BRADFORD MADE

Science Explorers

Play Lab

For ages 3-7
(EYFS & KS1 learners)

BRADFORD 2025
UK City of Culture

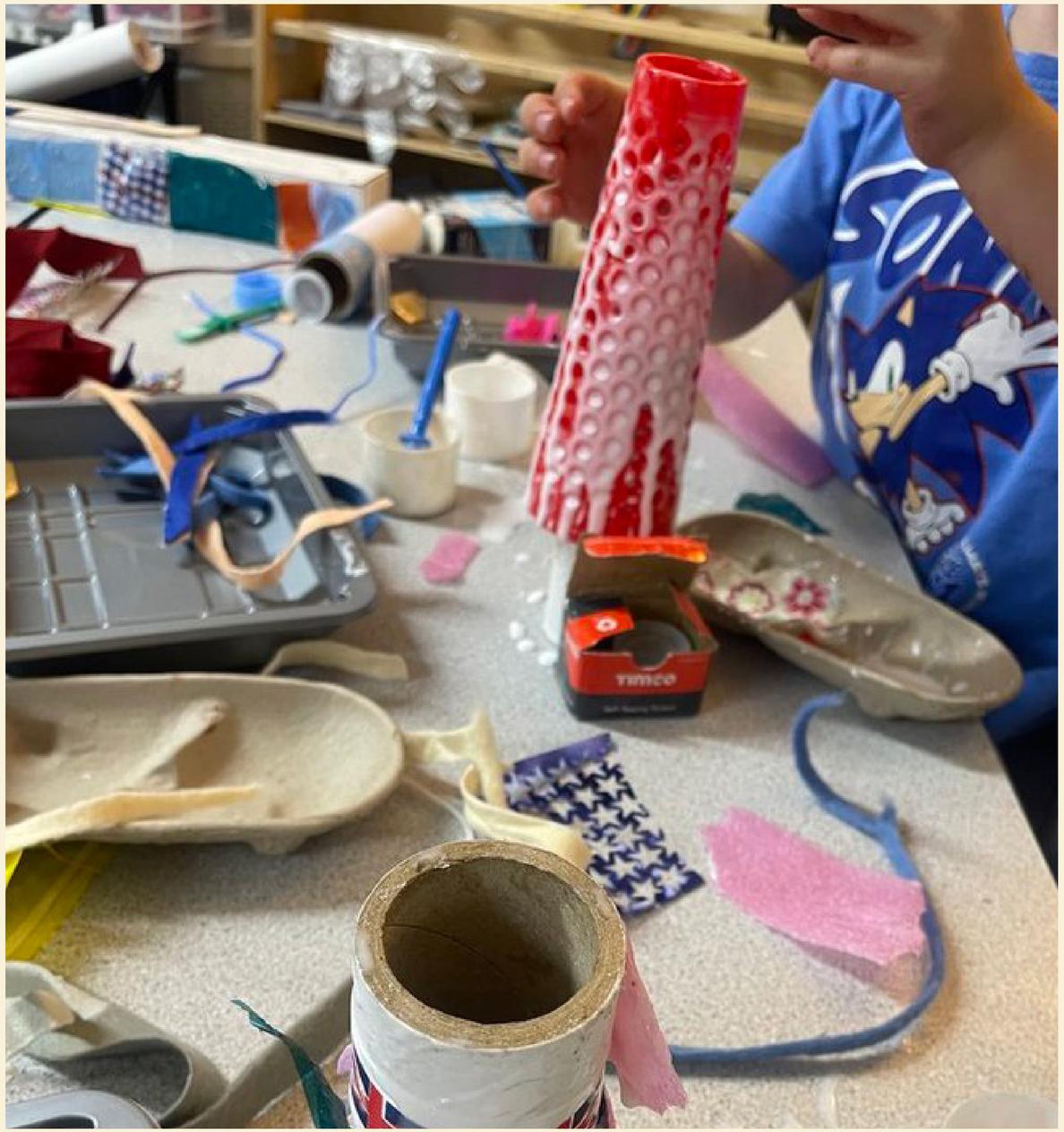
Science Explorers
Play Lab

Science is found all around us. Almost every aspect of your daily life is influenced by science.

