SS John Fisher & Thomas More Catholic Primary School

A Voluntary Academy

Year Group: Year 3 & Year 4	Term: Spring 1 (Cycle A)	Topic: Forces and Magnets

National Curriculum Links

Pupils in Key Stage Two should be taught to:

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Working Scientifically

- ask relevant questions and using different types of scientific enquiries to answer them
- set up simple practical enquiries, comparative and fair tests
- make systematic and careful observations and, where appropriate, taking accurate measurements using standard units and a range of equipment
- gather, record, classify and present data in a variety of ways to help in answering questions
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- use straightforward scientific evidence to answer questions or to support their findings.

Prior Learning	Future Learning
• Explore how things work (Nursery – Forces) • Explore and talk about different forces they can feel. (Nursery – Forces) • Talk about the differences between materials and changes they notice. (Nursery – Forces) • Explore the natural world around them. (Reception – Forces)	• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces) • Identify the effects of air resistance, water resistance and friction that act between moving surfaces. (Y5 - Forces)

• Describe what they see, hear and feel whilst outside. (Reception – Forces) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)	• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces) • Magnetic fields by plotting with compass, representation by field lines. (KS3) • **Earth's magnetism, compass and navigation. (**KS3)

Common Misconceptions

Some children may think:

- the bigger the magnet the stronger it is
- all metals are magnetic.

Sustainable Development Goals & Catholic Social Teaching

These Sustainable Development Global Goals would be perfect to fit with this unit of learning:

These Catholic Social Teaching strands would be perfect to fit with this unit of learning:

Add activities here

Applied Write Opportunities	Enrichment Opportunities

Assessment Opportunties

- Can use their results to describe how objects move on different surfaces
- Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface
- Can use classification evidence to identify that some metals, but not all, are magnetic
- Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles
- Can use test data to rank magnets

Key Vocabualary

Tier Two: Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

Tier Three:

Knowledge and Skills Objectives	Activity	Differentiation
Lesson One I know that some forces need contact between two objects. Working Scientifically	**Copy all planning over from Joshua's plan**	

I **Resources** =		 **Plenary** =

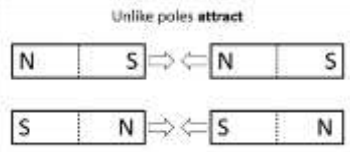
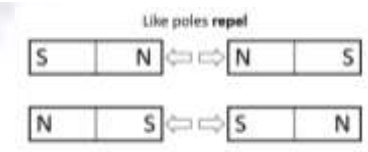
Knowledge and Skills Objectives	Activity	Differentiation

Lesson Two I can compare how things move on different surfaces. **Working Scientifically:** =	Hook: Starter Question: Ask the children; Introduction: Task 1: Task 2:	Task 1 SEN: Year 3: Year 4: Challenge: Plenary
Resources		

Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Three I can compare, group and identify everyday materials on the basis of whether they are attracted to a magnet. **Working Scientifically:**	**Hook:** **Starter Question:** **Ask the children;** **Introduction:** Task 1	Task 1 SEN: Year 3: Year 4: Challenge: Plenary

Resources		

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Four I can explain how magnets work. Working Scientifically	**Hook: a range of magnets** **Starter Question:** **Show the children both ends of a magnet.** **Ask the questions;** ***What will happen when I put these two magnets together?*** ***Do both ends of a magnet act in the same way? If not, why not?*** **Children to discuss with their Talking Partner before discussing as a whole class.** **Introduction:** Explain what a magnet is: **'Magnets are pieces of metal or rock with an invisible power to attract** special kinds of metal. That power is called a force. In nature, a force is something that causes a push or a pull. Magnetism is the force that makes a magnet stick to your refrigerator. **Magnetism is at work all around you'.** Task 1: Give children two bar magnets or so that they can explore what happens when magnets are placed near one another. What do they notice?	Task 1 Make a compass. Everyone Take photographs of the children observing the compass modelled. Stick photographs in the book following the activity. Children to write a sentence about what a compass is and how it works. WAGOLL A compass is a tool used for finding direction. A magnetic needle on a pivot spins freely until it finds north. It points **north because it lines up with Earth's lines** of magnetic force. Task 2: Record understanding of attracting and repelling SEN:

	Discuss with the children; **'One end of a magnet is called 'North Pole'** and the other end is called **'South Pole'**. These names are used because if you hang a magnet from a **thread, the magnet's North Pole points (almost) towards the north** direction. This is because the **Earth's co**re (its centre) is a large magnet. It is made up of the metals nickel and iron. Your little magnet lines up with **Earth's magnetic core, and so points north'.** Give the children a compass to look at and explore if they can find north. Model how magnetic Earth works by either tying some string around a magnet or make a compass following the instructions attached.  <u>Task 2:</u> Next, introduce the terms; repel or repulsion and attract. Explain; **'If you hold two magnets the** ***wrong way*** around, they push apart - they repel! In other words, if you hold two magnets together so that like-poles are close together (two norths OR two souths), they repel. It feels like the magnets are surrounded by an invisible rubber layer pushing them apart. That invisible layer is called a magnetic field. **It's only when you hold unlike**-poles together (a north pointing to a south) that magnets stick together. This is called attract. Now, the magnetic field **acts like a stretched rubber band pulling the magnets together'.** Give the children a variety of magnets (bar/wand/marbles/horseshoe) and continue to explore further. Can they feel the magnets attracting or repelling? Encourage the children to talk to one another to discuss what is happening and why.	Children to complete sentences and to identify which magnets show attracting and repelling. <u>Main Task:</u> Children to draw two magnets repelling and two magnets attracting. Children to explain what is happening. WAGOLL: Magnets have two poles. One called the North Pole and one called the South Pole. When opposite poles are near one another, they pull together. This means the two poles attract.  When two poles the same are near one another, they push away from one another. This means the two poles repel.  <u>Task 3:</u> Which magnet is the odd one out?

