



St Paul's C of E Primary School

Twist it, smash it, bend it!



This overarching question will have a Scientific focus, with a clear view point on materials, what their properties are, what they can be used for and how practical this is, whilst linking this to the practicality of objects and their designs, using the cyclical design, make, evaluate approach of Design Technology. Pupils' understand of materials and their properties will link to their exploration of Art through textiles and collage methods.

Discrete Lessons

RE: Glos Syllabus

PHSE: Dreams and Goals

Music: Performnce

PE: Agility (competition and performance)

MFL (KS2): Food and Shopping (conversational French)

Science

Pathway 5

Materials and their properties

Plants and Rocks (Year 3)

Art

Pathway 1

Collage

Design Technology

Pathway 2

Designing and Making

Mechanisms

Ensure you are looking the National Curriculum for statutory requirements for Working Scientifically and at the notes and guidance sections.

North Gate (N/R)

East Gate (1/2)

South Gate (3/4)

West Gate (5/6)

Materials – PROPERTIES & STATES OF MATTER

To identify and name a variety of everyday materials, (wood, plastic, glass, metal, water and rock)

To begin to investigate using different materials such as clay, dough and paper how some objects can be remoulded into different shapes.

To describe simple physical properties of a variety of everyday materials (*rough, smooth, bumpy, scrunch, shiny, dull*)

Year 1 – Everyday Materials

Pupils should be taught to:

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials
- compare and group together a variety of everyday materials on the basis of their simple physical properties.

Year 2 – Use of Everyday materials

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials

Year 3 - Rocks

Pupils should be taught to:

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.

Plants

Pupils should be taught

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants,

Year 5 and Year 6 – Properties and Changes of materials

Pupils should be taught to:

- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the

To begin to understand that it is cold and wet in winter and hot and dry in summer.

- compare and group together a variety of everyday materials on the basis of their simple physical properties.

: □ identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses

- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

including pollination, seed formation and seed dispersal.

Year 4 – States of Matter

Pupils should be taught to:

- compare and group materials together, according to whether they are solids, liquids or gases

- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)

- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

action of acid on bicarbonate of soda.

Working Scientifically

Identify and Classify: Group materials based on: colour, transparency, texture, thickness etc.

Comparative Testing: What type of sugar dissolves the fastest? Which shoe is the most slippy? Which material is best at keeping Paddington dry in a storm?

Fair Testing: How long does the temperature of tea affect how long it takes a sugar cube to dissolve?

Pattern Seeking: Do all stretchy materials stretch in the same way? Do all transparent materials have the same use?

Research: What are micoplastics and why are they harming the planet?

Observation over time: How does a container of salt and water change over time? How does a sugar cube change as it is put in a glass of water? How does a nail in salt water change over time?

Famous Scientists:

Jamie Garcia (BP website) – invention of a new plastic

Sir Humphrey Davy – separating gases

Spencer Silver – invented post-it notes

Ruth Benerito – wrinkle free cotton

	Antoine Lavoisier (1743-1794) Dmitri Mendeleev (1834-1907) John Dalton (1766-1844)
	KS3: Chemical reactions as the rearrangement of atoms. Representing chemical reactions using formulae and using equations. Combustion, thermal decomposition, oxidation and displacement reactions. Defining acids and alkalis in terms of neutralisation reactions. The pH scale for measuring acidity/alkalinity; and indicators..

Design Technology: Pathway 2
Designing and Making – Mechanisms

	North Gate (N/R)	East Gate (1/2)	South Gate (3/4)	West Gate (5/6)
Key Pathway 2: Design and make for a wide range of contexts	<p>Moving scene – Levers and Sliders</p> <p>Design</p> <p>Generate ideas by talking, drawing, and looking at examples.</p> <p>Choose characters, objects, and a simple background for the scene.</p> <p>Decide which movement to use: slider (back-forth) or lever (up-down).</p> <p>Make</p> <p>Use scissors safely.</p> <p>Join materials using glue, split pins, and card strips.</p> <p>Create sliders and levers that work smoothly.</p> <p>Evaluate</p> <p>Talk about what works well and what could be improved.</p> <p>Does slider work smoothly etc</p>	<p>Moving Story Book – levers and linkages – moving story book.</p> <p>Design</p> <p>Research and explore examples of moving posters/books.</p> <p>Use annotated sketches to plan movement paths.</p> <p>Select appropriate linkage types (fixed pivot, loose pivot, parallel linkage).</p> <p>Make</p> <p>Accurately measure, cut and assemble card strips.</p> <p>Use tools more independently: hole punch, split pins, scissors, craft knives (supervised).</p> <p>Build stronger, more stable mechanisms.</p> <p>Evaluate</p> <p>Evaluate function and appearance.</p> <ul style="list-style-type: none"> - Does your linkage create the movement you intended? 	<p>Childrens Toy – Cam mechanism</p> <p>Design</p> <p>Research real moving toys</p> <p>Understand how different cam shapes affect movement.</p> <p>Produce labelled diagrams, cross-sections, or exploded drawings.</p> <p>Make</p> <p>Measure and cut materials accurately.</p> <p>Construct a strong frame to house the mechanism.</p> <p>Assemble cam, axle and follower correctly.</p> <p>Evaluate</p> <p>Evaluate the success of the mechanism and final product.</p> <ul style="list-style-type: none"> - Does the cam produce the movement you planned? - Is the toy stable and strong? 	