Science is one of the subjects in the term STEM. STEM stands for science, technology, engineering, and mathematics.

There is a big push from educators and professionals to include the arts into the field. STEAM is the incorporation of the arts.

Introducing arts into STEM lessons creates lots of opportunities. Not only does it broaden the curriculum it also introduces students to creative ways of thinking and increases their problem-solving skills.



Activity at a Glance

In this activity pack you'll find a series of fun, creative, and curiosity-sparking science sessions designed especially for early years learners across three themes:

Forces and Motion (p.04)
Prepare for an energetic, messy, and fun-filled session! Children will use cars, marbles and pendulums to create dynamic, large-scale artwork – all while exploring the science of movement and forces.

Junk Modelling (p.09)
This creative session explores recycling and everyday materials through play and creating art. Children will learn about different materials, properties of their materials, why we recycle, and how they can help protect the environment – all while building their own sculptures from recycled items.

Nature Pictures (p.14)
Head outside on a 'mini nature adventure' and collect leaves, sticks, flowers, and other natural treasures. Once your mini adventure is over, head back indoors and create beautiful collages and nature prints.

Recommended for:
EYFS & KS1 (3-7 year olds)

The activities can also be adapted and expanded for older learners and are accessible for learners with SEND

Links to:
Art / Science / Maths / Understanding the world

Forces & Motion

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Prepare for an energetic, messy, and fun-filled session! Children will use cars, marbles and pendulums to create dynamic, large-scale artwork – all while exploring the science of movement and forces.

During the activities they'll discover:
– Push, pull, gravity, speed and direction
– Scientific vocabulary in action: fast, slow, spin, bang!
– Cause and effect through experimentation

Children will understand why the paint falls, and how we can make it move faster, exploring the science of motion in the most creative way – by making art!

You will need:
– A4/A3 paper or longer lengths of paper
– Paints
– Marbles
– Trays or plates
– Toy cars
– Objects to use as ramps, for example lengths of wood, drainpipes etc.
– Garden canes
– Bucket
– String

Approx session times:
– Engage activities: 20 – 30 minutes
– Make, Create and Do activities: 1 hour

Key words:
Push, Pull, Twist, Movement, Force, Spin, Swing, Slide, Swerve, Turn, Fast, Slow, Up, Down, Force, Direction, Higher, Lower, Distance, Further, Speed Up, Slow Down, Start, Stop, Gravity, Speed, Move, Left, Right, Change Direction, Motion, Change Shape

Engage

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Forces cause objects to move, change speed, change direction or change shape.

A force is needed to cause movement.

How can you make an object move, change shape or change direction?

– What do you do to a car to make it move?

– What happens if you pull an object?

– What happens if you push an object?

– What happens if you twist an object?

Make, Create and Do

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Questions to encourage conversation during activities:

– What can you see?

– What happens to the car / marble / paint / balloon?

– Can you make the car move faster?

– Can you make the car move slower?

– Can you push harder?

– What makes the car move?

– What happens if you change car?

– What happens if you add more marbles?

– What happens if...?

– How...?

Activity 1:
Cars down a ramp

– Place paper on the floor – ensure that the area you want to use is fully covered!

– Make a ramp for your cars to travel down. To make a ramp you could use guttering or wooden planks. Stack one end up on a chair, or a table. Leave the other end on the paper on the floor.

– Place blobs of paint on the ramp or at the bottom of the ramp. Or roll your car in the paint.

– Place the car at the top of the ramp.

– Let go!

– Watch the car travel down the ramp and see the art it makes.

– What happens if you change the car?

– What happens if you change the height of the ramp?

– What happens if you push the car rather than let it go?

Make, Create and Do

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Activity 2:
Moving marbles

- Take your plate or tray and place a piece of paper inside it.
- Add a few blobs of paint onto the paper.
- Add a marble.
- Move the tray around and watch the marble move and create art.
- What happens if you add more marbles?
- Can you make the marbles move faster? Or slower?
- Can you mix the paints?