Resources A variety of magnets String Slice of cork Needle Bowl of water	Then watch this video to support understanding. https://www.bbc.co.uk/bitesize/topics/zyttyrd/articles/zpvcrdm <u>Task3:</u> Give children 3 different types of magnets; a bar, a horseshoe and a round magnet. Get the children to explore them and ask them which one is the odd one out? When children are exploring the magnets, encourage them to use scientific vocabulary; north pole, south pole, attract and repel.	<u>SEN:</u> **Record the children's thinking onto** Post-It notes and stick into book. <u>Main Task:</u> Children to draw the three magnets into their books, and explain which one they think is the odd one out and why. <u>Challenge:</u> Research about magnetic Earth; Draw a diagram of magnetic field lines around the Earth. **Plenary** Consolidate the terminology. Watch this video to consolidate all learning **from today's learning.** https://youtu.be/yXCeuSiTOug
Knowledge and Skills Objectives	**Activity**	**Differentiation**
<u>Lesson Five</u> I know that some forces need contact between two objects but magnetic forces can act at a distance. <u>Working Scientifically</u> I can set up a simple enquiry.	<u>Hook</u>: a variety of magnets **<u>Starter Question</u>** **Ask the children ;** ***How can you make something move without touching it?*** **Get the children to discuss with their Talking Partner before discussing as a whole class.** <u>Introduction:</u>	<u>Task 1</u> Magnetism is an invisible force <u>Everyone:</u> Stick in image and write a sentence or paragraph about the invisible force.

Resources

Loads of metal paper clips
Paper
Variety of magnets
Objects for the investigation

Give the children some paper clips and asked to think about how they can make it move without touching it.
Have some magnets close by. Observe the children as they investigate this. The children will probably place the magnet close to paper clips and see them quiver and possibly pull towards the magnet. Once they have done this, ask them if they can move the paperclips over a greater distance, still without touching the paperclips. The aim is for the children to place a magnet under a piece of paper or the table to move the paper clips from one place to another. Allow the children to problem solve – if they are not realising that they could place an object between the magnet and the paper clips, offer the suggestion.
*take photographs of children doing this, and listen into the discussions. Record some of **the children's ideas onto flip chart paper or post**-it notes to reflect on as a whole class later.

Task 1:
Discuss:
'Magnetism is an invisible force.
In order for the magnet to move, they had to place the magnet under a material to make it move. The paper**clip wasn't touched by them. The invisible force moved it.'**

Explain to the children that they are going to make a magnetic track or maze to explore the invisible force of magnets. You could provide the children with magnetic tracks or invite the children to make their own.
Remind the children that a magnetic force can work through solid materials, so with a strong magnet under the table you will be able to move your magnet items along the track as if by magic!

SEN: Stick in image.
Children to write a simple sentence about magnetism being an invisible force.
Main Task (Stick in image of the children exploring the invisible force of magnetism)
Children to write a prediction complete a table of results and write a conclusion.

WAGOLL
Prediction:
I think the invisible force will attract only through some of the materials. **I don't** think the force will travel through the mug because the centre of the mug is hallow and wide. I do think the force will travel through the tinfoil because tinfoil is made of metal.

Method and results:

Conclusion:
I found out that not all materials allowed **the magnet's invisible force to travel** through it. I think this happened because some materials are thicker than others, such as, the wall is thicker than paper. If **the paper was a thick as the wall, I don't**

Get the children to challenge one another by;

- Moving their magnetic item all the way along the track without touching the sides
- Getting to the end in the fastest time
- Racing with someone else
- Chasing someone else, e.g. cat and mouse

*take further photographs of the children exploring magnets.

Children to write about magnets being an invisible force in their book.

Task 2:

Ask the children if they think all materials will allow the invisible force of a **magnet to work through it. Generate children's hypothesis & record on w/b** paper.

Explain to the children that we are going to investigate this. Show the children 10 materials e.g. tinfoil, school jumper/cloth, a ruler/plastic lid, a workbook/thick card, wipe-board, table, plastic chair, the classroom wall, a classroom window, a teachers mug.

Invite the children to predict whether a magnet could hold the paperclip in place from the other side.

Children to complete the table and write about their thinking.

Name of object	Main material (if known)	Is the paperclip still attracted to the magnet?	
		Predict	Measure

Next, discuss the method.

1) Place the magnet on one side on an object.
2) Place the paper clip on the other side of the object.
3) Lift up the object with the magnet on the top - does the

think it the invisible force would be able to travel through it.

If I was going to do this investigation again, I would have to make it fair. I would do this by having the same thickness of materials.

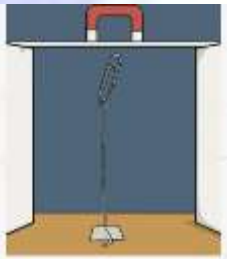
Challenge:

Children to think about if the size of the magnet is important?

Explain.

