

# TECHFEST

*Presents*



**VARIOUS PARKS IN  
ABERDEEN & SHIRE!**



# STEM IN THE PARK

The aim of STEM In The Park is to engage all ages in science activities that are done in parks by utilising teamwork, creativity and most of all having fun while learning.

All children must be accompanied by a responsible adult. Please wear sturdy footwear and dress for the weather.

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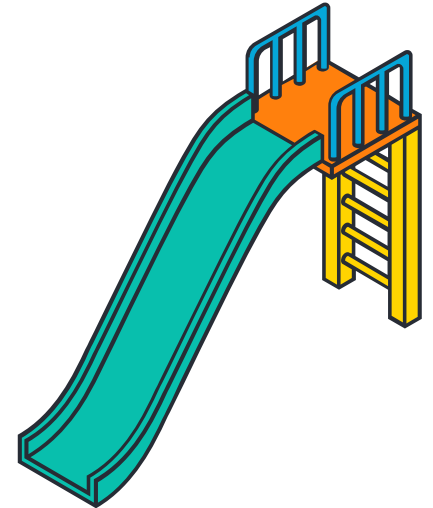
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# Slides

Head out to your nearest slide and explore gravity and friction! This playground science activity is a great way to explore physics using a variety of materials right in your garden, at the local park or at the school playground!



[CLICK HERE TO WATCH THE VIDEO](#)

- 1 First thing you need to do is gather materials such as a leaf, stick, pinecone or a small stone.
- 2 Climb up the slide with your items. Have a partner near the bottom of the slide with a stopwatch or timer. Make sure you are to the side of the slide and a safe distance away and that no other people are nearby. (Do not stand directly in front of the slide. Items can launch off the bottom and hit you- especially heavy items like rocks.)
- 3 Time how long it takes the first item to get from the top of the slide to the bottom. Do this with the other items. Why do you think the amount of time is different for each item? How long do you think it will take you yourself to get down the slide? What about your friend or parent?
- 4 Use the printed table to write down how long each object took to travel down the slide. Why do you think the amount of time is different for each item? How long do you think it will take you yourself to get down the slide? What about your friend or parent?

What's going on? Well, gravity is pulling the items down the slide, but there's another force also at work - friction (or resistance)

Friction/resistance results from two things rubbing against each other. Friction/resistance works against gravity to slow items as they go down the slide. Each item going down the slide creates a different amount of friction which affects its speed

Want another fun activity to do at home? Check out CREST's "Slippery Slidy Shoes" you can find the challenge on page 48

<https://primarylibrary.crestawards.org/all-star-challenges/61746949>



# Slides

Use the table below to keep track of your predications and how long each objects takes to travel down the slide.

OBJECT	PREDICTED TIME	ACTUAL TIME



# Roundabouts

Use roundabouts to explore centrifugal forces and dizziness. We are going to explore the two scientific concepts, the first is the feeling you get being pushed off (which is why you have to hold on tight) which can be explained by centrifugal forces, and the second is dizziness.



[CLICK HERE TO WATCH THE VIDEO](#)

## Centrifugal forces

When something is rotating around itself or on a central axis, a force is created which pushes things in an outward motion. This force is created because the rotating object is constantly changing direction. So when you're on a really fast roundabout you have to hold on tight so the centrifugal force doesn't push you off!

Centrifugal forces experiment: Place a ball on the roundabout and spin it really fast, what do you think will happen? Try different sized balls and see what will happen.

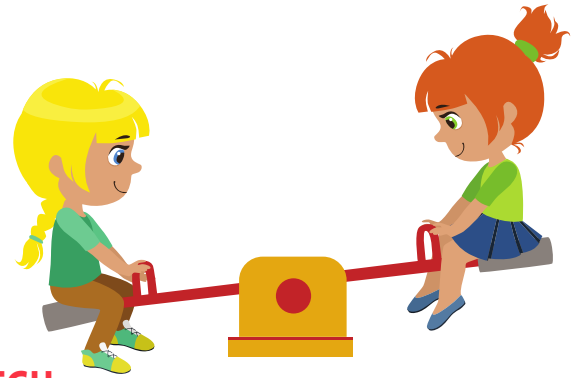
## Dizziness

So why does being on a roundabout make us feel dizzy? Well, blame it on your ear! We have liquid, small bones and hair inside our ears that detect movement and changes in direction. They send this information back to our brain and this is what helps us keep our balance. When we spin quickly the liquid in our ears is sloshing around and sending messages back to our brain to tell it that we are spinning. When we suddenly stop spinning the liquid in our ears keeps sloshing round for a little while, making our brain think we are still moving even though our eyes are telling our brain that we have stopped. So that is why we feel dizzy!