Activity 3:
Pendulum art

- Using the link, create your tripod.
  Tripod link:
  www.bsatroop1424.com/skills/scouting-skills-tripod-lashing
- Make a small hole(s) in the bottom of the bucket
- Attach the bucket to the trip using the string.
  Make sure the bucket can swing around
- Place your paper under the pendulum –
  make sure the whole area is covered!
- Mix your paint with a small amount of water to thin down the paint
- Add your thinned down paint into the bucket
- Push, pull and twist the bucket and watch the art develop

The Science

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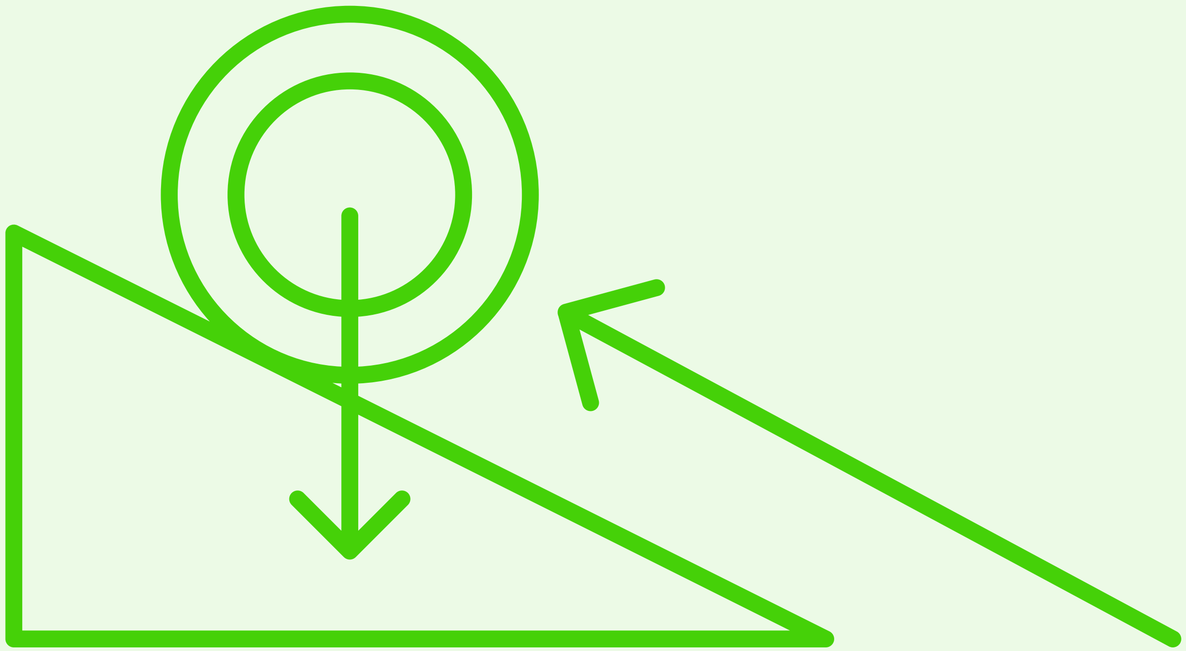
A force

– Changes the shape of an object

– Changes the direction of an object

– Changes the speed of an object



A force can be a push, a pull or a twist

Push: Pushing a car along the floor

Pull: Pulling a door open

Twist: Using a screwdriver

You cannot see a force, however you can see the effect of a force.

If you increase the height of the ramp, the car will go faster and further.

If you decrease the height of the ramp the car will go slower and travel less.

Adding more marbles will make more patterns, this is because the marbles will collide more frequently, creating more forces, therefore changing the direction and speed of the marbles.

A pendulum is made of an object with a mass, called a bob, that dangles from the end of a rod or string and swings freely. When the bob is displaced from its centre, resting position and released, gravity acts to return it to the lowest point, causing it to accelerate. However, due to inertia, the bob overshoots, swinging to the opposite side. This back-and-forth motion continues, gradually slowing due to friction and air resistance.

Junk Modelling

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This creative session explores recycling and everyday materials through play and creating art.

Children will learn about different materials, properties of their materials, why we recycle, and how they can help protect the environment – all while building their own sculptures from recycled items.