Plenary

Quiz the children on their knowledge about forces and magnets to date.

	paperclip fall away from the object? Following the task, discuss with the children what they have found out and why. Children to write a conclusion in their books.	
Knowledge and Skills Objectives	Activity	Differentiation
Lesson Six **Working Scientifically:**	**Hook: loads of paper clips in a chain, a box of paper clips, magnets** **Starter Question:** **Ask the children.** ***Can you make a paper clip float in the air?*** Discuss with Talking Partners before discussing as a whole class. Introduction: Consolidate how magnets have an invisible force around them. Give them all a paper clip, and invite them to try and make it float in the air. Invite the children to suggest how they could do this, and test out some of their hypothesis.  In order to make the paperclip float, the children need to attach the paper clip to a piece of string and to the table. Using a magnet, the child can make the paper clip fly. Task 1: Explain	Task 1 Animal and skeleton match SEN: Match 1 of each animal type Year 3: Match several animals including **one that you wouldn't expect to have an** endoskeleton. Year 4: Match several animals including an odd one out. Challenge: Read

Resources		
Images of animal and their skeletons Animal skeletons to sort and animal skeletons to stick into their book Sorting hoops Animal pictures (pairs)		
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Seven **I know skeletons differ between animals.** **Working Scientifically:** I	**Hook:, animal figures including invertebrates.** **Starter Question:** **Ask the children.** ***Do*** Discuss with Talking Partners before discussing as a whole class. Introduction: Task 1: Watch the	Task 1 Sorting animals SEN: Children to be given headings and 1 of each to match. Year 3: Children to sort animals with headings. Year 4: Children to sort without headings. Children to consider headings and write their own. Challenge:

Resources		
Applied Write Opportunities: Add these to the plan		
Enrichment Opportunities: Add these to the plan		
Assessment Opportunities		

- Can use their results to describe how objects move on different surfaces
- Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface
- Can use classification evidence to identify that some metals, but not all, are magnetic
- Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles
- Can use test data to rank magnets

Key Vocabulary

Add these to the plan

Tier Two: skeleton,

Tier Three: pelvis,

Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

SS John Fisher & Thomas More Catholic Primary School

A Voluntary Academy

Year Group: Year 3 & Year 4	Term: Spring 2 (Cycle A)	Topic: Light and Shadows

National Curriculum Links

Pupils in Key Stage Two should be taught to:

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows changes.

Working Scientifically

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units and a range of equipment
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- use straightforward scientific evidence to answer questions or to support their findings.

Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.

Prior Learning	Future Learning

Sustainable Development Goals & Catholic Social Teaching

Sustainable Development Global Goals would be perfect to fit with this unit of learning:

These Catholic Social Teaching strands would be perfect to fit with this unit of learning:

Applies Write Opportunities	Enrichment Opportunities
Poster on sun safety	Visit a sundial

Assessment Opportunities

Key Vocabulary

Tier Two:

light source, dark, absence, reflect, reflective, sunlight, Sun, bounce, glare, travel, shadow, block, length, width, height, strength, darker, lighter, fainter, brighter, partial, materials, shiny, sunglasses, shade, shield, line graph, bar graph, rainbow, protect, heat, energy, angle

Tier Three:

fluorescent, cats-eyes, opaque, transparent, translucent, cast, invisible light, visible light, spectrum, ultra violet (UV), waves of energy/light, pupil (eye), radiation

Knowledge and Skills Objectives	Activity	Differentiation
Lesson One I know that dark is the absence of light. I recognise that I need light in order to see things. Working Scientifically	**Hook: Copy of the text, The Dark by Lemony Snickett, a torch, and watch the trailer of The Dark by Lemony Snickett** **https://www.youtube.com/watch?v=zWoHwjpI89c** **Starter Question:** **Ask the children;** ***What is 'The Dark'?*** **Discuss with Talking Partners before discussing as a whole class.** **Introduction:** Discuss with the children that dark is the absence of light. When we have not light at all, it is dark. Task 1: Take the children to a darkened room/tent or give children a box with a cover blocking out light, just an eye hole to peer in. Ask the children what so they notice? Do our eyes see into the dark straight away? Where is the light? Reinforce that it is dark because there is no light – dark is the absence of light. Uncover some holes in the box, and ask the children to look again. What do they notice this time? Does it take our eyes a little bit of time to adjust? What is in the box? How do they think they could see the object? Next ask the children, *What is light?* Explain to the children that light is a form of energy, and because of light we are able to see things. Continue to explain that light comes from a light source.	Task 1 Explore dark in a darkened room/tent or use a box. Note: ensure the children are ok about the dark as some do not like it. Task 2 Sorting images of light sources SEN – Support the children with the social aspect of group work. Children to be in mixed ability groups. Task 3 Recording what they have found out. SEN – children to colour the light sources (natural/man-made) then write an answer to what is dark. Main Task – Children to record what they have found out. WAGOLL Light is a form of energy. Light comes from lots of different sources. Some sources are natural and some are artificial or man-made.

Resources

Copy of text, The Dark
Torches
Black out room/tent/boxes
Objects for inside the room/tent/boxes
Sorting hoops
Images of light sources
Copies of the reading text

Where does light come from?

Children to think for a moment. In groups, children to take it in turns to share their ideas, and if their group agrees with them, they jot it down onto a mind map, and continue going around the group sharing and gathering ideas. Use this as a pre-assessment task.

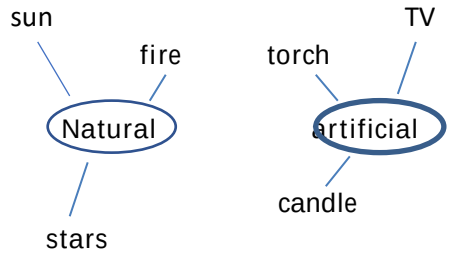
Take feedback from the groups, listing their ideas onto word cards for the working wall. Look at the words with the children and explain the term, **'sources of light'.** Ask the children if we can group these light sources (natural/man-made or artificial).