To use a hammer and nails to join two pieces of material together (wood) in a supervised area

To begin to safely explore other tools that can be used to create/ break down products

In a group, or with an adult, discuss what has been made and discuss the process that was followed to make the object

Compare final product to original design.

- Is the mechanism smooth and reliable?
- Does the product meet the design criteria?

Suggest improvements using DT vocabulary (pivot, linkage, lever, movement).

- Is it appealing to the target user?
- Does it meet your design criteria?

Reflect using technical vocabulary (cam, axle, follower, rotation, lift).

Art: Pathway 1
Textiles and Collage

	Northgate (N/R)	Eastgate (1/2)	Southgate (3/4)	Westgate (5/6)
	Through exploration and application of the essential concepts, pupils will:			
Immerse. The art technique/ artist	<p>To know that an artist is a person who creates pieces of art</p> <p>To discuss what I like and don't like about a piece of artwork</p> <p>To use words to describe the colours and images in different pieces of artwork</p> <p><i>Vocabulary</i> Artist, different, same, like, dislike, back, front, light, dark, colour (ful)</p>	<p>Artist focus: Brianna McCarthy</p> <p>Introduce the work of a range of artists.</p> <p>Looking at the language used to describe art work.</p> <ul style="list-style-type: none"> Describe the work of artists and designers. Use some of the ideas of artists studied to create pieces. <p>Collage To begin to use a range of materials creatively to make an imaginative piece</p> <ul style="list-style-type: none"> To begin to carefully use a range of small tools, including scissors To use cut, torn and glued materials. To sort and arrange materials dependent on a variable To begin to mix materials to create new textures 	<p>Artist focus: Hannah Hoch and Picasso</p> <p>To build upon known work of artists seen before</p> <ul style="list-style-type: none"> Replicate some of the techniques used by famous artists, artisans and designers. Create original pieces that are influenced/inspired by studies of others. <p>Collage</p> <ul style="list-style-type: none"> To arrange materials for a striking effect. To ensure work is precise. Start to use coiling, overlapping, tessellation, mosaic and montage. 	<p>Artist focus: Henri Matisse and Antoni Gaudí</p> <p>To identify, discuss and evaluate great artists, architects and designers in history.</p> <ul style="list-style-type: none"> Give details / information (may include own sketches) about the style of some famous artists, artisans and designers. To show how the work of artists studied was influential in both society and to other artists. Create original pieces showing a range of different influences and styles. <p>Collage</p> <ul style="list-style-type: none"> To effectively mix textures. To successfully combine visual and tactile qualities. Start to use ceramic mosaic materials and techniques.

To use a selection of materials or objects to create a piece of art – based on the theme being taught

Collage

- To begin to use scissors to cut a thin material (paper)
- To use cut, torn and glued materials
- To arrange materials dependent on a variable eg. Rough, smooth, shiny.

Evaluate and Analyse

To begin to comment on other people's work (artists or peers) saying what they like or dislike and give reasons for this

Vocabulary

Artist, different, similar, compare, observe, (observation) background, foreground, light, dark, colour (ful), bright, dull, pattern

Vocabulary

Draw, sketch, line, thick, thin, shape, colour, pattern, texture, repeating
Technique, match, mix, primary colours, secondary colours, thick brush, thin brush, warm (colours), cold (colours)
Materials, tools, press, roll, stamp, rubbings, pattern, printing block
Model, collage, textiles, rolling, cutting, moulding, carving, kneading, shaping, join, natural, man-made, texture, glue, stitch, plait, tearing, fold(ing)

Evaluate and Analyse

To begin to comment on other people's work) saying what they like or dislike.

Evaluate and Analyse

To give personal opinions, with justification about likes and dislikes about a piece of art.

To describe the differences and similarities between different practices and disciplines, and making links to their own work.

Vocabulary

Middle ground, detail, develop, complement, contrast, variety (variations), creative process, technique, symbolic, patterned, pale, deep, vibrant, balance

Vocabulary

Tone, texture, blend, shading, light, shadow, grades of pencil, hatching, cross-hatching, figure
Wash, mood, watercolour, tertiary colours, , colour wheel, tone, shade, combine, brush strokes, paint (poster, powder, acrylic),
Block printing, layering, scraping, gouge,
Sculpture, slip, form, manipulate, construct, cross-stitch, back-stitch, weave, quilt, pad, fabric, detail, form, texture, expression, movement, overlapping, crumple

Evaluate and Analyse

To create sketch books to record their observations and use them to review and revisit ideas

To compare ideas, methods and approaches in my own and others work and comment on what I think and feel about it.

Vocabulary

Representation, atmosphere, subtle, complex, perspective, proportion, intense, emotion(al), engaging, flowing, delicate,

Vocabulary

Smudge, refine, alter, layer, realistic, impressionistic, movement
Palette, spectrum, tint, hue, colour wash, complimentary (colours), contrasting (colours), overlay
Motif, relief, impressed, resist, visual elements
Visual elements, tactile, frameworks, stability, form, precision (in techniques, tapestry, applique, harmony, coils, slabs, malleable

Vocabulary

Draw, line, thick, thin, shape, colour,
pattern, repeating
mix, primary colours,
Materials, tools, press, roll, stamp,
pattern,
rolling, cutting