# Seesaw

Using a seesaw to investigate how balance works. Ever wondered why the seesaw sometimes balances perfectly and sometimes does not? Take part in our seesaw challenge to find out why.



[CLICK HERE TO WATCH THE VIDEO](#)

1

Challenge 1: In pairs (adult and child) sit at either side on the seesaw. What do you think will happen? Why will this happen?

2

Challenge 2: In pairs (roughly the same weight) sit on the seats to make the seesaw balanced. What happens if one person moves towards the middle of the seesaw or to the very edge of the seat?

3

Challenge 3: Come up with some ideas on how you could make the seesaw balanced? Use objects around you.

## So how do Seesaws work?

A seesaw is a specific type of lever; it consists of a long beam attached to a pivot called the fulcrum. As soon as you put weight on one end by sitting on one side of the beam it drops to the ground. This is because the force of gravity is acting on the weight of your body, pulling it and the beam down.

## How to make your own seesaw

You will need:

- A brick
- A long plank of wood

Carefully place your brick on the ground, you may need an adult to help you. Take your plank of wood and place it on top of the brick, making sure the brick is in the middle.

Test out your balancing skills by standing on both sides with a friend or by using objects to create a balanced seesaw.

# Design your own Playpark

If you could design your own play park, what would it look like?  
What would you include?

Make sure your design includes:

1 A place for physical exercise

2 An area for quiet play

3 An area to attract nature



Use our template to create your very own play park with pens and pencils or be creative and use any fun materials you have lying around to make a 3D play park!

Want another fun activity to do at home? Check out CREST's "Playground Games" you can find the challenge on page 136

<https://primarylibrary.crestawards.org/all-superstar-challenges/61747644>



# Design your own Playpark



# Bug Hotel

Create your very own bug hotel for your garden. Before we get started have a look at the materials that you could use to build your bug hotel.



## Natural Materials

- Leaves
- Pinecones
- Twigs
- Flowers
- Moss
- Grass
- Stones
- Shells
- Woodchips

## Recyclable Materials

- Toilet Paper Roll
- Scrap Paper
- Bricks
- Cardboard
- Plastic bottles/Milk Cartons
- Popsicle Sticks
- Rope
- Plant Pots
- Old Drawers

1

First thing you need to do is gather your materials, check outside for natural materials such as leaves and twigs and make sure to look for recyclable materials you have lying about at home.

2

You will need something like a box or bottle to pack your bug house into. Keep in mind it will need to be waterproof, as it'll be outside rain or shine!

3

Start to build up your Bug Hotel with all the items you have collected. Be inventive! There is no right or wrong way.

4

Once you are happy with your bug hotel find somewhere in the garden or your balcony to make its home. Remember to go and check up on it after a few weeks and see who has moved in. Just remember to be really careful not to scare them, we don't want them to move out after we have made it so welcoming.



Bug hotels benefit lots of different types of minibeast and insects such as ladybirds, bees, spiders and woodlice. Minibeasts can then use your bug hotel as a safe space to shelter, lay their eggs, raise their young, and seek refuge from predators

# Make a birds nest

It's your mission to build a bird's nest using natural materials you can find outside.

1

Use the materials such as Paper plates, scissors, string/yarn to make a start to your nest.

2

Look for natural materials such as twigs, leafs, moss and grass



## Things to think about:

- How strong can you make a birds nest?
- Will your birds nest stay together in a wind?
- How deep does your nest need to be to keep the eggs safe?
- Would your birds nest be comfortable?
- What happens if it rains?
- Will water collect inside or drain away? (You can test it with a watering can.)

# Playpark Games

Join us for some traditional playground games that you can play at home or at the park.



