. Stick the cardboard into the box using glue.
4. Decorate the maze using coloured pens/pencils or paint.
5. Using pipe cleaners create a character to travel through the maze.
6. Place the completed maze on stilts. Books are an easy way to lift it off the table.
7. Hold the magnet underneath the maze and try and get the character from one end to the other.
8. Make the maze more challenging by adding different features.

Safety First

Use a tablecloth or newspaper to protect the surface from paint.



Sinking Ships

Resources:

- Plasticine
- Weights (marbles, paper clips etc. can be used as non-standard units of measurement)
- Plastic Tub
- Water
- Scales



About:

Displacement explains why objects sink or float. This occurs when an object is placed in water and it moves the water out of the way. Gravity pulls the object down but the pressure above and below the object causes an upward force. The object pushes water out of its way, making the water rise. Ships are heavy but they are shaped so that they push aside lots of water, they also contain lots of air inside their hulls making them more buoyant. The water pushes back hard enough to keep them floating.

What to do:

1. Fill a tub with water.
2. Weigh the plasticine so that they are all the same.
3. Roll the plasticine into a ball.
4. Mould the plasticine into an object that floats.
5. Make predictions about how much weight/marbles the boat can hold.
6. Add the weights/marbles and record the results.
7. What shape carried the most weight?
8. Evaluate, explain and discuss.

Safety First

Place the plastic tub with water on a non slip surface to ensure that it does not move about. Keep the scales, if they are electric, away from the water.



Resources:

- Gummy bears
- Water
- Salt
- Baking soda
- Vinegar
- 4 cups/containers
- Measuring cylinder
- Scales & rulers



About:

Gummy bears are made of water, sugar and gelatin.

When being made not all the water leaves when they are cooled. Gelatin keeps the gummy bears from dissolving in the water. The water that partly makes up the gummy bear acts a solution of water (with lots of sugar dissolved). The water in the bowl with very little dissolved in it will move to the solution of water with a lot dissolved in it, in the gummy bear. This is called osmosis. The salt water has salt dissolved in it so less water will move in order to balance the solutions.

Growing Gummy Bears

What to do:

1. Pour 50ml of water into 3 cups/containers.
2. Pour 50ml of vinegar into 1 cup/container.
3. Add a tablespoon of salt into one of the cups/containers and stir.
4. Add a tablespoon of baking soda into another cup/ container with water and stir.
5. Chose 4 gummy bears of different colours (red, orange, yellow and green).
6. Measure the weight and length of the gummy bears and record this.
7. Place a gummy bear into each of the cups/containers.
8. Remember to label each cup/container so they can be easily identified.
9. Leave for 24 hours.
10. Gently remove the gummy bears from their cups.
11. Measure the weight and length of the gummy bears and compare to the previous measurements.
12. What has happened? Why has this happened?

Safety First

Paper towels may be needed in case of spillage.

Wash hands after handling the vinegar to ensure it does not come into contact with eyes.



Growing Gummy Bears

	Water	Vinegar	Baking Soda	Salt
Weight before (g)				
Length before (mm)				
Weight after (g)				
Length after (mm)				
Difference in weight (g)				
Difference in length (mm)				

Resources:

- Card
- Art Straws
- Torches
- Pens/pencils
- Butterfly pins
- Sticky tape



About:

Light is emitted from the torch in the direction pointed. This means some light is directed towards the puppet. The shadow is the area where the light cannot reach as the puppet blocks it. The position of the torch affects how much light is being blocked. Shadows change size as the angle of a light source changes. When the torch is low it will block more light and the shadow will be longer.

Shadow Puppets

What to do:

1. Using card draw a puppet that has a number of parts that can be cut out.
2. Cut the puppet out.
3. Attach an art straw or a number of art straws using sticky tape.
4. Turn the lights off.
5. Use a torch to shine the light on the puppet and create a shadow.
6. What can be changed to alter the position, shape and size of the shadow?
7. To add more movement to the puppet use butterfly pins to create moveable arms or legs. Attach separate art straws to these.

Safety First

Be careful when pushing the butterfly pins through the card.

Ensure safe use of the torches and shine only against the wall.