Task 2:

Give each group 2 sorting hoops and light source picture cards (include some non-light source images for deeper thinking). Children to sort the images according to what type of light source it is.
Take photographs of children working scientifically.
Invite children to share ideas, and to explain why the object mentioned was placed where it was.

Task 3:

Children to record what they have found out today. This can be in the form of tables, diagrams, pictures, written explanations. Model how you would like the children to present their learning in their books.

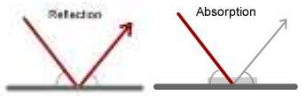


Without light, we would not be able to see. Dark is the absence of light.

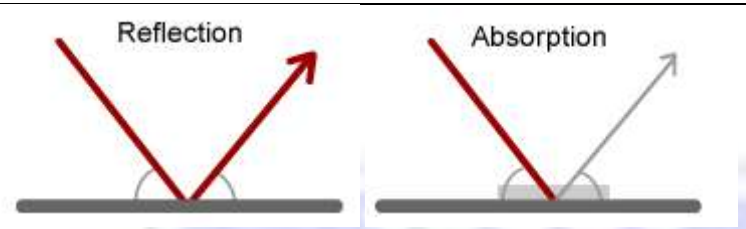
Challenge:
Read the following text to find out more about light.

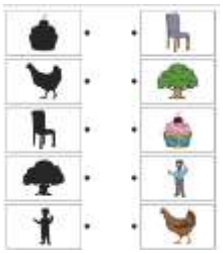
Plenary

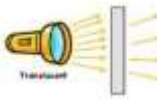
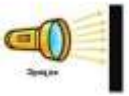
		Consolidate what light is. Watch the following video and then discuss what they have learnt today. https://www.youtube.com/watch?v=d65mdTJaJTI
Knowledge and Skills Objectives	Activity	Differentiation
Lesson Two I can explore how light reflects from surfaces. **Working Scientifically:**	Hook: a reflective jacket, a school bag with a reflective strip, a bicycle reflector, a range of objects made from different materials, torches, paper Starter Question: Ask the children; *What is light?* *What is dark?* Discuss with Talking Partners before discussing as a whole class. Introduction: **Ask the children the following questions;** *Why can we see a table?* *Why can we see the carpet?* *Why can we see each other?* Discuss with Talking Partners. Invite the children to share their thinking. Explain to the children that light travels in a straight line. When light from a light source hits an object, it is reflected (bounces off). If the reflected light hits our eyes, we can see the object. The object itself is not a light source.	Task 1 Discuss reflective materials SEN: Support children with social aspect of group work. Task 2 Investigate different materials SEN: children to be supported in the writing of their prediction. During the investigation, they could be given a role in the investigation, such as, holding the torch. Main Task: Children to write a prediction with a detailed explanation. Children to work together, taking it in turns to ensure the investigation is completed fairly. WAGOLL

	 Explain that some surfaces and materials reflect light well. Other materials do not reflect light well. <u>Task 1:</u> In groups, children to take it in turns to discuss any materials that they think reflect light well. Use this as a pre-assessment activity. Explain to the children that reflective surfaces and materials can be very useful, such as; • Reflective strips on coats or bags mean you can be seen at night. They are also useful for fire-fighters or builders who may work in a dark and dangerous environment. • 'Cat's Eyes' help drivers see the road by reflecting light from headlamps. • Mirrors let us see ourselves, and are also useful in cars, to allow drivers to see behind them. • Retroreflectors are used for road signs so that drivers can see the signs from their car. <u>Task 2</u> **Explain to the children that we are going to investigate which materials are good reflectors.**	I think a metal spoon, a mug and a mirror are good reflectors of light. These objects are very smooth and shiny. I think a brick, a jumper and a book are not good reflectors of light. The objects have a lumpy or holey surface. Results (include a table to show their results) <u>Task 3</u>: Write a conclusion <u>SEN:</u> children to be supported in the writing of their conclusion. Use a scaffold if necessary. <u>Main Task:</u> Children to write a conclusion I found that materials that were shiny and smooth were reflective for example a metal spoon, a newspaper and a mug. The light easily bounced off these materials. I found that materials that were dull and dark were not reflective for example cardboard, fabric and brick. The light did not bounce off, it was absorbed by the material.  <u>Challenge:</u>
Resources Reflective jacket,		

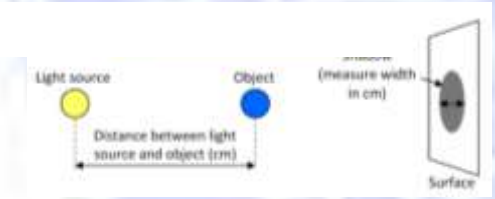
School bag with reflective strip Torches White paper A range of objects/materials Result tables for sticking into books ipads	**Show the children a range of objects made from a range of materials; cardboard box, school jumper, mirror, foil, a book, a spoon, a mug, carpet** **Ask the children to predict which materials/objects will reflect the light easier and why they think this. Children discuss with their friends. Take feedback, and model how to write a prediction. Children to write their prediction in their books.** In order to test the materials, you will need to make a reflection tester. 1. Attach a piece of white card to a torch: 2. Cut a hole in the centre of the card and push the torch through so that the card fits snugly around the torch without you having to hold it. 3. Shine the torch at the material you are testing. 4. If the material reflects light well, you will see the reflected light shine through the white card and light it up. 5. Record results in a simple table format.  Before children write a conclusion, they need to understand why some reflect better than others. Show the children 2 diagrams; one showing reflection and the other showing absorption. Explain that if a material is dull and dark, the light is absorbed into it. If a material is smooth and shiny, the light is reflected. Pick up some of the materials, such as the spoon, and explain that when I look into a spoon, I can see my reflection. When I look at the cardboard box, I cannot see my reflection. Therefore the material has absorbed the light.	Reflective materials are important to us. **One of these is cat's eyes. How do cat's eyes** work? Find out about the invention of the **cat's eye. Explain how it was invented and** why. How has it helped people in life? **Plenary** Consolidate what the children have learnt today. Recap vocabulary; reflective/reflected/ reflection, absorb/absorption, Watch the following video – it helps to consolidate as well as introduces some new