1

Jumping rope is an old, cherished game that has earned its place on playgrounds everywhere. It is a vigorous, alert activity that sharpens hand-eye coordination and timing. Many creative variations have sprouted: criss-cross, double Dutch, double under and leg over to name a few. There are many group games that jump roping can provide. A line of players can try to simultaneously jump over the rope, encouraging open communication and teamwork. This line can grow with each successful jump, creating more of a challenge and spreading the merriment. Jump rope relays are a rush of competitive fun. A player from each team runs while jump roping to a set point and back, passing the rope to the next teammate and repeating until the first team to finish wins.

2

Scavenger Hunt - Things to find:

- Something round
- Something with feathers
- Something that flies
- Something that smells nice
- Something you can sit on
- Something striped
- Something with wheels
- Something made with wood

3

What's the time Mr Wolf

This game requires one player to be Mr Wolf. The other players stand in a line at the other end of the playground to Mr Wolf, which is known as 'home'. Whoever has been selected as Mr Wolf must stand with their back to the line and reply to cries of 'What's the time Mr Wolf' from the players with whatever time they choose. If they say 2 o'clock, then the players must advance two steps, and so on, until the wolf thinks they are close enough to catch. The wolf will then reply with 'IT'S DINNER TIME' in a scary voice and chase the players until one is caught. You are only safe once you return to the home area as decided at the start of the game and, whoever gets caught, must be Mr Wolf for the next game.

# Animal adventures with CREST

Go on an animal adventure and see how many animals you can find

## What you will need

Collecting jar    Magnifying glass (optional)    Pens    Paper  
Identification book (below resource)

1

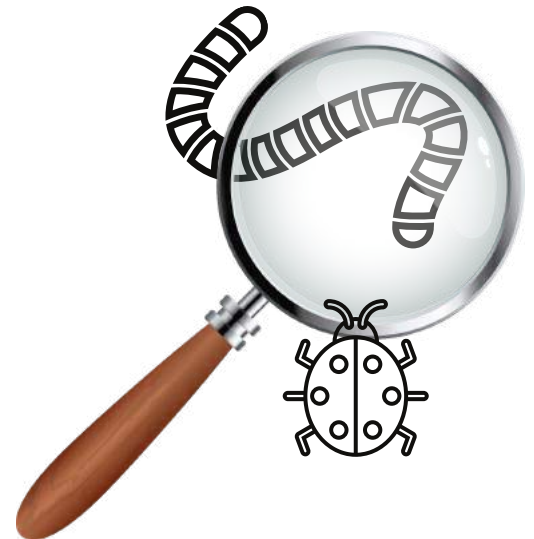
We're going on a mini beast hunt! Think about which areas the mini beasts will be hiding?

2

Take photographs or draw the animals that you find. Remember to be careful if collecting them, we don't want to harm the animals.

3

Now you have collected your drawings or photographs it is time to identify which mini beasts you have found! Use your knowledge or use the identification book to help.



## What is a mini beast?

The term 'minibeast' means a small animal. The scientific name for minibeast is invertebrates. This means an animal without a backbone. Some invertebrates have no skeleton, like worms. Others, like insects and spiders, have a skeleton on the outside (exoskeleton).

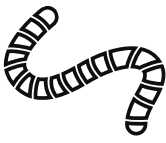
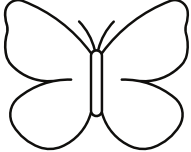
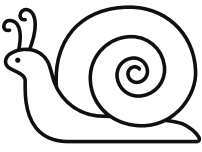
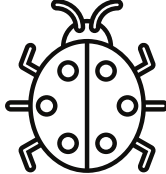
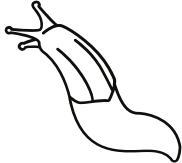
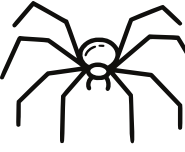

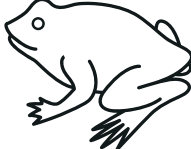

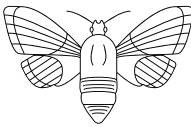


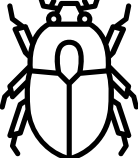
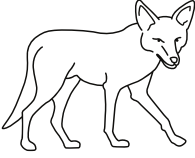
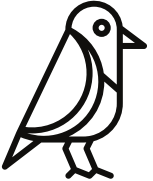
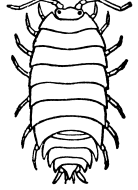
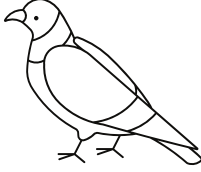
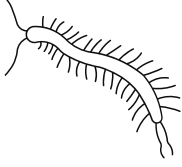
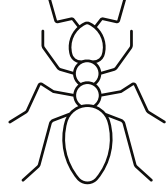
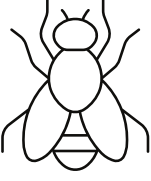
## Where can I find mini beasts?