While creating and playing, they'll investigate:
– Materials: hard/soft, shiny/dull, bendy/stiff
– Sorting and identifying recyclable items
– Simple concepts around climate change and environmental care

Let's turn junk into masterpieces!

You will need:
– Recycling / junk materials – boxes, paper, newspaper, fabric, plastic containers etc.
– Paints
– Glue
– Play sand
– Water
– Stones
– Small world animals and plants

Approx session times:
– Engage activities: 20 – 30 minutes
– Make, Create and Do activities: 1 hour

Key words:
Strong, Weak, Flexible, Bendy, Transparent, Opaque, Soft, Hard, Waterproof, Absorbent, Shiny, Dull, Rigid, Hot, Cold, Rough, Smooth, Describe, Material, Properties, Stretchy, Natural, Man-Made, Object, Bend, Twist, Stretch, Squash, Recycle, Glass, Paper, Cardboard, Metal, Cloth, Plastic, Climate, Habitat, Earth, Destroy

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Different materials are found all around us. From the cloth your clothes are made from, to plastic drinks bottles, to the glass jars that your jam is kept in.

Recycling is really important. Everyone needs to do their part to recycle. Almost all materials can be recycled. Recycling is important to:
– Conserve natural resources
– Protect ecosystems and wildlife
– Save energy
– Cut climate-changing carbon emissions
– Save money

What materials can you name?
What is your cereal box made from?
What is your milk bottle made from?
How would you describe your material?

Protecting the environment, including animals, plants and humans is important due to climate change. We could soon see our homes being destroyed, or animals dying out if we don't protect our Earth.

What would happen if the ice started to melt?
What would happen if we chopped down all the trees?
What would happen if it got too hot and fires started?

Make, Create and Do

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Questions to encourage conversation during activities:

– What can you see?

– What does it feel like?

– What material is this?

– Can you describe it?

– Is this material...?

– Why do we recycle?

– Which material is the same as this?

– What is happening to the Earth?

– What will happen to the polar bears? The penguins?

– Where will the monkeys live? The birds live?

– How do we recycle?

– Who might we hurt or damage?

Activity 1:
Junk Modelling

– Make a model using the recycled materials and glue.
– Could you make a tower? A house? A car? An animal?
– What do the materials feel like?
– How would you describe the materials? Shiny, dull etc.

Activity 2:
Junk inspired collage

– Take a piece of recycled material and dip it into paint.
– Create patterns on the paper.
– Can you make a repeating pattern?
– What shapes can you see?
– What do the materials feel like?
– Do the shapes change?
– How would you describe the materials? Shiny, dull, etc.

The Science

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Throwing rubbish away can be dangerous. People and animals can be trapped or injured by litter. It's not just animals who are affected by litter. Their habitats can also suffer.

Litter includes anything that is discarded and not put in bins or waste containers.

Litter includes smokers' materials, fast food items, chewing gums, snack packings, sweet wrappings, soft drink tins, discarded bottles, broken glass along with bits of paper, discarded bags of rubbish, old food and dog waste.

Dropping litter costs money and impacts the health and well-being of ourselves, animals and the environment.

Litter gets carried onto our hills, into our drains, or rivers and beaches and eventually the sea. Over time it breaks down, poisons animals, pollutes our ecosystems, and damages the environment.

Impacts of climate change

– sea levels could rise, covering low lying areas,

– droughts and floods become more likely as extreme weather increases

– increased demand for water in hotter summers puts pressure on water supplies

– industry may be impacted

– sea level rise will affect 80 million people

– tropical storms will increase in magnitude (strength)

– species in affected areas (e.g. Arctic) may become extinct

– diseases such as malaria increase

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Materials

Metals: Most metals are strong, hard and shiny materials that can be hammered into different shapes without breaking. They are good conductors of heat and electricity and some are magnetic.

Plastics: Plastics are materials made from chemicals and are not found in nature. They are often strong and waterproof. They can be made into any shape by applying heat. Plastics are not magnetic. They are good insulators and don't conduct heat or electricity.

