

Science



Intent



At Southway Junior School, we aim to equip our children with the skills and knowledge to enable them to explore, understand, engage with and question an increasingly scientific world. Our ambition is for children to be curious to find out answers to their own questions and develop an increased understanding of the world around them.

Our coherently planned and sequenced curriculum intends to:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics;
- Build **resilience** whilst equipping children with a range of scientific skills, including; observing, measuring, predicting, explaining, communicating and evaluating;
- Enable children to explore and solve problems through active, hands-on learning, where **teamwork** and **kindness** is often a priority;
- Develop progressive use of scientific language to support children's understanding of scientific concepts and **respect** for the world around them;
- Develop positive attitudes and a passion for science.

Implementation

In science, we implement an inclusive curriculum that meets the statutory requirements of the National Curriculum. We have sequenced the curriculum to ensure that progression is made year on year and that it fits in with the topics where appropriate. Scientific enquiry skills, along with progressively challenging vocabulary and concepts, will be explicitly taught in lessons throughout the children's school career.

Through careful planning, we incorporate the school's pedagogical approach of inside out, interactive and independence, allowing children to find out for themselves how to answer questions in a variety of ways. Children are encouraged to ask their own questions and will be given appropriate equipment to use their scientific skills to discover the answers.

At the beginning of each science unit, the children complete an assessment grid, where they record their current knowledge on the topic. This is then used by teachers to inform and prioritise planning. At the end of the unit, children return to their original assessment grid and add to it in a different colour to demonstrate progression.

Impact

Science books will demonstrate a progressive knowledge and skills in a variety of ways. Sometimes, children will record in a traditional scientific written report style, including using prediction, method and conclusion. However, other recording methods can be used, including photos of practical work, drama with captions, writing scientifically for a purpose (e.g. letters or diaries), factual non-chronological reports. The work presented in books is to a high standard which shows the love and passion for the subject.

At the beginning and end of each unit, every child will complete an assessment grid. The assessment grid will show progression of knowledge and that common misconceptions have been addressed through careful planning. Individual progress will also be evident from the end of unit summative 'quizzes' which will involve children applying their scientific understanding to a variety of real life contexts. These summative assessments are recorded on a whole-school assessment grid from years 3 to 6.

Southway Three IIs



At Southway our pedagogical approach is based on three key, identifiable elements.

INDEPENDENT LEARNING MEANS...

- Teachers providing structured, well ordered classrooms
- Teachers ensuring clear routines
- Staff having consistent learning behaviour expectations
- Teachers providing high quality resources
- Teachers promoting children as teachers as well as learners
- Teachers providing appropriate tasks and learning for children to access at all levels of ability
- Staff applying the C3B4ME – ‘See three before me’ approach

INTERACTIVE LEARNING MEANS...

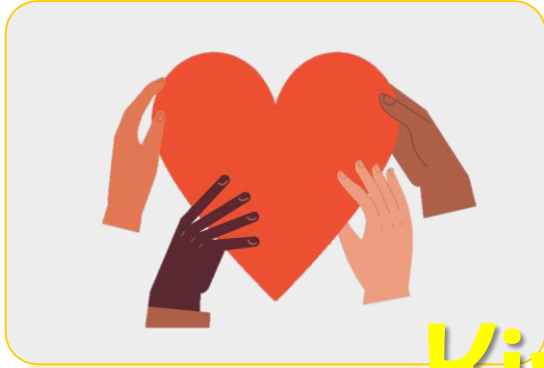
- Teachers finding appropriate opportunities for exploratory learning through hands on experiences
- Teachers using the outdoors as a teaching and learning space



INSIDE-OUT LEARNING MEANS...

- Children working harder than teachers
- Children investigating rather than being told
- Teachers asking more open ended questions
- Teachers focusing on enquiry based learning
- Teachers demanding excellence