You can generally find plenty of mini beasts living in moist, damp, dark environments which help to keep them safe and stop them 'drying out'.

# Animal adventures with CREST

## Animal Identification sheet

How many did you find? Use the identification sheet and colour in the animals you found

			<b>SPECIES BINGO!</b> HOW MANY CAN YOU FIND?			
<b>Wiggly Worm</b>	<b>Beautiful Butterfly</b>	<b>Slow Snail</b>		<b>Spotty Ladybird</b>	<b>Slimy Slug</b>	<b>Sneaky Spider</b>
						
<b>Pleasant Pheasant</b>	<b>Fantastic Frog</b>	<b>Happy Hedgehog</b>	<b>Marvellous Moth</b>	<b>Brilliant Blackbird</b>	<b>Bumbling Bee</b>	<b>Bashful Beetle</b>
						
<b>Fast Fox</b>	<b>Red-Breast Robin</b>	<b>Wonderful Woodlouse</b>	<b>Pesky Pigeon</b>	<b>Crawling Centipede</b>	<b>Amazing Ant</b>	<b>Frolicking Fly</b>

# How to make the water cycle in a bag

Learn how the water cycle works.

## What will you need

**Plastic zip-lock bag. Permanent marker. Water. Blue food colouring. Clear tape**

1

Design your bag by using the permanent markers to draw a sky. Remember to include clouds and the sun as these are important elements in the water cycle

2

Pour one or two drops of your blue food colouring into a cup and mix until the water turns blue. Carefully pour into the zip-lock bag and make sure it is closed so no water can escape!

3

Take your bag over to a bright sunny window for best results. Take two long pieces of tape to stick the corners of the bag up onto the window. Remember to press down tightly as we do not want the bag to fall!

4

You should see a change in your bag between two hours and 1 day: this will depend on the amount of sun and the time of day you started. Eventually you will notice droplets of water sticking to the sides of the bag. Some droplets will be higher up in the clouds others will begin to fall down like rain.



## So why does this happen?

The sun rays hit the window which heats up the water in the bag causing the water to transform into a gas through the process called evaporation. Outside, evaporated water vapor goes into the atmosphere, however, in our bag it has nowhere to go and ends up sticking onto the sides. The water then turns back into a liquid as condensation, which then slides back into the pool of water below as "rain".

# How to Make a Rain Gauge

Find out how to make your very own rain gauge

## What will you need

**A glass jar or plastic bottle. Permanent marker. Ruler.**

1

if you are using a plastic bottle cut the top off to create your gauge. Or take a jar and move onto the next step

2

Take your ruler and line the "0" up with the bottom of the jar. Make a mark on the jar for each centimetre (we went up to 8).

3

Fill the bottom of your rain gauge with pebbles, rocks or soil to stop it from moving outside in the wind.

4

Now that your rain gauge is in place, either in the ground or hung up somewhere secure, you can start to track the rainfall in your garden. At the same time each day take a look at how far up the jar the water has reached- you can track this using the sheet on the next page!