Resources:

- 2 sealable sandwich bags (1 large, 1 small)
- Ice
- Salt
- Fruit juice/milkshake
- Spoon



About:

Salt is used to lower the temperature of the ice as when the two substances are mixed together the water takes heat from its surroundings in order to dissolve the salt. This causes a drop in temperature. Due to this drop in temperature it causes the fruit juice/ milkshake to cool quicker and the temperature becomes low enough to freeze.

Ice Scream Cone

What to do:

1. Put both the ice and salt in the LARGE sandwich bag.
2. Make sure the salt has mixed well with the ice.
3. Pour the fruit juice/milkshake into the SMALL sandwich bag.
4. Seal the SMALL bag carefully so that no liquid escapes.
5. Place the SMALL bag inside the LARGE bag and seal.
6. Rub the salt and ice mixture around the SMALL sealed bag. Continue to do so until your fruit juice/ milkshake freezes.
7. Once frozen open up the bag and enjoy the sorbet/ ice cream.

Safety First

Make sure that the small sandwich bag is sealed and that no ice and salt solution gets into the small bag otherwise there could be some very interesting tasting sorbet/ice cream. The bag will become very cold it is advisable to do this in pairs so turns are taken.



Resources:

- Large lollipop sticks
- Scissors
- Paper
- 2 small elastic bands
- 1 thick elastic band
- Sticky tape
- Coloured pens to decorate



About:

Sound is caused by vibrations. The air flowing above and below causes the elastic band to vibrate. The airflow around the elastic band will also affect the sound. The player can change the pitch by moving the paper slider(s) or blowing at different speeds.

Kazoo

What to do:

1. Cut 2 strips of paper the same length and width of the lollipop sticks.
2. Hold the two lollipop sticks together and wrap 1 strip of paper around the sticks at one end. Use sticky tape to secure.
3. Repeat with the second piece of paper.
4. Remove 1 of the sticks, leaving the paper rolls on the remaining stick.
5. Take the large elastic band and wrap it end over end around the stick and papers.
6. Place the lone stick up back on top of the stick with the elastic band.
7. Use 1 of the smaller elastic bands to bind one end of the 2 lollipop sticks together.
8. Repeat with another elastic band around the other end.
9. Blow into the edge of the kazoo to make sound.
10. Move the paper sliders to create different notes.

Safety First

Ensure safe use of the elastic bands.



Resources:

- Shoebox
- Scissors
- Sticky tape
- Card
- Pot
- Soil
- Bean seed
- Water
- Glue



About:

Green plants move and grow towards the light. This is called phototropism. Plants contain chemicals that collect in the cells in the part of the stem that does not have any light which then forces it the stem bend towards the light. This is one of the ways in which plants can respond to a stimulus, identifying it as a living thing.

Bean Me Up

What to do:

1. Create a maze inside the shoebox by sticking strips of card to the inside of it.
2. Cut a large hole in the side of the shoebox.
3. Place the shoebox on its side, near a window so that the hole faces upwards towards sunlight.
4. Stand the plant in the bottom of the shoebox and put the lid of the box back on.
5. Remove the lid each day to water the plant.
6. Track the progress of the plant each day as it grows.

Safety First

Ensure there is appropriate drainage for the plant, a couple of holes in the bottom of a plastic cup will work with a plate or tub underneath.



Resources:

- 3 lemons
- 3 zinc coins
- 3 copper coins
- Knife
- 2 electrical wires with crocodile clips
- Multimeter
- Bulb, buzzer, switch



About:

By putting copper and zinc coins in the lemon, electrodes are created.

The citric acid inside the lemon reacts with the coins and electrons are released. The copper coin contains negatively charged electrons and the zinc coin contains positively charged electrons. The difference in energy between the two coins causes the electrons to flow between them which creates a current.

Bitter Battery

What to do:

1. Roll the lemons to release the juice inside but don't break the skin.
2. Use the knife to make 2 slits in the top of each lemon.
3. Take a copper and zinc coin and put one of each into each lemon.
4. Clip the crocodile clip to silver coin in one lemon and attach to the copper coin in another lemon.
5. Clip the second wire to the silver coin in the second lemon and attach to the copper coin in the third lemon.
6. There should be a copper coin in the first lemon and a silver coin in the last lemon unconnected.
7. To test the battery attach the multimeter leads to these 2 terminals.
8. More lemons can be used to create more energy and other parts of a circuit can be added e.g. bulbs, buzzers etc.

Safety First

Keep the knife in a safe place and make sure that an adult makes the slits in the lemon or supervises when being used.



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