

Autumn Scheme of learning **Year 2**

The White Rose Science schemes of learning

Schemes of learning

Our research-based schemes of learning are designed to teach the aims and objectives of the National Curriculum.

Content over time

Our schemes are written for content rather than time. This ensures that children are developing a solid understanding of scientific processes and concepts.

Substantive knowledge

Our schemes of learning ensure full coverage of the scientific content as stated within the National Curriculum.

Disciplinary knowledge (Working scientifically)

Each step has a working scientifically skill focus. Working scientifically skills are developed across years and year groups.

Year 2 Autumn term Block 1 – Animals' needs for survival Step 1	
Mammals	
Notes and guidance In Year 1, children identified familiar mammals and described their basic structure. In this small step, children build on their knowledge as they explore mammals' needs for survival. It is important that children are confident with what a mammal is before they think about their needs for survival. Children should know that all mammals need air, water, food and shelter to survive. In Year 2, children should use the term "air" instead of oxygen, because they will not yet have been introduced to gases. They will need to recap the terms "carnivore", "omnivore" and "herbivore" so they can differentiate between different dietary requirements. There is an opportunity for children to think about sustainability within this step. Children can explore how they can help to protect and care about mammals in their local area.	Key questions - What mammals are shown? - Do all mammals live on land? How do you know? - What do all mammals need to survive? - What does a carnivore eat? - What does a herbivore eat? - What does an omnivore eat? - How do mammals that live in water breathe air?
Things to look out for - Children may think that all mammals live on land. Discuss whales and dolphins to help address this misconception. - Children may need support when thinking about dietary needs for different mammals.	Sustainability link What can you do to help care for mammals?
National curriculum links - Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). Working scientifically – Asking simple questions and recognising that they can be answered in different ways.	

Working practically

Research shows that children learn best from a 'hands on and heads on' approach whereby practical activities are engaging and relevant. This features throughout our schemes of learning.

Experiments

Children carry out experiments following a plan, investigate and evaluate (KS2) model. Children plan their investigations, carry out their experiments and conclude and provide evaluations.



Modelling

Modelling is used wherever possible to explain abstract scientific ideas and concepts. This makes it easier for children to apply their knowledge and improve their understanding. In Upper KS2, children are introduced to the limitations of models.

Outdoor learning

Children are encouraged to work outside the classroom wherever possible to help provide relevancy to scientific concepts.



Scientific enquiry

There is one enquiry question per block covering the five enquiry types. This allows children to develop answers to a range of relevant scientific questions.



Teacher guidance

Every block in our schemes of learning is broken down into manageable small steps, and we provide comprehensive teacher guidance for each one. Here are the features included in each step.

Notes and guidance

that provide an overview of the content of the step and ideas for teaching, along with advice on progression and where a topic fits within the curriculum.

Things to look out for

which highlights common mistakes, misconceptions and areas that may require additional support.

Year 3 | Autumn term | Block 1 – Skeletons | Step 1

Identify and name bones in the human body



Notes and guidance

In this small step, children explore the human skeleton for the first time by identifying and naming bones. There are lots of bones in the human skeleton, many of which have complex names. The focus of this small step is on the skull, femur, pelvis, spine and ribcage. Some of these are made up of several bones, which will be covered in more detail in the following steps. By the end of this step, children should be able to identify, name and locate these bones in the human body.

The enquiry question for this block is "How can animals be sorted and grouped based on their skeletons?" This is an identifying, classifying and grouping enquiry. Within this step, children can create relevant questions to begin the enquiry process.

Things to look out for

- Children may think that the skeleton is one large bone, rather than lots of bones.
- Children may believe that bones in the body do not have specific names, for example, they may think all bones in the leg are called "leg bones".
- Children may think that the arms and legs have one long bone, rather than multiple bones.

Key questions

- How many bones are there in the human skeleton?
- Where is the skull?
- Where is the femur?
- Where is the pelvis?
- Where is the ribcage?
- Where is the spine?

Enquiry question

- How can animals be sorted and grouped based on their skeletons?

National curriculum links

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- **Working scientifically** – Asking relevant questions and using different types of scientific enquiries to answer them.

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Key questions that can be posed to children to develop their scientific understanding and reasoning skills.

Enquiry questions are highlighted when children are undertaking the scientific enquiry process. Each block has one enquiry question and there is coverage of the five enquiry types across a year.

