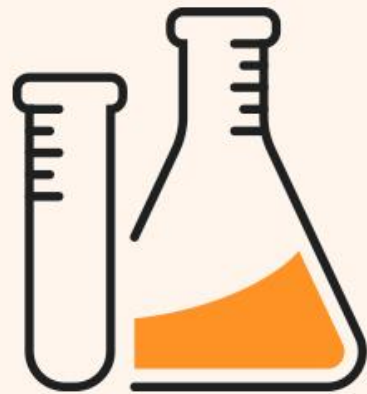


# Science



# 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's Values



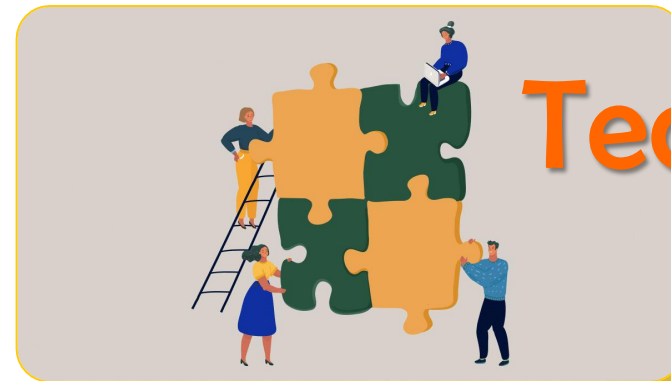
**Kindness**



**Respect**



**Resilience**



**Teamwork**

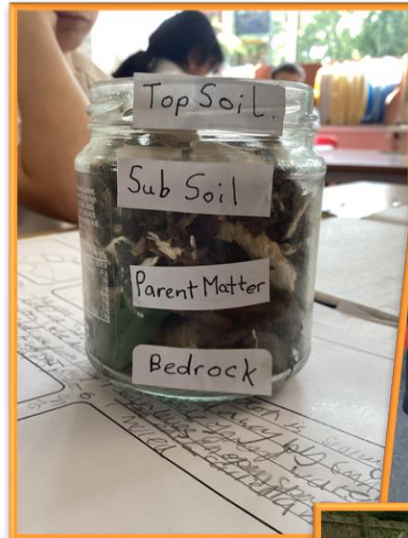
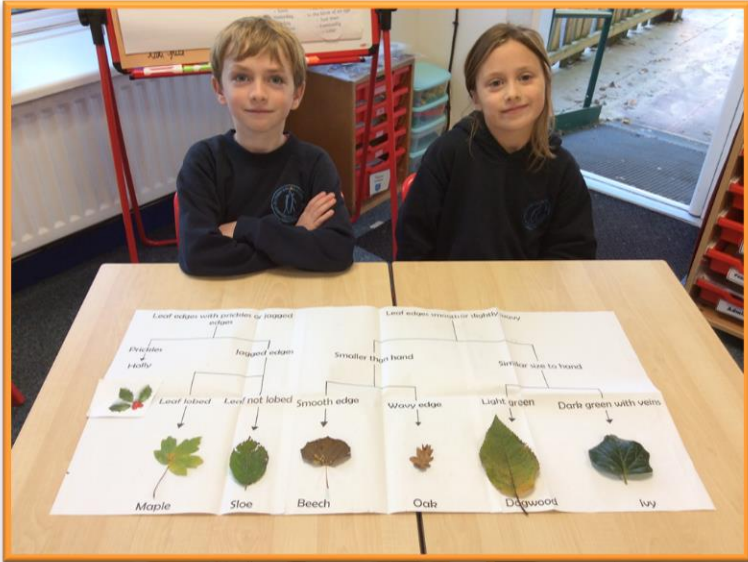
# Curriculum Overview



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

The plant wants to make more of itself and smell of those flowers lets the bee know that there is sugar in it.

The bee then flies to another plant and helps the plant produce more of the pollen sticks seeds to the stigma.

The bright colours whilst calling the bee on the bees legs.

Finally the plant can make more of itself.

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**

water Jar  
Rock Bubbles

**Metamorphic Rock**

water Jar  
Rock  
Lots of tiny Bubbles

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.