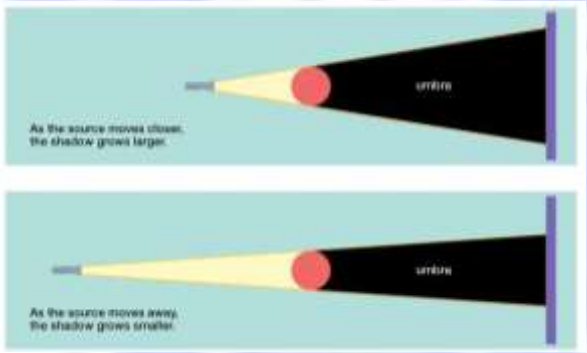
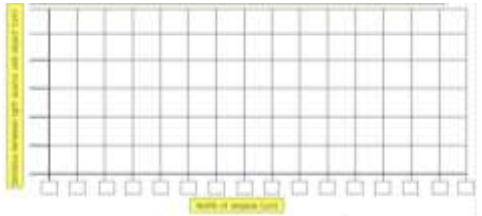
	 Task 3: Model how to write a conclusion e.g. I found that materials that were _____ and _____ were _____ for example _____, _____ and _____. The light was easy to bounce off. I found that materials that were _____ and _____ were not _____ for example _____, _____ and _____. The light could not bounce off easily, and instead, the material absorbed it. For the HA children, they could draw the two diagrams into their books to support their explanation of what happened.	words such as luminous. It then starts to introduce the next steps in learning. https://www.youtube.com/watch?v=a8xt_m4iMYc
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Three I can explain why shadows are formed when the light from a light source is blocked by an opaque object. **Working Scientifically:** I can ask questions and use different types of scientific enquiries to answer them. I can setup simple practical enquiries.	**Hook: torches, silhouettes** **Starter Question:** **Ask the children;** ***How does light travel?*** **Discuss with Talking Partners before discussing as a whole class.** **To demonstrate how light travels:** • **Punch holes in the centre of three equal-sized pieces of card.** • **Hold the pieces of card so that the holes line up.** • **Shine a torch so that the beam of light can travel straight through the holes.**	Task 1 Finding shadows SEN- Support children in outdoor learning, as this could be very stimulating or overwhelming for them. Task 2 Matching shadows SEN- Provide fewer images for the children to match.

I can make careful observations. I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	**What happens if you move one of the pieces of card so the holes don't line up? When you moved one of your pieces of card so the holes did not line up, the card blocked the ray of light. This is because light can only travel in a straight line, so it cannot travel around the card.** **Introduction:** At the start of the lesson, turn off the lights and close all the blinds. Make the room as dark as possible. Switch on a torch and have it shining on an object. Ask the children what they notice. The object should be casting a shadow. Explain that the shadow is the dark area on a bright surface. It is created because something is blocking a source of light. As we have previous learnt, light travels in a straight line. It cannot go around corners. The object blocking the light is also opaque. Opaque is a material that does not allow light through it. Therefore as shadow occurs. A shadow's outline, called a silhouette, will have the same shape as the object blocking the light. Task 1 If it is nice outside, go outside and go on a shadow hunt. If not, in the classroom, leaving the lights off but blinds open, children to find shadows in their classroom. Whilst looking for shadows, ask the children to think about the following questions; Where are the shadows? What direction is the shadow? How long? What shape? Why? Where is the light source coming from? Take photographs of the children exploring shadows and these to be stuck into their books.	Main Task – Children to match object to silhouette. Children to write about what makes shadows, demonstrating their understanding from the lesson. WAGOLL  Shadows are created when an opaque object blocks the light from a source. The object leaves a silhouette on the bright surface. The object and the silhouette are the same shape. Task 3: Sorting materials SEN – support children in the sharing and social aspect of group work. Task 4 Recording their learning

	On return to the classroom, discuss what the children observed and invite them to explain their thinking. Task 2: **Display on the IWB, shadow images. Invite the children to guess what object is making the shadow. How do they know?** **Children to match object to the shadow.** **Children to write about how shadows are formed,** **Task 3:** **Re-watch this video from lesson 2,** https://www.youtube.com/watch?v=a8xt_m4iMYc. Discuss with the children what is meant by opaque **(can't see through it)**, transparent (can see through it) and translucent (can see a bit of the outline of the object). Children to be given a selection of materials or objects. In groups, children to sort according to whether the material or object is opaque, transparent or translucent. Task 4: Children to write and draw what they have learnt about opaque, transparent and translucent.	SEN – Give them images of torches showing opaque, translucent and transparent for them to label. Main task – Children to draw three torches to show opaque, transparent and translucent. Children to write about these. WAGOLL   Transparent materials allow light to pass through it, such as, plastic water bottles and sticky tape.  Translucent materials allow some light to pass through it, such as, ice cubes and toilet paper. Opaque materials allow no light to pass through it, such as, chairs and books. Challenge: Children to read this text about shadows. Write a fact on an A4 piece of paper for the working wall about shadows. 
Resources		