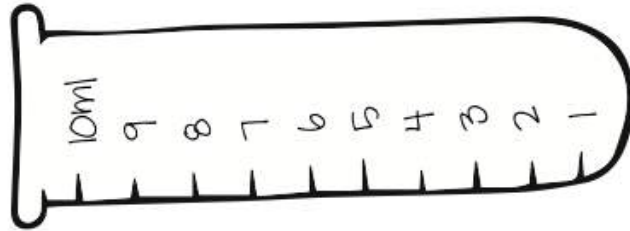


## So why is this useful?

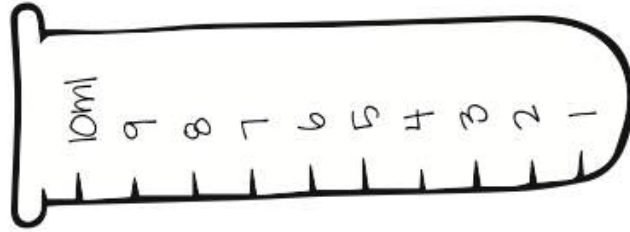
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# Weekly Rainfall Tracker

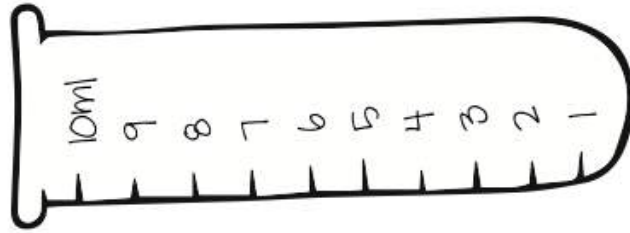
Monday



Tuesday



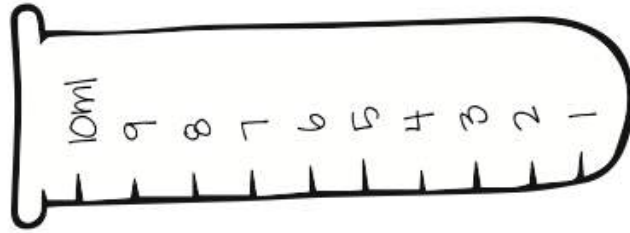
Wednesday



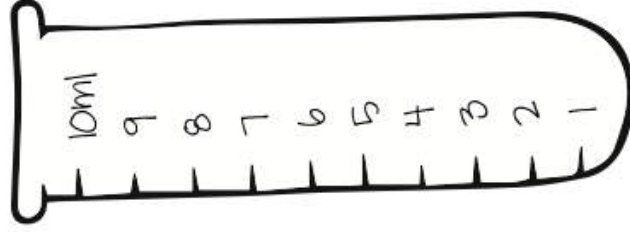
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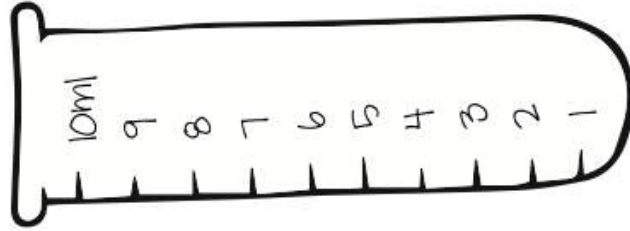
Friday



Saturday



Sunday



Calculate the total rainfall for the week:



# Making Rainbow Rain

Create your very own cloud and make it rain!

## What will you need

A glass jar. Small bowls or glasses. Water. Food colouring. Shaving foam. Pipette.



- 1 Fill each bowl or glass with some water and a different food colouring- you can use as many colours as you like, and can even mix them together to make even more!
- 2 Half or three quarter fill a glass jar or vase with cold water then top with a shaving foam "cloud".
- 3 Use the pipette to drop the rainbow water onto the shaving foam "cloud".
- 4 Once the cloud is full, rainbow rain will start to fall into the jar. This could happen really quickly or take a little bit longer depending on how thick your shaving foam cloud is and how far into the cloud you stick the pipette (the farther in you go, the sooner the rain will fall).

## What does this teach us about weather?

Cloud formation happens when water vapour rises into the air. When this vapour hits cold air, it turns into tiny droplets of water. These droplets start to stick together and form clouds. When the clouds get full of water that they can't hold anymore, the water falls down as rain.

In this experiment, the clouds are the shaving foam and the food coloured water is the rain. As you drop the coloured water into the cloud the weight of the water forces itself through the cloud to "rain" down into the jar.

Credit: <https://www.thebestideasforkids.com/rain-cloud-in-a-jar/>

# Terrific Trees

When we're outdoors there are trees around. We're so used to seeing them that we hardly notice them

Suitable for primary

## What will you need

**Observation Sheet (on a clipboard), HB Pencils (sharpened),  
Trees**

1 Look at the Information Sheet showing the shapes of trees.  
See page below.

2 Look at the Information Sheet showing the shapes of leaves.  
See page below,

3 Look at the Information Sheet showing the textures of bark.  
See page below.

4 Take your Observation Sheet & pencil around the trees that you can see. Record the shape  
of the tree and sketch the shape of the leaf.