**Diagram**

**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.

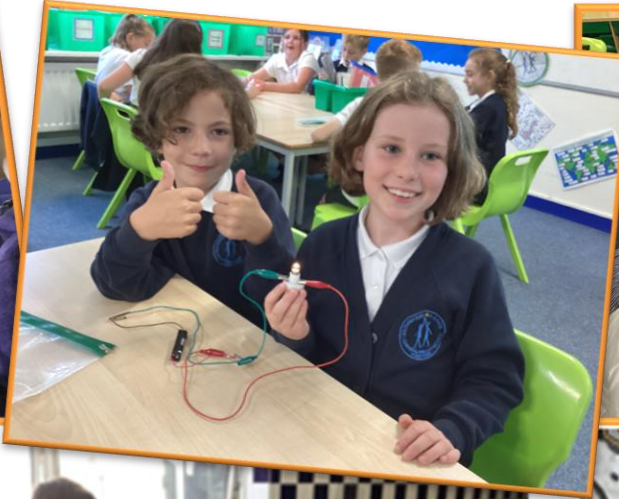
Soil	Observation
Clay	No water went through. Impermeable. Water sat on top then went down edge instead of going through the clay.
Loam Soil	Extremely slowly water dropped through. Soil absorbed water before letting it through.
Sand	Water went straight through.

**Diagram**

water filter paper funnel  
soil beaker



# STANDARDS IN YEAR 4



**Solid**



**Liquid**



**Gas**

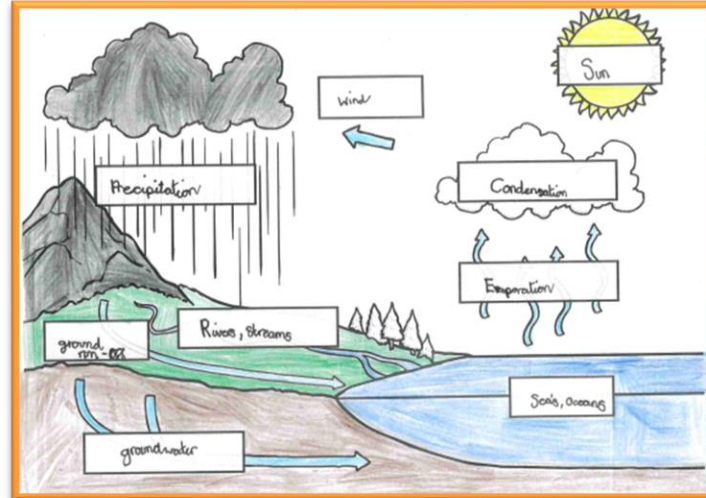


# STANDARDS IN YEAR 4



15.06.22  
WALT: Select appropriate materials to build a circuit.

The diagram shows a rectangular circuit loop. At the top is a battery symbol. On the right side is a circle with an 'X' inside, representing a bulb. At the bottom is another circle with an 'X' inside, representing a switch. A vertical line on the left side represents a wire. Below the main circuit, there are labels: 'wire' with an arrow pointing to the left vertical line, 'battery' with an arrow pointing to the top horizontal line, and 'bulb' with an arrow pointing to the right vertical line.



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 chiefl  
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    objects

**When I change...** distance of light source

**I predict...** when the torch is closer to the object the shadow will be bigger. When the torch is further 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 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.

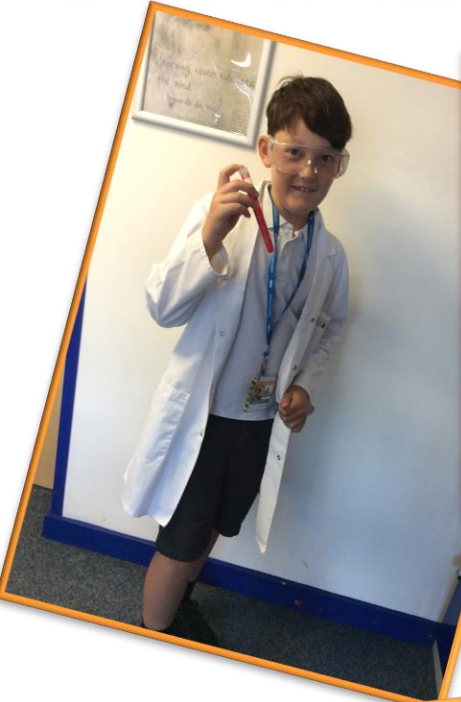
04.10.22  
WALT: explain which materials conduct and insulate electricity.

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



1- Colander  
2- Sieve  
3- Spoon  
Use Colander to get the peas.  
Use the Sieve to get the grain.  
Use the bowl to scoop out the sand.



# 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 (realign)  
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: 4 <sup>th</sup>

Evaluation:  
We finished 4<sup>th</sup> 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.

13.03.23 WALT: Identify soluble and insoluble materials

Results:

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

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 dissolve faster.

27.01.23 WALT: classify materials based on their properties

Solids	Liquids	Gas
orange Deans paper pencil	cherry-aid water Blackcurrent Squash	oxygen methane Helium

I sorted my 4 items into: solids, liquids and gas.