Southway's Values



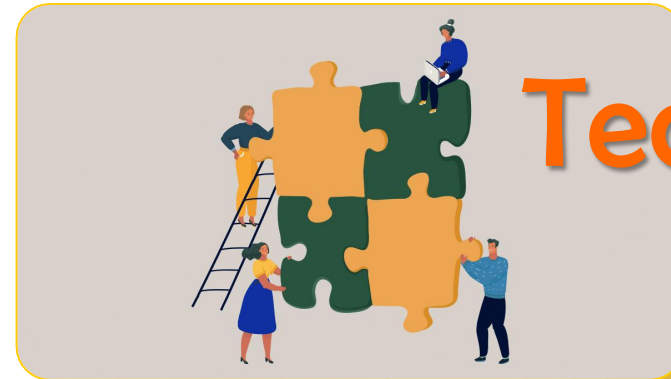
Kindness



Respect



Resilience



Teamwork

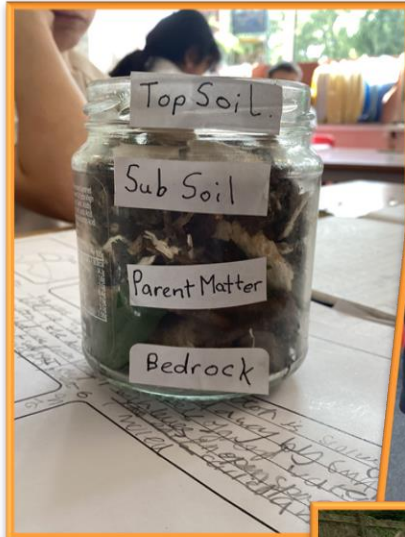
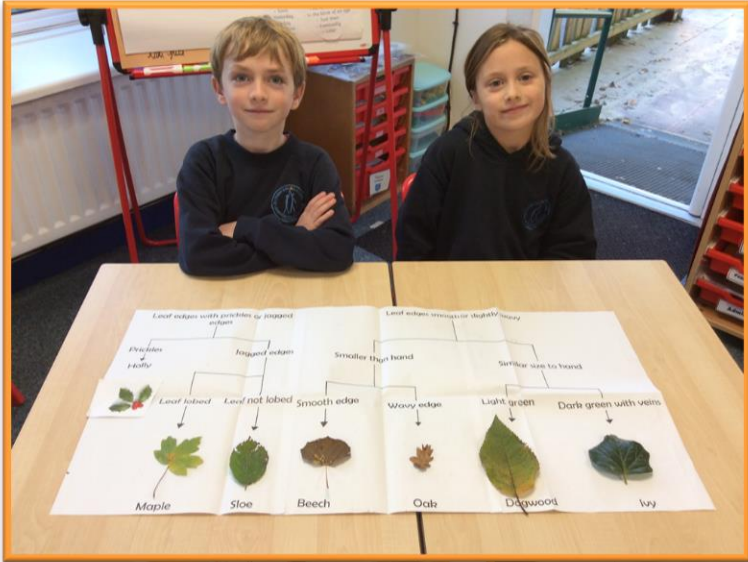
Curriculum Overview



A high-quality science education provides the foundations for **understanding the world** through the specific disciplines of **biology, chemistry** and **physics**. Science has changed our lives and is vital to the world's **future prosperity**, and all pupils should be taught essential aspects of the **knowledge, methods, processes and uses of science**. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of **rational explanation** and develop a sense of **excitement** and **curiosity** about **natural phenomena**. They should be encouraged to understand how science can be used to **explain** what is occurring, **predict** how things will behave, and **analyse causes**.

Year group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3	Plants	Living things and their habitats	Animals, including humans - teeth and healthy eating	Animals, including humans – the skeleton	Rocks and soils	Rocks and soils
Year 4	Electricity	Forces and magnets	Light	Light	States of Matter, Earth and Space	States of matter, Earth and Space
Year 5	Sound	Sound	Properties and changes of materials	Properties and changes of materials	Living things and their habitats	Living things and their habitats
Year 6	Evolution and inheritance Animals, including humans – food chain	Forces	Light	Electricity	Animals, including humans – growth, life cycles, healthy living	Animals, including humans – growth, life cycles, healthy living

STANDARDS IN YEAR 3



STANDARDS IN YEAR 3



Which damages teeth more?

Type of liquid	Day 1	Day 2	Day 3	Day 4	Day 5
Water					
Orange juice					
Coke					
Tea					

WALT understand how plants are pollinated



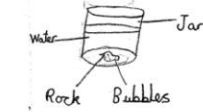
18.05.23

WALT: investigate which rocks are permeable.

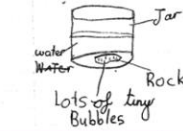
Prediction: I think the Sedimentary rock will be the most permeable because it has been formed by many layers so maybe it has some between each layer so water can go through.