5 Do a rubbing of the bark - place the Observation Sheet against the bark and, with the  
pencil lead flat against the paper, rub it gently to and fro. (Ask the helpers if you don't  
know what to do)

6 Can you see flowers or seeds? Draw them or describe them if you can. (What colour are  
they? What shape are they? Are they growing singly or in bunches?)

7 Can you identify the tree? If you know its name, write it on your sheet. If you don't you can  
try looking it up in the books - ask a helper.

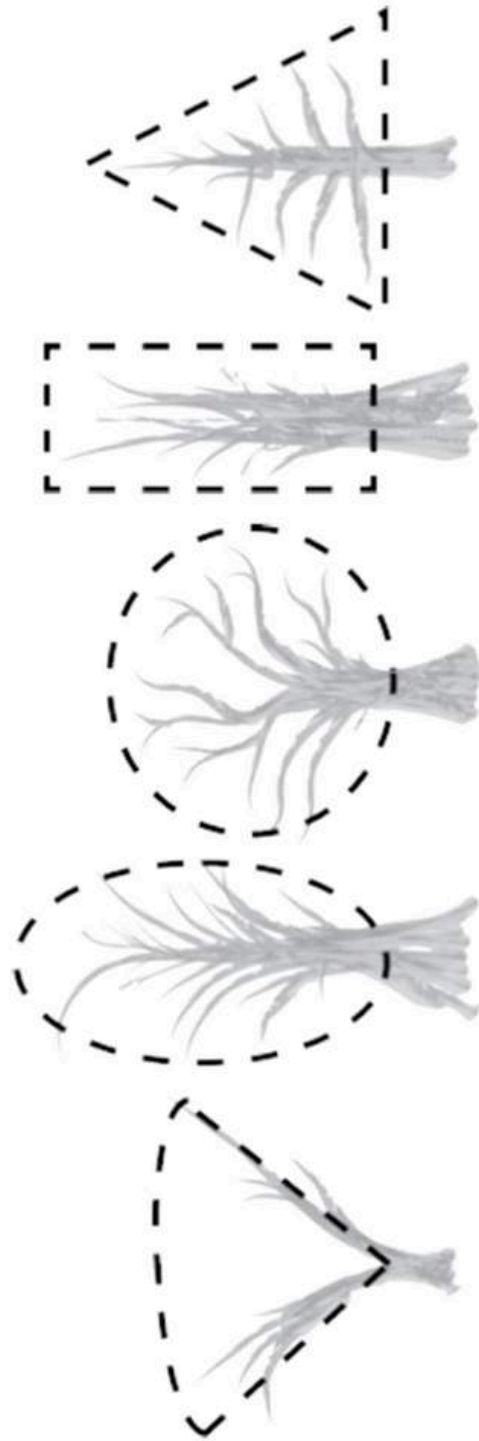


We are fortunate to live in a part of the world where we have many trees providing a backdrop to our landscapes. There are trees in gardens, in parks and on urban streets - and yet we often overlook them, failing to observe the detail. In this activity we learn to look more closely, examining the texture of the bark, the shape of the leaves and the outline of the trees themselves.

# Terrific Trees Images

These images are intended to illustrate the shapes that the children are to look for in the surrounding trees. Ideally, they would be printed and laminated. It may be helpful to have more than one copy of each available.

## Tree Shapes

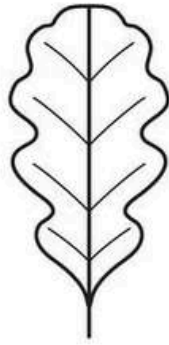
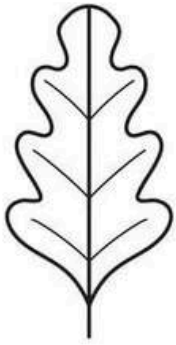


## EXPLORE TREE SHAPES

A perfect outdoor math lesson for children to explore geometry and nature!