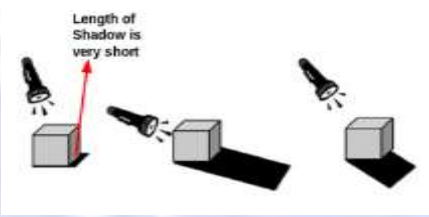
Torches Card with 3 holes in Paper Objects Matching sheet		**Plenary** Consolidate what creates a shadow. Play a quiz. 
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Four I can investigate the size of shadows. Working Scientifically I can ask questions and use different types of scientific enquiries to answer them. I can set up simple practical enquiries. I can make careful observations. I can record findings using simple scientific language, drawings, labelled diagrams and tables	**Hook: torches, objects** **Starter Question:** **Ask the question;** ***What is meant by opaque, transparent and translucent?*** **Children to discuss with their Talking Partner before discussing as a whole class.** **Introduction:** Explain to the children that they are going to investigate shadows. Explain to the children that they are going to place a piece of paper on the wall. Then, using a torch, they are going to shine it onto an object so that the shadow/silhouette casts onto the paper. The children will draw around the shadow before moving the light source away from the object. Ask the children what do they think is going to happen to the shadow? Why? Children to make a prediction. Task 1: In groups, children to	Task 1 Investigating shadows SEN – support children in the sharing and social aspect of group work. Give children a specific role within the investigation. Main Task – Children to write a prediction independently. Children to work in mixed ability groups – taking on a specific role. Children to complete results table. WAGOLL I predict the shadow will be bigger when the object is nearer to the wall. When a light source is close to the object the light is blocked and cannot shine around the edge of the object easily. When a light source is

I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	1. Attach a piece of paper to the wall. 2. Place an object between the torch and the paper on the wall. Children to measure the distance from wall to object to torch. 3. One child to shine a torch at object. (Note: The child holding the object must not look at the torch or into the light) 4. One child to draw around the shadow. Measure the width of the shadow. 5. Complete the table of results. 6. Move the light source away. Measure the distance. 7. Repeat.  Following the investigation,, discuss what they noticed. What happened to the size of the shadow? What happened to the colour of the shade? Children to stick in their completed results. <u>Task 2:</u> Model how to draw a line graph to show the result. Children draw their own line graph on squared paper. <u>Task 3:</u> Model how to write a conclusion, for example, The nearer the object is to the light source the _____.	further away, the light has more space to shine and therefore casts a true shadow. Width of shadow at its widest point (cm) Distance between light source and object (cm) / Prediction / Measurement <u>Task 2</u> Make a line graph <u>SEN</u> – Depending on need, either have a pre-drawn graph for completion or provide a geoboard in which together you can model how to create a line graph through labelling the axis and using pegs and elastic band. <u>Main Task - Children</u> to use squared paper to draw an axis developing the skill of using a ruler. Then children to label axis, write a title and plot points. <u>WAGOLL</u>

	The further away from the light source the _____. To get the biggest shadow you need to _____. Model through diagrams how the light hits the object and how the light casts its shadow.  	 Task 3 Write a conclusion SEN – Support children in the writing of their conclusion or provide a scaffold for them. Main Task – Children to reflect on the investigation and what they have learnt. Children to write a conclusion independently. WAGOLL The nearer the object is to the light source the larger the shadow. The further away from the light source the smaller the shadow. To get the biggest shadow you need to place the light source nearer to the object. This happens because the object appears bigger and the light has got to get around a larger shape. Whereas, when the object is further away, the object appears smaller.

		Children to draw a diagram to support this understanding. Challenge: What do you think would happen if the light source stayed in the same position but the object moved? Predict and investigate.
Resources Torches Objects Plain paper Copies of tables and graphs for children to complete Pencils		**Plenary** Consolidate what they have learnt today. What have they learnt about shadows? What else would they like to know about shadows?
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Five I can investigate the length of shadows. Working Scientifically I can ask questions and use different types of scientific enquiries to answer them. I can set up simple practical enquiries.	Hook: boxes, torches, metre sticks **Starter Question** **Ask the children ;** ***Why does it appear that the sun travels across the sky during the day?*** **Children to discuss with their Talking Partner before discussing as a whole class.** Watch this video to help explain this https://youtu.be/GXoNwiU2ojM Introduction: Following the video ask the children;	Task 1 Write a prediction SEN – support children in the writing of their prediction or provide a scaffold for writing. Main Task – Children to write independently using the modelled write for support. WAGOLL

I can make careful observations. I can record findings using simple scientific language, drawings, labelled diagrams and tables I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. I can use straightforward scientific evidence to answer questions or to support their findings.	*Does the height of the light source affect the length of shadow?* **Children to discuss with their Talking Partner before discussing as a whole class.** Task 1: Explain to the children that they are going to explore what happens to the height. Model with an torch in the off state what height means. Invite the children to predict what will happen to the shadow of an object when the height is altered. Model how to write a prediction before the children write a prediction in their books. Task 2: Model how to make this investigation fair and discuss possible roles of children within the group. Children to carry out the investigation by changing the height of the light source shining at the opaque object – every 30cm? Children record the length of the shadow cast in a table. Following the investigation, discuss with the children what they found out? Did they find any patterns? Task 3: Model how to take the data and produce a bar graph. Children to create a bar graph to show their results. Task 4: Discuss what they found out. Discuss the angle of the light source shining on the object.	I predict a shadow will be longer when the light source is the lower. When a light is low in the sky the shadow will spread out from the object making it longer. When a light source is high in the sky it shines down directly on an object and the shadow do**esn't go anywhere.** Task 2 Carry out the investigation SEN – Support children with the social aspect of group work. Give children a specific role to do. Main Task - Children to work in mixed ability groups Task 3 Making a graph SEN – Provide the children either with a pre-drawn axis or use blocks/lego to make a bar graph. Main Task – Children to use squared paper. Draw and label an axis, then use their data to draw the bars. Children to give their graph a title. WAGOLL