I think the Igneous/Metamorphic rock is impermeable because it has heat in it and with heat will not let water get through it.

Igneous Rock.



Metamorphic Rock.



23.10.22

ROOTS

The roots absorb water from the soil. They help to hold the plant.

Stem

The stem helps to support the plant.

Leaf

The leaves use sunlight to make food for the plant.

Flower

The flower helps the plant reproduce (make more plants).



WALT: investigate the way in which water is transported within plants.

I predict that the food dye is gonna change the water and flower.



Method

1. Pour 4 drops of food dye into a cup.
2. Add water to the cup.
3. Remove the ends of the celery.
4. Place the celery in the cup.

WALT: name the different teeth and understand their function

My Teeth



How many...

Incisors: 8

Canines: 4

Molars: 8

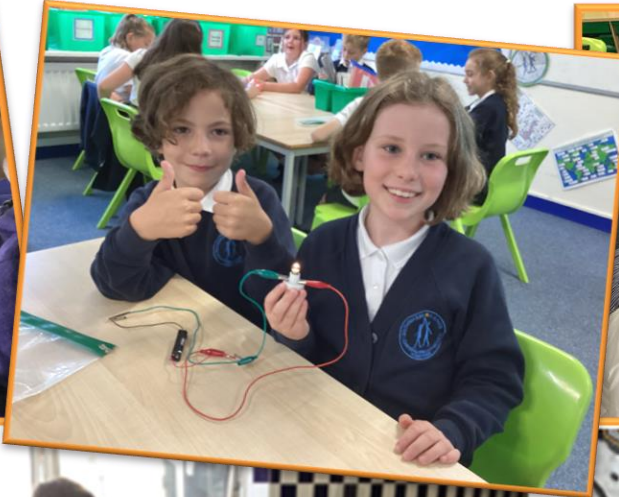
Pre molars: 8
Wisdom teeth: 0

The soil which I predict will let the least water through will be the clay because it is hard to break up.

Soil	Observation
Clay	No water went through. impermeable. Water sat on top then went down edge instead of going through the clay.
Loam Soil	Extremely slowly water dropped through. Soil absorbed water before letting it through.
Sand	Water went straight through.



STANDARDS IN YEAR 4



Solid



Liquid



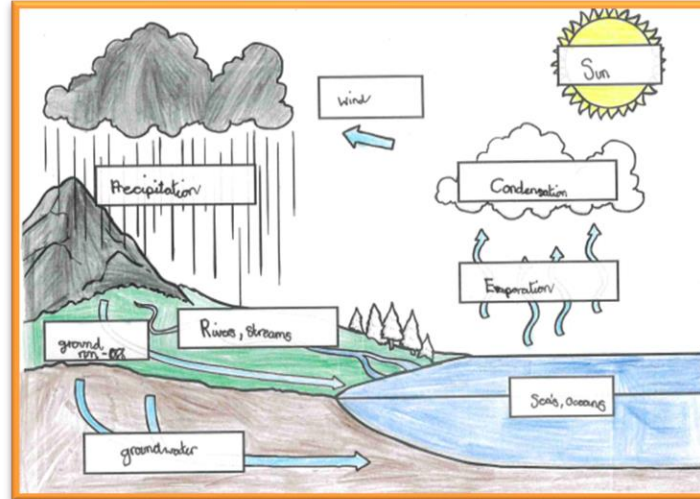
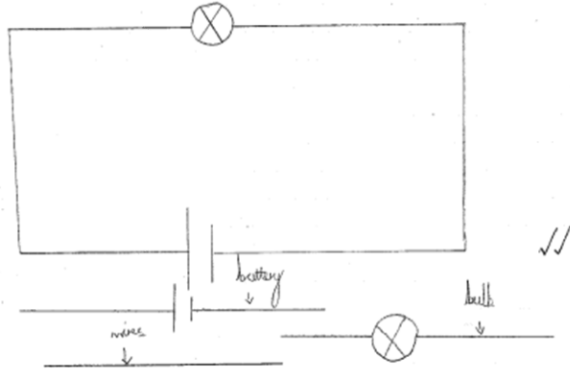
Gas