National Curriculum links

to indicate the objective(s) being addressed by the step.

Teacher guidance

During **experiment steps**, experiment variables and **equipment** are clearly identified.

The **key vocabulary** section highlights essential vocabulary and definitions.

Relevant and purposeful **practical ideas** to encourage a 'hands on and heads on' approach.

Year 5 | Autumn term | Block 1 – Forces | Step 3

Plan – parachute experiment

Experiment variables

- independent variable** (what is changed) – the size of the parachute
- dependent variable** (what is measured) – the time it takes for the parachute to fall to the ground
- controlled variables** (what is kept the same) – the material that the three parachutes are made from, the object that is attached to both parachutes, and the height that the parachutes are dropped from

Equipment needed

- plastic bags
- scissors
- 12 pieces of string 30 cm each
- ruler
- 12 paper clips
- stopwatch
- scales
- modelling clay to attach to the strings

Practical activity

- Put children in small groups.
- Give each group the equipment needed for the experiment.
- Children should identify what the equipment is and why it is used within the experiment.

Planning sentence stems

- I predict that ...
- I think this will happen because ...
- The independent/dependent variable is ...
- The controlled variables are ...

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Sentence stems to help promote the use of scientific talk in the classroom.

Year 3 | Autumn term | Block 1 – Skeletons | Step 2

Functions of the skeleton

Key vocabulary

- skeleton** – a collection of bones that provides protection and supports movement

Practical ideas

- Children work in pairs to draw around the outline of their partner's body on a large sheet of paper.
- Children then correctly identify and label the locations of the bones learnt in Step 1

Children should add labels to describe the functions of each of the bones.
(Note: If drawing around a partner's body is not appropriate, a printed outline could be used.)

Factual knowledge

- Bones have specific functions.
- The skull protects the brain.
- The femur helps humans to stand and move.
- The pelvis helps to support the spine.
- The spine helps humans to twist and stay upright.
- The ribcage protects the heart and lungs.

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Factual knowledge written in clear, child-friendly language.

Symbols

Key Stage 1 and 2 symbols

The following symbols are used to indicate:



Children are answering an enquiry question.



Highlights when and how health and safety measures need adhering to.



An outside activity or one that uses resources from nature.



Children talk about and compare their answers and reasoning.



A question that should really make children think. The question may be structured differently or require a different approach from others and/or tease out common misconceptions.

Sustainability

Sustainability blocks are highlighted with a leaf symbol.



Yearly overview

The yearly overview provides suggested timings for each block of learning, which can be adapted to suit different term dates or other requirements.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Animals' needs for survival			Humans			Materials			Plastic		
Spring term	Plants (light and dark)			Living things and their habitats						Plants (light and dark)		
Summer term	Plants (bulbs and seeds)			Growing up			Plants & bulbs and seeds			Wildlife		
										Consolidation		

Each year group has two blocks dedicated to sustainability. We want to help children to:

-  Understand the current issues around sustainability and climate change.
-  Identify that they have a role to play in creating a more sustainable future for themselves and others.
-  Think of ways to make a positive impact on their local and wider environments.
-  Have a positive and proactive mindset when it comes to making sustainable changes.

Premium supporting materials

Worksheets to accompany every small step, providing relevant practice questions for each topic that will reinforce learning at every stage.

Identify and name bones in the human body

1 Here is Mo.

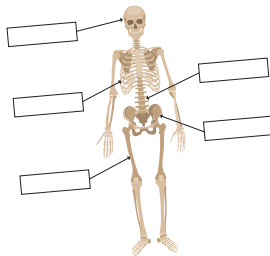


Label the parts on Mo's body.

head leg arm
shoulder hand knee

2 Use the words to complete the labels on the skeleton.

ribcage skull femur spine pelvis



3 Diddy has been looking at the human skeleton.

The ribcage is part of the leg.

Do you agree with Diddy? Explain your answer.

4 Match each part of the skeleton to its name.



femur
skull
spine
ribcage
pelvis

5 Use the words to complete the sentences. You can use each word only once.

skull skeleton femur

a) The collection of bones that supports a human body is called a skeleton.

b) The long bone in the upper leg is called the femur.

c) The bones in the head are called the skull.

6 Is the statement "always", "sometimes" or "never" true?

All human skeletons are the same.

Circle your answer.
always sometimes never

Explain your answer.