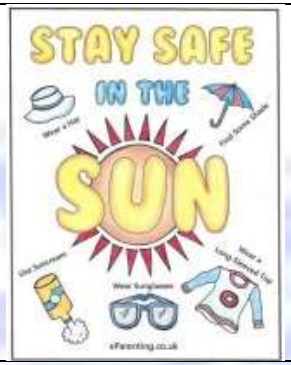
	Model how to write a conclusion. Children to write a conclusion into their book. Show a diagram that will explain this too.  	Task 4 Write a conclusion SEN - support the children in the writing of this or provide a scaffold. Main Task – Children to write a conclusion independently; use the modelled text for support. WAGOLL The lower the light source, the longer the shadow. The higher the light source, the shorter the shadow. The length of a shadow is affected by the angle of the light source on the object. Children can draw an image of this to support their understanding. Challenge: What is a sundial? Children to find out about sundials using ipads.
Resources Torches Objects e.g. boxes Metre sticks Paper Pencils		**Plenary** Consolidate what they have learnt today. https://www.tes.com/teaching-

Copies of tables and graphs		resource/shadows-and-silhouettes-ks1-11298856 Then ask the children, what is a sundial? Explain that a sundial is the oldest known instrument or equipment for telling time. The surface of a sundial has markings for each hour of daylight. As the Sun moves across the sky, another part of the sundial casts a shadow on these markings. The position of the shadow shows what time it is. Model how to make a sundial and set the task of making and using a sundial for homework. 
Knowledge and Skills Objectives	Activity	Differentiation
Lesson Six **I know light from the sun can be dangerous and that there are ways to protect their eyes** **Working Scientifically:** I can make systematic and careful observations.	**Hook: a large pair of sunglasses, a model of the eye** **Starter Question:** **Ask the children.** ***What is the sun?*** Discuss with Talking Partners before discussing as a whole class. Introduction: Remind the children that our main light source is – the sun. Ask the children,	Task 1 Is the sun a friend or a foe? SEN – support children if they find these moving around activities overwhelming. Task 2 UV light investigation SEN – Support the children with the social aspect of group work.

I can record findings using simple scientific language, drawings and labelled diagrams I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Why is the light from the sun dangerous? Discuss with Talking Partners before discussing as a whole class. <u>Task 1:</u> Explain to the children that you are going to show them some things the sun does – they have to decide if they think the sun is a hero or a villain. Using Vote with your Feet, children to make a choice. Following each choice, **discuss the children's thinking.** Watch this video to explain what happens https://youtu.be/g1gpi9yUpmA (It goes into detail about the eye which the children do not know – this is focused on in year 6 but good to be introduced to in Year 3/4) Discuss with the children what UV light is. The sun emits (gives out) rays of light. We can't see all the types of light that come from the sun. One of the types of light is called UV (ultra violet) light and it is invisible to humans, however, we can see and feel its effects. Some UV light is blocked by the atmosphere (ozone layer) however, the rest reaches us here on Earth. The amount of UV light that reaches us depends on different things. • It is stronger at midday and in the summer. • If there are no clouds there is more UV light. • It also gets stronger nearer to the equator. • The location can make a difference too - water, sand and snow all reflect UV light, making it stronger. <u>Task 2:</u> Explain to the children that we are going to set up an investigation; the **investigation will be a measurement over time (we won't get the results** until after the holidays). Explain to the children that they are going to work in a group to set up an investigation to see the effects of UV light. Here are the instructions:	Give the children a role within the investigation <u>Task 3</u> Looking at the eye <u>SEN</u> – Support them in the discussion of what they can see; introduce and reinforce new vocabulary. <u>Task 4:</u> Create a poster <u>SEN</u> – Depending on ability, provide the children with a template or produce a poster alongside one another, modelling each step. <u>Main Task</u> – children independently make <u>Challenge:</u> What is a rainbow? Children to find out using ipads
Resources		**Plenary**

Sun glasses Model of eye Mirrors Paper Colours Torches Prisms Black paper Bright paper **Resources** Images of animal and their skeletons Animal skeletons to sort and animal skeletons to stick into their book Sorting hoops Animal pictures (pairs)	1. Cut out several shapes from black card. 2. Place them on a piece of coloured paper, and position them in a sunny spot for a week. 3. When you take the shapes off, observe what you can see. (The paper under the shapes should still look the same. The UV light could not get to the paper under the shapes, so the paper under the shapes has not been damaged by the UV rays.) <u>Task 3:</u> Introduce the children to the eye. Explain that the eye is made to let light in; this is how we see. Give the children a mirror and get them to identify the pupil? It looks like a black circle. Light enters the eye through the pupil. Get the children to look closely at their pupil in the mirror. Then get them to close their eyes for 30 seconds, then open them and look at their pupil. What do you notice? Explain to the children that the pupil grows bigger in the dark to allow more light to enter the eye, and gets smaller in bright light. Light enters the eye through the pupil. . Explain that if too much light comes through the pupil, it can damage the retina. It causes pain, so that you instantly close your eyes, or turn away from a bright light. Explain and stress that it is very important that they never look directly at the sun, as the light can damage your eyes very quickly. Also explain how bright lights indoors can also damage your eyes, so you should never look at them, or shine lights into anyone's eyes. <u>Task 4:</u> Ask the children, *How can we protect ourselves from the sun?*	Explain that UV light is invisible. However some light is visible. The visible spectrum is the name for the light that we **can see. We call this light 'white light'.** However, white light is made up of the colours of the rainbow. Have they ever seen a rainbow (except those in the sky) before? Where? Explain that each colour has a different wave length. Violet being the shortest and red being the longest. When light is refracted or passes through an object the colours pass through at a different rate and why we see a rainbow. Use the prisms to demonstrate this. Let the children play with making a rainbow! Consolidate all learning on light.