STANDARDS IN YEAR 4



15.06.22
WALT: Select appropriate materials to build a circuit.



08.02.23
WALT: observe how light travels through materials.

Materials	Prediction (transparent, translucent or opaque)	Result (What did you see?)
Foil	opaque	opaque
Plastic wallet	transparent	transparent
Felt	opaque	opaque
Card	opaque	opaque
Tissue paper	translucent	translucent
White board	opaque	opaque
Tracing paper	translucent	translucent
Mirror	opaque	opaque
Dishcloth	translucent	translucent

Dear chief,

Today we tested different materials to see which ones would be best for you to use in your hut. From our observation we have found out that the best material for your lounge is plastic wallets because it's transparent which means all of the light goes through it and the best material for your bathroom is tissue paper because it's translucent which means only a bit of light goes through it.
Yours sincerely,

WALT: plan a fair test to investigate the size of shadows

Our question is... How does the distance between a light source and an object affect the shadow?

We could change
distance of light source
distance of the object

We could measure/observe
measure the width
darkness of the shadow
measure length

We will change...
distance of light source

We will measure/observe...
measure length

We will keep these the same...
the object will stay in the same place
light source
object

When I change...
distance of light source

I predict...
when the torch is close to the object the shadow will be bigger. When the torch is far away from the object the shadow will be smaller.

22.03.23
WALT: carry out a fair test to investigate the size of shadows.

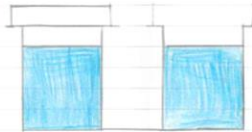
Results from moving the object

Distance (from light source)	size of light shadow
10cm	75cm
20cm	45cm
30cm	35cm

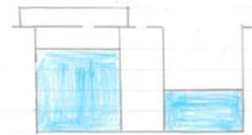
I found out that when the object is further away from the light source, the shadow is smaller. Additionally, if the object was closer to the light source, the shadow is created was bigger. This was because the object blocks the light. When it blocks more light, it makes a bigger shadow. When it blocks less light, it makes a smaller shadow.

3.06.23

WALT: understand and explain what happens when water condenses and evaporates.



Last week, we filled two jars with water and left them in a warm place by the window. One jar had a lid on it and the other did not. Each day, we checked the water level and marked on where it was.



This week, the jar without the lid has far less water than the jar with the lid. This is due to evaporation.

04.10.22

WALT: explain which materials conduct and insulate electricity.

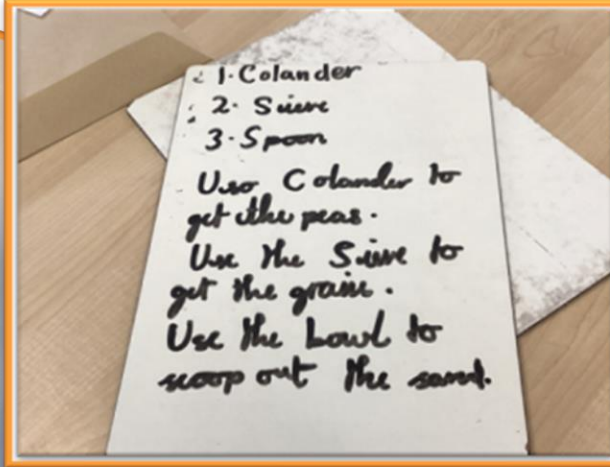
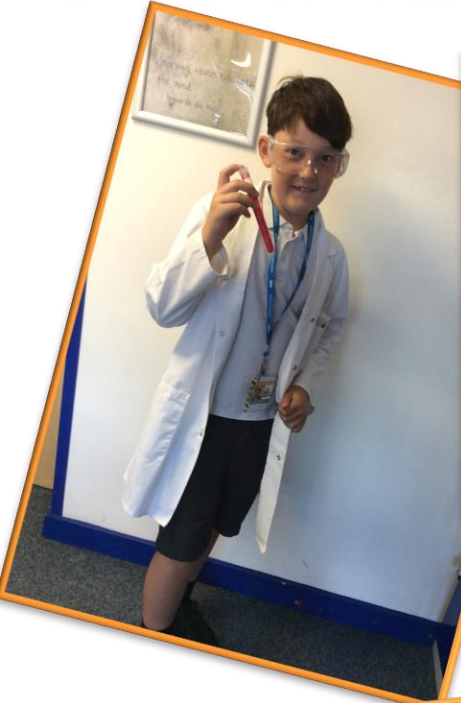
WALT investigate which materials conduct electricity

Materials	Prediction	Results
sugar paper	Insulator	Insulator
wire	Conductor	Conductor
Tin foil	Conductor	Conductor
Lolly stick	Insulator	Insulator
Peg	Insulator	Insulator
Paper	Insulator	Insulator
Paper clip	Conductor	Conductor

Spit pin Conductor Conductor

Today we found out what a conductor and an insulator do. A conductor lets electricity through and an insulator does not. We tested different materials and found out that metal objects are good at conducting electricity.