Glass: Glass is made by melting sand and other minerals together at very high temperatures. It is normally transparent and can be made into different shapes. Thick glass can be strong, but thin glass breaks easily. It's used for objects that need to be transparent, such as windows and glasses.

Wood: Wood comes from trees. It is strong, flexible and long-lasting. It is an insulator of heat and electricity. Paper is made from wood.

Fabrics: Fabrics are made from thin fibres woven together. Different fabrics have different properties. They can be stretchy (a pair of tights), insulating (a woollen coat) or absorbent (a towel).

Nature Pictures

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Head outside on a 'mini nature adventure' and collect leaves, sticks, flowers, and other natural treasures. Once your mini adventure is over, head back indoors and create beautiful collages and nature prints.

While creating, they'll explore:
– Shapes, colours, textures, and patterns
– Counting, symmetry and reflection
– Curiosity about the natural world: Who lives here? What do plants need to grow?

After creating their art, dive into small world play and create amazing habitats and discuss the animals and plants that you would find in these habitats.

Immerse your children in nature – from leaf collecting to paint printing, they'll explore their environment and habitats and express it creatively!

You will need:
– A4/A3 paper or longer lengths of paper
– Containers to collect natural resources
– Further natural resources if the outdoor walk is not possible, e.g. twigs, leaves, flowers, feathers, grass
– Paints
– Glue
– Magnifying glasses (optional)
– Play sand
– Water
– Stones
– Small world animals and plants

Approx session times:
– Engage activities: 20 – 30 minutes
– Make, Create and Do activities: 1 hour

Key words:
Grass, Leaf, Stick, Tree, Flower, Grow, Soil, Water, Sunshine, Nutrients, Producer, Consumer, Habitat, Environment, Animals, Plants, Fruit, Seed, Branch, Twig, Root, Stem, Petal, Trunk, Bark, Alive, Dead, Feather, Fur, Coat, Beak, Legs, Colour, Shape, Moves, Long/Short, Small/Large, Big/Little, Tall/Short, Mammals, Amphibians, Insect

Engage

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Incorporating nature into the arts is an easy link, however, how does nature, arts and art all link together?

Nature or the natural world is everything around us that is living.

– What can you see around your room that is living?

– What do you like to do in nature?

– Can you name any plants?

– Can you name any animals?

The place that animals and plants are found is known as their habitat. Their habitat provides everything they need to survive.

– Can you name any habitats?

– What animals and plants would you find in those habitats?

Questions to encourage conversation during activities:

– What can you see?
– What can you hear?
– What can you smell?
– What part of a plant is this?
– What does it feel like?
– What does it smell like?
– What colour is the .....?
– How many can you count?
– What shape is it?
– Can you point to the ....?
– Who might live here?
– Why do they live here?
– What do they eat?
– What does a plant need to grow?
– What animal is this?
– What plant is this?

Activity 1:
Nature walk (optional)

– Head outside and go on a walk in nature. This could be your garden, your playground or any other outside area. You don't need to go far to find natural resources.

– While out in nature collect natural resources, for example leaves, twigs, grass, flowers, stones, feathers, to take back inside with you for the activities. Make sure these resources are dry.

– What colours can you see?

– What shapes can you see?

– What can you hear? See? Smell? Feel?

– What animal would live here? What does that animal eat?

If you can't make it outside to do your own nature walk with your learners, you can collect a selection of natural resources to share with the children indoors for the activities below. This might include leaves, twigs, feathers, flowers and grass.

Make, Create and Do continued

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Activity 2:
Nature inspired prints

Take the natural objects and dip them in the paint.
Create patterns on the paper using the natural objects.

– What object are you using?

– How does the object feel?

– What do you notice about the pattern?

– Can you make a repeating pattern?

– What colour paint are your using?

– Does the whole object appear in the print?

– What happens if you print it softly? Or press hard?

Activity 3:
Nature inspired collages

Take a natural object and dip into the glue. Stick the object onto the paper to create your collage. Try making a face, or a known picture.

– What object are you using?

– How does the object feel?

– What colour is the object?

– Where would you find this object outside?