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, strong.

15.09.22 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.	
Vibrating	When you slip the metal wheels 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.

Later years  
In Paris, Marie met Pierre Curie (who was also enthusiastic about science) and married him becoming Marie Curie. After they got together they 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 won the Nobel Prize in 1911 in chemistry.

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

A letter from Marie  
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.

13.03.23 WALT: Identify soluble and insoluble materials

Results:

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

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 dissolve faster.

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

Life cycle of a frog:

Life cycle of a butterfly:

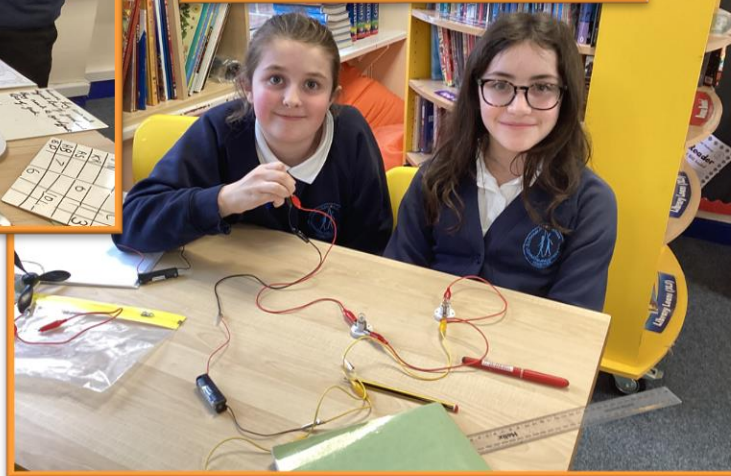
Day 1:  
Dear diary, my mum left me in my egg with my brother Fin and sister Emmy. I'm only little Emmy said that I'm red with blue stripes and Fin said that we are all in the young stage and that we hatched 1 day ago.

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 gully caterpillar.

Day 10:  
Dear Diary, we are all now in adult hood 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 one caterpillar so we hung in a chrysalis. It was dark. It's called metamorphosis.

# STANDARDS IN YEAR 6



# STANDARDS IN YEAR 6



Name: Sophia Chester

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.

**Adaptation to Climate:**  
The Zelfe doesn't get sunburnt because of its thin fur so it doesn't. It's fully coloured for the Zelfe can resist the hot weather of the day.

**Defence/Movement:** The Zelfe can run away in the place of being hurt. With its teeth and sharp claws it can eat its food and close into the nearest forest.

**Adaptation Body/Physical:** It has sharp teeth to kill prey, pattern fur to camouflage. To allow the Zelfe can jump and can smell up to 5 metres away.

**Diet - Carnivore:**  
What does it eat? Insects, birds, and other small animals.

**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 this because it is smaller so it's more aerodynamic than the bigger one.  
I predict that the largest spinner will fall the slowest. I think this because it will have more air resistance so the air will stop it slower.

**Results**

**Paper Spinners**

Spinner	1st Drop Time	2nd Drop Time	3rd Drop Time	Overall Drop Time	Average Drop Time
Small	1.45	1.25	1.65	4.35	1.45
Medium	1.25	1.35	1.55	4.15	1.38
Large	2.25	1.85	1.65	5.75	1.92



**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 sixth out of six children and was born into a wealthy family. He had a mother and a father but his own dad when he was 5 years old. As a child he had shyness, eating disorders and being Christianity with his brother. At school he didn't anyone or he was just a loner and you care for nothing but shyness, dogs and not talking, and you will be a disgrace to your family. Later on he went to study medicine at Edinburgh University but didn't carry on because he was too shy. Then he studied 'Geology' at Cambridge. He then became a vicar but didn't because he got an opportunity to go on the H.M.S. Beagle.

**Discovery:**  
Although lots of people think so, Darwin did not come up with the idea of evolution. He realized specific advantages about animals to survive. Due to people being christians they didn't like the idea so he had to look them up because it was too upsetting for lots of people. In 1859 some one was about to discover what he was about to discover. 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 he got a lot of support. In 1882 he got away due to health issues.

**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 discovered 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.

## ZELFE

**Habitat:**  
The Zelfe is native to Australia and is highly adapted to survive the challenges of the Savannah biome. Although the Zelfe is a lovely 20°C to 30°C all year round, it can still live in the summer to keep cool in the hot environment, the Zelfe normally burrows underground. Large, bushy trees. An abundance of fauna (animals) can be found in the Savannah, such as kangaroos, koalas and wombats. (Note: koalas are not in the Savannah). The Zelfe has thin fur to cool down but it also protects it from getting sunburnt. As night is cooler than daytime the Zelfe is partly nocturnal. (Note: 'Carnivore' means it eats meat and gets up in the night).