STANDARDS IN YEAR 5



STANDARDS IN YEAR 5



2.9.22 WALT: Conduct an experiment.

Challenge:
Design a structure to protect an egg cracking when dropped.

Equipment:

- cotton wool
- 5 plastic bags (cleaning)
- 3 elastic bands
- 2 tape
- Kitchen roll
- shoes

Diagrams:

Results:

Drop Number	Points	Result
1	10	no cracks
2	10	no cracks
3	10	no cracks
AVERAGE POINTS:	10	POSITION: 4th

Egg content (no cracks) = 10pts
A good crack (cracked but no yolk visible) = 5pts
Scrambled egg (smashed) = 0pts
Egg cooking (egg not basted/uncooked) = +5 pts

Evolution
We finished 4th because our egg did not crack after three drops. Our average score was 10 points. The reason our egg didn't crack was because we used so much padding. I would maybe change this experiment.

Parts of a Lily

Style
Female part of the flower which is sticky that allows pollen to stick to it.

Filament
The thin stick that supports the anther which is the male part of the flower.

Petal
The part of a flower that is on the outside of the flower.

Sepal
The sepal absorbs the sun's rays and makes the flower grow bigger.

Anther
The part of the flower where pollen is produced.

Ovary
The enlarged base portion of the flower where the ovules are.

Stigma
It is a sticky part of the flower that catches pollen.

Leaf
In photosynthesis, the leaf takes in carbon dioxide and releases oxygen.

27.01.23 WALT: classify materials based on their properties.

Solids	Liquids	Gases
orange Deans paper pencil	cherry-aid water Blackcurrent squash	oxygen methane Helium

I sorted my items into: solids, liquids and gas.

House Diagram:

- Chimney: wood
- Roof: glass
- Windows: glass
- Door: wood
- Sofa: fabric and pillows
- Stairs: wood

My roof is made of glass the same as my windows.

My door, stairs and chimney are made out of wood.

My sofa is made out of fabric, blanket and pillow.

Roof because I can see the weather and glass is strong.

5.02.22 WALT: explore and explain how sounds are made.

Instrument	How did it make sound?	Picture
Ukulele	When you pluck the string it vibrates and the sound box amplifies the sound.	
Hand drum	When you hit the skin, it vibrates creating sound.	
Vibraphone	When you dip the metal weights against the wooden board.	
Chime bar	When you hit the chime it vibrates and the sound is amplified in the sound box.	

Marie Curie

Marie Curie is one of the most famous female scientists of all time. She was the first woman to win a Nobel Prize and the only woman to win the award in two fields of science.

The young scientist

Although known to the world as Marie, Curie's real name was Maria and she was born in Warsaw, Poland, in 1867. Maria's father inspired Maria to achieve science. She moved to Paris to study physics at university because she could not study at her homeland, Poland.

Fun Fact
Marie Curie did her most important scientific research in her shed!

A letter home
In World War I, Marie created small moving X-ray machines (called Röntgen Curie) and her daughter X-rayed wounded soldiers to find broken bones, bullets and shrapnel. However, she did not know how dangerous it was to work with radioactive elements. At the age of 66 she died of radiation poisoning, but there is a Marie Curie charity shop that still helps people today.

Later years
In Paris, Marie met Pierre Curie (who was also a scientist about science) and married him. Marie Curie and her husband discovered new elements, radium and polonium. Amazingly, she won a Nobel Prize in physics in 1903. Then unfortunately, three years later her husband, Pierre, died in a road accident. However, she still worked hard and won her second Nobel Prize in 1911 for chemistry.

13.03.23 WALT: Identify soluble and insoluble materials.

Soluble: able to be dissolved.

Insoluble: incapable to be dissolved.

Dissolved: when a substance combines with water creating a mixture.

Prediction
I think sugar is soluble because you put it in tea.
I think herbs are insoluble because when you cook herbs don't dissolve.