7 Annie and Kim are talking about human skeletons.

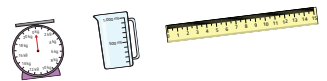
Annie: A skeleton is one large bone.
Kim: There are 206 bones in a typical skeleton!

Who do you agree with? Talk about it with a partner.

Investigate - parachute experiment

1 Max is setting up the equipment for his experiment. Circle the correct piece of equipment for each purpose.

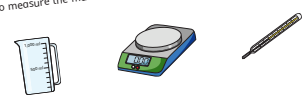
a) To measure the length of the sides of the parachute.



b) To measure the time taken for the parachute to drop.



c) To measure the mass of the modelling clay.



Evaluate - parachute experiment

1 The parachute is falling to the ground.



Air resistance is a type of friction force on an object moving through air.

A
B

Which letter shows air resistance acting on the parachute?

2 Circle the parachute that hit the ground first in your experiment.



3 Write your experiment prediction below.

4 a) Was your prediction correct? b) How do you know?

5 Annie and Amir completed a parachute experiment.

Parachute length (cm)	Time taken in seconds
10	0.46
20	18.23
30	0.98

a) Circle the anomalous result in Annie and Amir's data.
b) In your own words explain what is meant by an anomalous result.

Meet the characters

Our class of characters brings the schemes to life and will be sure to engage learners of all ages and prior attainments. Follow the children and their class pet, Diddy the duck, as they explore new scientific concepts and ideas.



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Summer term	Plants (bulbs and seeds)		Growing up				Plants (bulbs and seeds)	Growing up	Wildlife		Consolidation		

Autumn Block 2

Humans

Small steps

Step 1

Exercise

Step 2

Food

Step 3

Hygiene

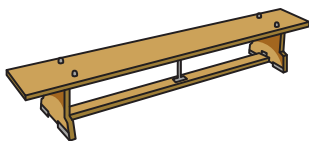
Step 4

Teeth

Key resources

Step 1 – Exercise

- PE equipment – skipping ropes and benches



Step 2 – Food

- food for the different tasting stations



- food items or food packaging for sorting and grouping
- large hoops

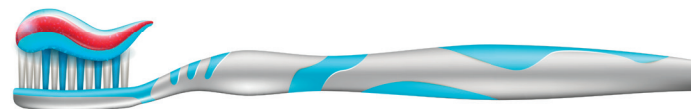
Step 3 – Hygiene

- dried herbs
- hand gel or hand cream
- soap
- large container
- warm water



Step 4 – Teeth

- plaque revealing tablets
- toothbrush



- toothpaste



Exercise

Notes and guidance

In this block, children look at how to keep healthy. This small step focuses on exercise.

Children carry out a simple investigation to see whether different forms of exercise increase their heart rate. In Year 2, children do not need to find their pulse (heart rate) and count beats per minute. They can observe whether their heart rate has increased by either putting two fingers on their wrist near the thumb or using a flat palm on their chest.

Before completing the investigation, children should make predictions to state which form of exercise will raise their heart rate the most and why.

Things to look out for

- Children may think that exercise has a negative effect on the body because it can leave you feeling breathless.
- Children may think that slower forms of exercise, such as yoga or walking, are not classified as exercise.
- Children may think that their heart is a “love heart” shape. Show a picture or diagram of the human heart to address this.

Key questions

- Is _____ a form of exercise?
- Why is exercise good for your body?
- Why is exercise good for your mind?
- What happens to your body when you exercise?
- Make a prediction. Which form of exercise will raise your heart rate the most?
- Make a prediction. Which form of exercise will raise your heart rate the least?
- Which exercise raised your heart rate the most?
- Which exercise raised your heart rate the least?
- Was your prediction correct?

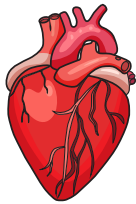
National curriculum links

- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
- **Working scientifically** – Gathering and recording data to help in answering questions.

Exercise

Key vocabulary

- **heart** – the muscle inside the chest, which pumps blood around the body



- **exercise** – physical activity that makes the body strong and healthy



- **physical health** – how well a person's body is working



- **mental health** – how a person is feeling inside their mind



Practical ideas

- Ask children to investigate which exercises increase their heart rate.

Set up exercise stations in the hall or playground.



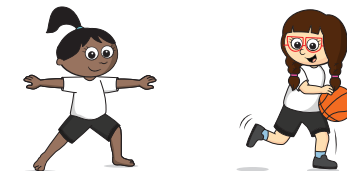
Make sure children are safe when exercising.