Make, Create and Do continued

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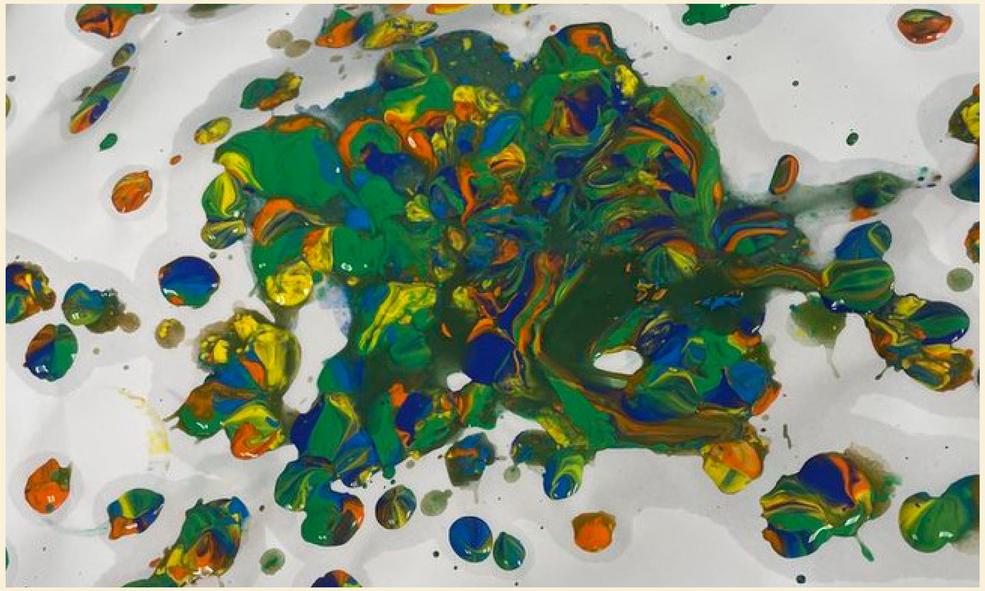
Activity 4:
Nature inspired writing and drawing

Use a stick as a pencil, dip into the paint and make marks or draw. Use a feather as a paintbrush, dip into the paint and make marks or draw.

– What other objects could you use as a paintbrush or pencil?

– How are the marks different with each object you use? Why do you think that is?



Activity 5:
Create your animal habitats

Using the sand, water, rocks etc. create your own habitat.

– Which animal will live in your habitat? Place your small world animals in your habitats.

– Where does a polar bear? Why does it live here? What adaptations do they have?

– Where does a snake live? Why does it live here? What adaptations do they have?

– What is happening to the animals and their habitats because of climate change?

– What is happening to the ice caps?

– What happens when we chop down tress?

– Investigate through play.

Optional: Study the natural objects further with the magnifying glass.

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Habitat information

Amphibians
Require both land and water. The area needs to be warm, damp, light and dark and have shelter.

Insects/crustaceans/invertebrates
Can live almost anywhere. They need shelter, normally a hollowed brick/tree trunk/stone. Could live above or below ground.

Mammals
Can live almost anywhere. Need warmth, sunlight, shelter and water.

Birds
Need places up high, such as trees, cliffs. Need resources available to build nests.

Animals you may find in a garden
frog – amphibian
toad – amphibian
newt – amphibian
dragonfly – insect
squirrel – mammal
hedgehog – mammal
mouse – mammal
rabbit – mammal
ladybird – insect
bee – insect
butterfly – insect
woodlouse – crustaceans
earthworm – invertebrate
blackbird – bird
pigeon – bird

Parts of a tree
leaves
branches
trunk
bark
roots

Parts of a plant
flower
stem
leaves
roots

Links to Explore Further

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KS1 Science - BBC Bitesize

Describing materials – KS1 Science curriculum - BBC Bitesize

Why is it made from that? – KS1 Science curriculum - BBC Bitesize

World Earth day | KS1 | Ages 5-7 - BBC Bitesize

Credits

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We'd love to hear your thoughts and see your learners' creations.
Please share your outputs with us by emailing learn@bradford2025.co.uk
or by tagging us on social media: @Bradford_2025 and by using our
#BradfordMade hashtag.

Credits

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