Method:

Conclusion
In conclusion I found out that sugar, honey and salt dissolved in water. This is because the attraction between the particles of the solvent and solute are strong. I found out that stirring and heating dissolved faster.

Results:

Material	Soluble and insoluble	Notes: Did it dissolve quickly? What colour is it? Did it dissolve?
Sugar	Soluble	Dissolved slowly like salt - still some small grains. Sugar dissolved when hot.
Honey	Soluble	Dissolved slowly - Honey is already a solution.
Herbs	Insoluble	Water turned green still big grains.
Food coloring	Soluble	Water turned red completely mixed all at the bottom.
Flour	Insoluble	Water went white but didn't dissolve.
Salt Spices	Insoluble	Water turned brown but still big grains.

15.5.23 WALT: apply knowledge about the life cycles of amphibians and insects.

Stem Metamorphosis in animals means the process of transformation from an immature form to an adult form in two or more distinct stages. Good examples are insects and amphibians.

Life Cycle Diagram:

Day 1:
Dear diary, my mum left me in my egg with my brother Fin and sister Emmy. I'm only a little. Emmy said that I'm red with blue stripes and Fin said that we are all in the young stage and that we hatched 1 day ago.

Day 2:
Dear Diary, I'm now 5 days old! Emmy said we are in the cocoon of life. Me and my sibling all were munching on leaves. They were delicious. We are now all gummy caterpillars.

Day 10:
Dear Diary, we are all now in adult head as caterpillars. So soon I will have to hang on a leaf. It sounds scary but I want to give it a go. Emmy and Fin said we'll be fine.

Day 14-30:
Dear diary, Emmy said that we are in the pupa stage. It sounds so exciting! I went with Fin and Emmy to a perfect leaf and we finished being a caterpillar so we hung in a chrysalis. It was dark. It's called metamorphosis.

STANDARDS IN YEAR 6



STANDARDS IN YEAR 6



Name: Sophia Chesser

My creature is a Zelfe

Habitat Savannah Grassland
Where does your creature sleep? in long grass
What is its home made from? grass and mud.

Diet - Carnivore
What does it eat? Insects, lizards and other small animals.

Defence/Movement The Zelfe can run away in the place of being hurt. With its tail and sharp claws it can jump and climb into the nearest bush.

Adaptation to Climate
The Zelfe doesn't get hurt because of its thin fur so it can survive. It's fully adapted to the heat and the weather of the savannah.

Adaptation Body/Physical
It has sharp teeth to kill prey, pattern fur to camouflage. To attract the Zelfe can jump and can smell up to 500m away.

My habitat is Savannah Grassland

22.11.22

Walt: Plan and conduct a fair test to investigate air resistance

If we change the size of the spinner will it affect the speed the spinner drops to the ground?

Prediction
I predict that the smallest spinner will fall to the ground the fastest. I think that because it is smaller so it's more aerodynamic than the bigger one.
I predict that the biggest spinner will fall the slowest. I think that because it is bigger so it will have more air resistance so the air will stop it slower.

Results

Paper Spinners

Spinner	First Drop Time	Second Drop Time	Third Drop Time	Overall Drop Time	Average Drop Time
Small	1.45	1.25	1.65	4.35	1.45
Medium	1.25	1.15	1.35	3.75	1.25
Large	2.25	1.85	1.65	5.75	1.92

Conclusion: The best spinner, with the greatest air resistance, was the Medium spinner.

6. Conclusion
Having conducted my experiment, my prediction was correct but my work shows that the medium one had more air resistance but I know that it should have been the largest one because it has the largest surface area so there are more particles hitting it but for the smaller one it has a smaller surface area so there are less air particles hitting it.

CHARLES DARWIN

Early Life
Charles Darwin was born February 12th 1809 in Shrewsbury, England. He was eighth out of six children and was born into a wealthy family. He had a mother and a father but his mother died when he was 5 years old. As a child he had shyness, catshy and shy. He was very close to his brother. At school he didn't enjoy or like school, his father said "you care for nothing but shyness, catshy and shy, and you will be a disgrace to your name and your family." Later on he went to study medicine at Edinburgh University but didn't stay on because he was too shy. Then he started studying at Cambridge. He then became a vicar but didn't because he got an opportunity to go on the H.M.S. Beagle.