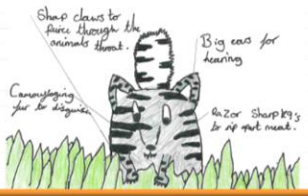
**Diet:**  
The Zelfe is known as a carnivore (which means it only eats meat) to survive the Zelfe eats insects, birds, and other small animals. In order to hunt prey it uses its long sharp claws and its teeth to pierce into the animals' blood. Another way of hunting, it uses its camouflage to creep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

**Sharp claws to pierce through the animals' blood.**

**Big ears for hearing.**

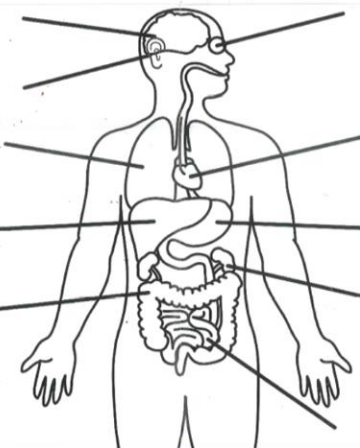
**Sharp sharp teeth to eat meat.**

**Camouflaging fur to disguise.**



21.10.23

**WALT:** Identify and label organs of a human

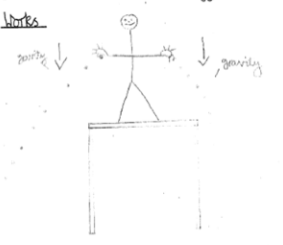


- Ear:** Helps you hear things.
- Brain:** Controls your body and thinks.
- Lung:** Helps you breathe.
- Liver:** Absorbs food into blood stream.
- Large intestine:** Digests anything that didn't get digested in the stomach.
- Heart:** Pumps blood around you.
- Stomach:** Stores energy, digests blood.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

11.2

**Walt:** Hypothesis and justify base Gravity

**Hypothesis:**  
The gravity pulls the objects down to the floor really quickly. Gravity is all around us. When we jump it stops you from going too high. Gravity is also one of many forces. The acceleration of dropping something is really fast.



6.12.22

**Walt:** Investigate water resistance

**Prediction:**  
I predict that the one with the least air resistance will be the cylinder because it's 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 1st time	Time taken 2nd time	Time taken 3rd time	Mean
Shape 1	1.53 seconds	0.81 seconds	1.13 seconds	1.16
Shape 2	1.07 seconds	1.31 seconds	0.89 seconds	0.96
Shape 3	0.90 seconds	0.80 seconds	0.58 seconds	0.76
Shape 4	5.06 seconds	4.72 seconds	7.15 seconds	5.63

# 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



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

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

“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.



The Booth Museum



South Downs Planetarium



Drusillas Zoo

# 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.

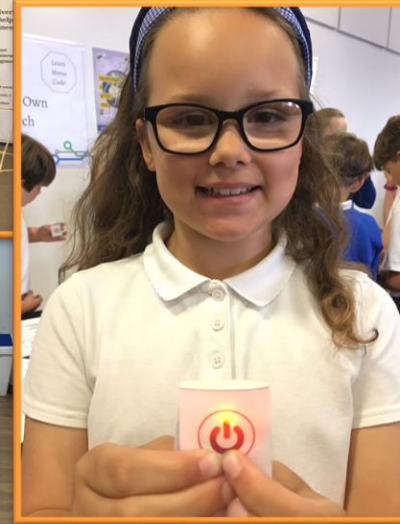
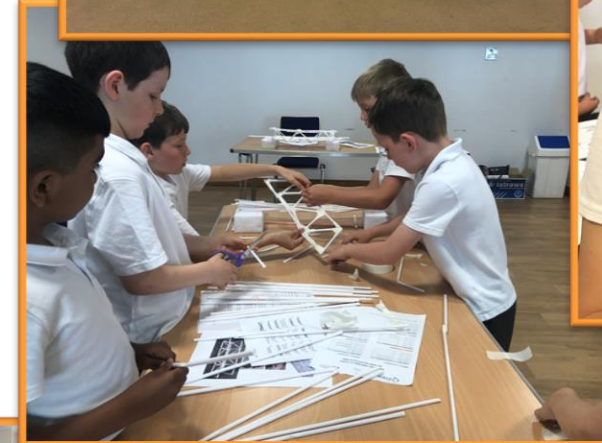
This year, our project was to use engineering skills to build rockets, which were made out of durable materials.

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.