# Terrific Trees Images

## Leaf Shapes



Download these free tree identifying apps [here](#) or [here](#) or scan the qr codes.



SCAN ME 



SCAN ME 

# Terrific Trees Images



Download a free tree bark poster and matching game for kids or scan the qr code!



SCAN ME



# Ecosystem in a Jar



Create your own ecosystems in jars! These miniature marvels serve a variety of purposes, from enhancing décor and hardscape design to educating children about ecosystem and sustainability in a practical way.

## What will you need

**A clean, empty container with lid (all labels removed), standing water, soil, small rocks, small plants/plant seeds, moss or algae**

Suitable for primary

1

Place small rocks at the bottom of the jar

2

Cover the rocks with a thin layer of soil

3

Place moss and/or algae on top of the soil

4

Add small plants and/or flower seeds to moss

5

Sprinkle standing water over plants & moss (use standing water from a natural source like a pond, stream, or puddle because standing water includes lots of bacteria and potentially also seeds as well as eggs, meaning that this way your mini-ecosystem will get some inhabitants.)

6

Seal your ecosystem in a jar

7

Place the jar at a sunny location



## How does it work?

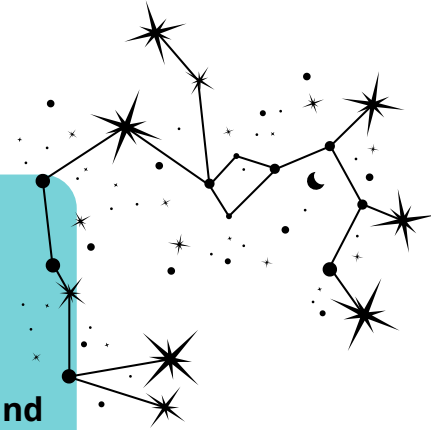
An ecosystem in a jar mimics a natural ecosystem, with plants and algae producing oxygen through photosynthesis while live organisms consume oxygen and emit carbon dioxide. Waste products from organisms, like nitrogen-rich waste and decaying matter, nourish the plants. Worms play a crucial role in maintaining ecosystem health by consuming algae and aiding in decomposition. Bacteria and microbes further contribute by breaking down organic matter and providing essential nutrients to plants. Condensation perpetuates the water cycle within the closed system. These intricate interactions create a self-sustaining circular system that can be observed and appreciated in detail, making the study of jar ecosystems a fascinating endeavor.



# Marshmallow Constellations



Explore the constellations and create your very own 3D models of your favourites with sweets and marshmallows.



## What will you need

- Marshmallows
- Spaghetti
- Black paper or fabric
- Images of Constellations (print out copies and laminate)

1 Invite participants to look at the constellation images provided.

2 Invite participants to choose a constellation that they would like to recreate using marshmallows and spaghetti.

3 Assemble the constellation, pushing spaghetti firmly into the marshmallows to secure them.

4 Display the constellations against black background.

## Did you know?

A constellation is a recognisable (but imaginary) group of stars, visible in the night sky. Modern astronomers recognise 88 constellations.

Many of the constellations were named by ancient Greek astronomers using names of mythological people, creatures or objects.

When we observe the sky, the sun, moon and planets in our solar system appear to travel along a path called the ecliptic, which runs through the 12 famous constellations that we call the zodiac.

Some constellations shift with the seasons and others can only be seen depending on where you are on the earth ie northern or southern hemisphere.

# Apply for your CREST Award

Star Awards: 5-7 year olds

Super Star Awards: 7-11 year olds

In order to gain your CREST Star or SuperStar Award you will need to complete 8 activities in total. You have already completed 4 during our STEM in the Park workshops so why not complete 4 more activities provided in our booklet.

The children develop their investigative and teamwork skills. After completing all eight challenges, each child will receive a CREST SuperStar certificate and iron-on badge.

To apply for your CREST Star or SuperStar award for £1 visit

<https://apply.crestawards.org/>



THE **CREST AWARDS** SCHEME IS THE BRITISH SCIENCE ASSOCIATIONS FLAGSHIP PROGRAMME FOR YOUNG PEOPLE, PROVIDING SCIENCE ENRICHMENT ACTIVITIES TO INSPIRE AND ENGAGE 5 – 19 YEAR OLDS.

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