Voyage
As soon as he was offered the opportunity to go on a voyage he was delighted to say yes. His main role was to collect the specimens but he started to go and discover new things. They were on the voyage for 5 years (1831-1836). Over the years he collected lots of things like fossils, bones and different new species. They visited Brazil, Chile, Argentina, the Falkland Islands and the Galapagos Islands. Sadly even though he did lots of hard work he did not get paid.

Discovery
Although lots of people think Darwin did not come up with the idea of evolution, he realised specific advantages about animals to survive. Due to people being shyness, they didn't like the idea so he had to look them up because it was too scary for lots of people. In 1859 someone was about to discover what he already did so he wrote everything he saw in a book called "On the Origin of Species" and got published. He still got some hate for that but lots of support too. Sadly in 1882 he got away due to health issues.

ZELFE

Habitat
The Zelfe is native to Australia and is highly specialised to survive the challenges of the savannah biome. Although the Zelfe is a lovely 100°C to 30°C all year round, it can still live in the savannah to keep cool in the hot environment, the Zelfe normally burrows underground, huddles down. An abundance of fauna (animals) can be found in the savannah, such as kangaroos, lizards and Zelfes. (Note: Zelfe) includes long grasses, trees and shrubs. Due to the fact it is hot in the savannah, the Zelfe has thin fur to cool down but it also protects it from getting sunburnt. As nighttime is cooler than daytime, the Zelfe is partly nocturnal. Carbach means it sleeps in the day and gets up in the night.

Diet
The Zelfe is known as a carnivore (which means it only eats meat). To survive the Zelfe eats insects, lizards and other small animals. In order to hunt prey it uses its long sharp claws and its tail to pounce into the animal's throat. Another way of hunting, it uses its camouflage to creep up on the victim and then pounce upon it.

Defence
Sitting in the middle of the food chain the Zelfe always has to watch out for the predatory birds but it has many forms of defence. The defences include standing on its back, two legs and hunking at the top of its wings and then standing up then jumping back down, throwing out its limbs.

Adaptation
Sharp claws to force through the animals throat.
Big ears for hearing.
Camouflage for to disguise.
Big sharp teeth to eat meat.

21/05/23

WALT: Identify and label organs of a human

- Ear**: Helps you hear things.
- Brain**: Controls your body and thinks.
- Lungs**: Helps you breathe.
- Liver**: Absorbs food into blood stream.
- Large intestine**: Digests anything that didn't get digested in the stomach.
- Heart**: Pumps blood around you.
- Stomach**: Stores energy, digests food.
- Kidney**: Controls breathing.
- Small intestine**: Digests anything that didn't get digested in the stomach.

11.2.22

Walt: Hypothesis and justify base Gravity

Links

When I stood on the table, the objects dropped off it. The gravity pulls the objects down to the floor really quickly. Gravity is all around us. When we jump it starts from going to high. Gravity is also one of many forces. The acceleration of dropping something is really fast.

6.12.22

Walt: Investigate water resistance

Links

Prediction
I predict that the one with the least air resistance will be the cylinder because it is the thinnest and that the one with the most air resistance will be the flat disc because it has the biggest surface area.

Shape	Time taken 1 st time	Time taken 2 nd time	Time taken 3 rd time	Mean
Shape 1	1.53 seconds	0.81 seconds	1.13 seconds	1.156
Shape 2	1.07 seconds	1.31 seconds	0.89 seconds	0.96
Shape 3	0.90 seconds	0.80 seconds	0.58 seconds	0.763
Shape 4	5.06 seconds	4.72 seconds	7.15 seconds	5.643

WRITING ABOUT SCIENCE:

At Southway Junior, each year group dedicates a unit of English, where children complete an extended piece of writing, linked to their science learning.

Year 3 – Non-chronological page about volcanoes, linked with rocks and soils learning.

Year 4 – Non-chronological page about planets, linked with space learning.

Year 5 – Fact pages about Class names

Year 6 – Evolution – creating animal

Pupil Voice



"I really enjoy it when we record how much something does over a period of time."

"My favourite kind of science lessons are when we get to do experiments."

"I loved creating my own animal after we learnt about evolution."

"My favourite piece of work is when we presented our science learning on fact pages."

"I learn best in science when we are working in groups."

"I learn most when I am using resources."

"I like learning science outdoors."

Science trips:

Throughout their time at Southway, the children get the opportunity to attend multiple school trips with a focus on their science learning.