Include examples of high and low energy exercises, such as jogging on the spot and completing simple stretches.

Children should spend one minute exercising at each station.

Ask children to test their heart rate before and after visiting each station. They can do this by putting two fingers on their wrist near their thumb or by putting a flat palm on their chest.

Ask children to record their findings using a simple table.



Factual knowledge

- Exercise improves physical health.
- Exercise improves mental health.
- Exercising daily makes your heart stronger.

Food

Notes and guidance

In this small step, children continue to explore how to keep healthy. They identify, name, sort and classify different foods based on a range of categories.

Children identify foods that can contribute to an unhealthy diet if consumed too often. This includes foods that are high in fat, sugar or salt or provide little nutrition for the body. Children do not need to group food using the five food groups, as this concept is not introduced until Year 3

Children should be given plenty of opportunities to work practically to learn about different food types. They should be shown a wide range of food to help them understand what a healthy diet is and how to make healthy choices.

Things to look out for

- Children may think eating an unhealthy diet has no impact on the body.
- Children may think that the food they enjoy is good for them regardless of fat or sugar content.
- Children may think that drinks have no effect on teeth or the body.

Key questions

- Should you eat _____ every day or only sometimes?
Explain your thinking.
- How many portions of fruit and vegetables should you eat per day?
- How can you sort these food items?
How many ways can you think of?
- What could happen if you eat too much fat, sugar or salt?
- What is a healthy diet?
- Why is your meal healthy?

National curriculum links

- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
- **Working scientifically** – Identifying and classifying.

Food

Key vocabulary

- **healthy diet** – a diet that includes fruit, vegetables and other healthy food



- **unhealthy diet** – a diet that is high in fat, sugar or salt



- **meat** – animals that are eaten for food



- **vegetable** – a part of a plant that can be eaten, such as a stem, root or leaf



- **fruit** – a part of a plant that can be eaten, and contains seeds



- **sugar** – a sweet substance that comes from plants



Practical ideas

- Children sort and classify food items or packaging into large hoops to classify whether they should eat these foods every day or only sometimes.



- Set up tasting stations in the classroom.



Be aware of any food allergies when setting up the tasting stations.

Stations should include healthy food, such as fruit and vegetables, and some unhealthy food.

Allow children to move around the tasting stations to try each food.

Factual knowledge

- A healthy diet includes fruit, vegetables and other healthy food.
- An unhealthy diet is a diet that is high in fat, sugar or salt.
- It is important to eat the right amounts of different types of food.

Hygiene

Notes and guidance

In this small step, children explore personal hygiene. They learn about keeping clean and the reasons why personal hygiene is important. They do not need to look at oral hygiene in this step, as they look at how to keep their mouths healthy in Step 4

Children are introduced to the idea of germs through a simple practical task to help them understand that germs can be passed easily between people and surfaces if handwashing is not carried out regularly. Children should understand that some germs can cause illness.

By the end of this step, children should recall ways that they can keep clean and make suggestions of what may happen if they do not maintain good personal hygiene.

Things to look out for

- Children may find the concept of germs difficult to understand as germs cannot be seen without a microscope. Use a substance to represent germs to show how easily they can be spread.
- Children may think that washing their hands with water alone is enough to remove germs.

Key questions

- What is a germ?
- Where can you find germs?
- Why is it important to keep clean?
- Why should you wash your hands after using the toilet?
- Why should you wash your hands before lunch?
- What else can you do to keep clean?
- Why should you use a tissue when you sneeze?
- Who could help you if you became unwell?

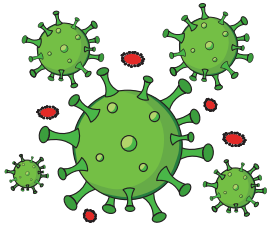
National curriculum links

- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
- **Working scientifically** – Observing closely, using simple equipment.

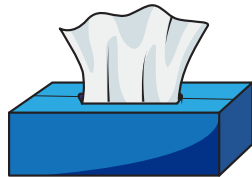
Hygiene

Key vocabulary

- **germs** – living things that are too small to be seen by the human eye



- **hygiene** – keeping yourself and your surroundings clean



- **doctor** – a person who looks after people when they are unwell



- **disease** – when something goes wrong with the body to make you unwell

Practical ideas

- Model the idea of germs to children using dried herbs.

Add a small amount of gel or hand cream to each child's hands.



Add a small amount of dried herbs on top of the gel/cream.

Ask children to rub their hands together.

Explain to children that the herbs represent the germs on their hands. Ask children to shake hands, high five, grab equipment, touch handles and desks. Ask them what they notice.

- Demonstrate how to wash hands correctly using soap, warm water and washing for 20 seconds.



Allow children to pair up and model to each other how to wash their hands correctly to prevent the spread of germs.

Factual knowledge

- Germs can make you unwell.
- Germs are spread easily by unwashed hands.
- You should wash your hands, sneeze into a tissue and have regular baths or showers.

Teeth

Notes and guidance

In the final step of this block, children learn how to maintain good oral hygiene and the reasons why it is important. They should understand that eating too much sugar and not brushing their teeth regularly contributes to tooth decay.

Within this step, children undertake a short pattern seeking enquiry to investigate whether the oldest children have the most teeth. They should think of ways to answer the enquiry question as a whole group. They should make predictions to state whether they think there will be a pattern or not.

After completing the enquiry, children should identify any patterns within the data they have collected and report whether age has an impact on the number of teeth a child has.

Things to look out for

- Children may not be able to count the number of teeth they have. They may find it helpful to work in pairs to do this.
- Children may think that their teeth only fall out if they are decaying. Baby teeth fall out naturally and are replaced with adult teeth.

Key questions

- Why is it important to brush your teeth?
- How long should you brush your teeth for?
- How often should you brush your teeth?
- How can you keep your gums healthy?
- What could happen if you do not brush your teeth?
- How does brushing your teeth help to keep your body healthy?
- Who could help you if you had a problem with your teeth?

Enquiry question

- Do the oldest children have the most teeth?

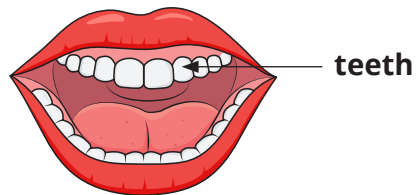
National curriculum links

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- **Working scientifically** – Observing closely, using simple equipment.

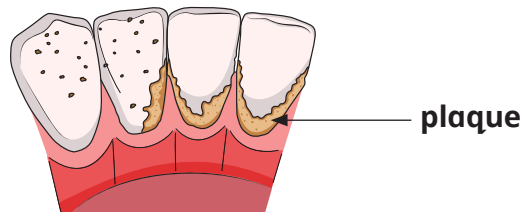
Teeth

Key vocabulary

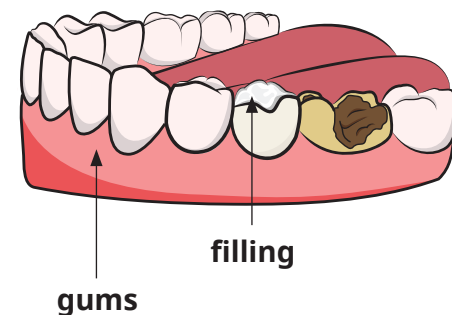
- **teeth** – the hard structures in the mouth used to bite and chew through food



- **plaque** – a sticky coating made by germs that can harm the teeth and gums



- **filling** – a special material that is used to fill a small hole in a tooth



Practical ideas

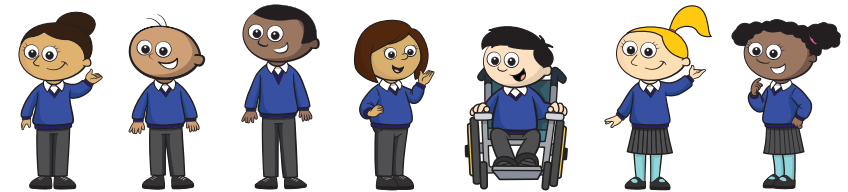
- Ask children to count their teeth.

Children could use their finger or their tongue to do this.

If they are struggling, a partner could help them.

They record the number of teeth that they have.

Line the children up from oldest to youngest.



Do the oldest children have the most teeth?

Do the youngest children have the fewest teeth?

Is there a pattern between age and number of teeth?

- Children can identify plaque build-up on their teeth by using plaque disclosing tablets.

Factual knowledge

- You should brush your teeth twice a day with a toothbrush, toothpaste and water.
- Plaque can build up on your teeth and can damage your teeth and gums.