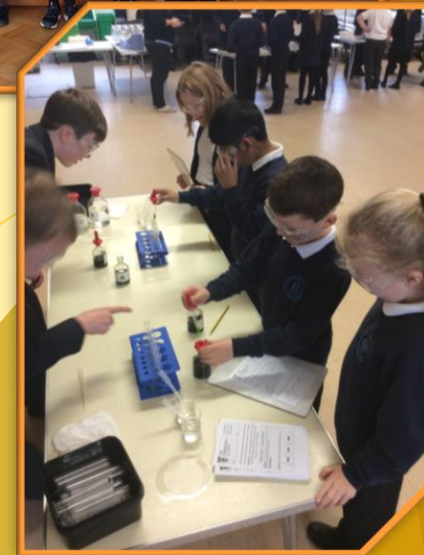


Enrichment Opportunities

Each year, we run a science week and it is themed in line with British Science Week.

Throughout this week, the children take part in a variety of science activities, including the following:

- Whole school science experiment.
- A science quiz, resulting in a winning team per year group.
- A science focused assembly.
- Visits from the local secondary school, where the children join in with a variety of different experiments.
- Science reading activities.



Each year we have the opportunity to take part in the Mid Sussex Science Week.

Mid Sussex Science Week 2022:

As a school, we were teamed up with local company, Edwards Vacuum, to complete a science project, which was decided between us and the company. Each teacher chose 2 children who had a special interest in science, technology, engineering and maths (STEM) to take part.

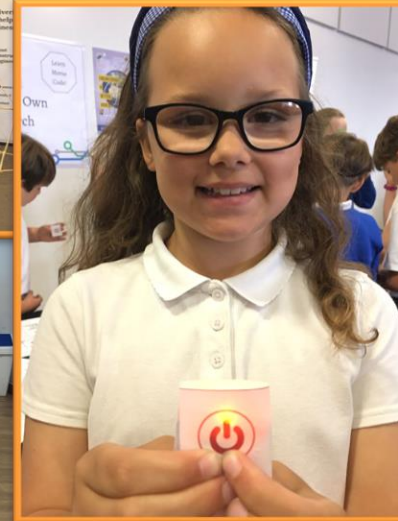
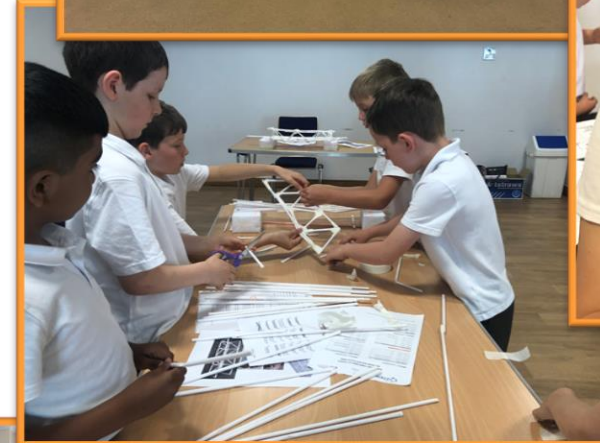
This year, our project was to use engineering skills to build rockets, which were made out of durable materials.

To start the week, the children tested a variety of materials against water, wind, strength when dropping from a height and how aerodynamic they were. They then used this information to design and build the rockets.

During the building stage, ambassadors from Edwards came in to help support the children and offer their expertise.

Finally, the children put their rockets to the test against the same elements from the beginning of the week.

As our fab finish for the week, we were invited to attend the 'Big Bang' science fair, where children were able to present their projects, as well as take part in a variety of STEM activities such as; making an LED torch, exploring what happens to objects when put into a vacuum, watching a science show and learning about solar cars.



Each year we have the opportunity to take part in the Mid Sussex Science Week.

Mid Sussex Science Week 2023:

This year we were teamed up with Leap Environmental and our project focused on sustainability and renewable energy. To start the week, the selected children had workshops with experts, learning about why being more sustainable is so important and ways that we can use renewable energy. The children then designed their own wind turbines, which needed to not only produce wind energy, but also be attractive and have another function (e.g. solar power or act as a habitat for bugs).

Once children had shared their designs and gained feedback from the professionals, they built their wind turbines and tested them.

Once again, we attended the 'Big Bang' science fair at the end of the week, where children were able to present their projects. The children really impressed the spectators with their enthusiasm, knowledge and hard work.