	Children to discuss with their Talking Partner before discussing as a whole class. Discuss with the children that we can wear hats, cover up and wear sunscreen. To protect our eyes we can wear sunglasses. Discuss how some sunglasses have a UV rating to show how well they block UV rays. Explain how it is important that they have sunglasses with a high UV rating. Stress how some sunglasses don't have a UV rating - these are really just toy sunglasses and don't protect your eyes. In fact, because they have dark lenses but no UV filter, the pupil opens wider, actually letting in more UV rays! As well as doing this, the following will help us to look after our eyes; • Wrap around sunglasses are best, as they cover more of the eye. • Also wear a hat with a wide brim to shade your eyes. • Have regular eye tests to check your eyes. • Even if you are wearing sunglasses and a hat, you should still never look directly at the sun. • Explain to the children that they are going to create a poster all about keeping eyes safe. Discuss the facts they can include. Model an example.  	

		 STAY SAFE IN THE SUN	

SS John Fisher & Thomas More Catholic Primary School

A Voluntary Academy

Year Group: Year 3 & Year 4	Term: Summer 2 (Cycle A)	Topic: Plants

National Curriculum Links

Pupils in Key Stage Two should be taught to:

- 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, including pollination, seed formation and seed dispersal.

Working Scientifically

- ask relevant questions and using different types of scientific enquiries to answer them
- set up simple practical enquiries, comparative and fair tests
- make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment
- gather, record, classify and present data in a variety of ways to help in answering questions
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- use straightforward scientific evidence to answer questions or to support their findings.

Prior Learning	Future Learning
• Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants) • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants)	• Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) • Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3)

Common Misconceptions

Some children may think:

- **plants eat food**
- **food comes from the soil via** the roots

- **flowers are merely decorative rather than a vital part of the life cycle in reproduction**
- **plants only need sunlight to keep them warm**
- **roots suck in water which is then sucked up the stem.**

Sustainable Development Goals & Catholic Social Teaching

Sustainable Development Global Goals would be perfect to fit with this unit of learning:

These Catholic Social Teaching strands would be perfect to fit with this unit of learning:

Applied Write Opportunities	Enrichment Opportunities
In English lesson, children write a diary entry from the perspective of a bee, including their scientific understanding about the life cycle of a flowering plant.	

Assessment Opportunities

- Can explain observations made during investigations
- Can look at the features of seeds to decide on their method of dispersal
- Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal

Key Vocabulary

Tier Two:

Tier Three:

Knowledge and Skills Objectives	Activity	Differentiation
Lesson One I know and can describe the functions of different parts of flowering plants. Working Scientifically	**Prior Assessment Task:** Children to go outside and find as many different plants as they can, taking photos of them so that they could talk about them back in the classroom. Can children identify not only flowers, but trees, grass, bushes etc? Children to make a PicCollage for their book. **Hook:** **Display as a slide share, images of the plants they found whilst exploring outside.** **Big Question:** ***Why are plants important?*** **TTYP** **Explain that without plants, there will be no life on Earth.** **When green plants make food, they give off oxygen. This is a gas that all animals must breathe in order to stay alive. Without plants, animals would have no oxygen to breathe and would die. People and animals depend on plants for food too.** **Introduction:** **Show the children a selection of plants, and ask them;** ***What are the different parts of a plant called?*** **Children to discuss the different parts of the plant are and if they know what the functions are of each part.** **Children to make a playdough 'plant' on a wipe-board and ask them to label it and record what they know about each part of the plant - pre-assessment: children learnt this in KS1.** **Take photographs for evidence. These can be stuck into their journals.**	Activity 1: Draw, label and write about the different functions of a plant. SEND: Children to have a pre-drawn image in interactive skeleton book. Children to label the image using a word bank and write a simple sentence about each part e.g. A stem holds up the plant. A leaf helps the plant make food. Main Activity Children to draw and label an image of a plant. Children to write about the function of each part of the plant using scientific vocabulary.

Resources

Ipads
Playdough
Wipe-boards
Information packs for groups
Interactive skeleton books
Fact sheets on types of plants

Activity 1:

Explain that they are going to learn more about the different parts of a plant and their functions.

Put the children in groups of 4. Each child to be nominated to be a part of a plant and given information and images about it. (The information can be differentiated to support reading abilities.)

Following this, children have to explain the function of their named part to the rest of their group, ensuring they explain key scientific vocabulary.

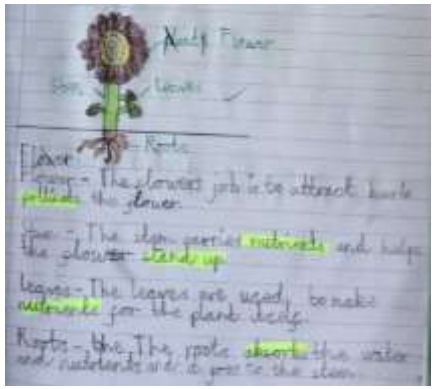
Children to record what they had learnt about the main parts of the plant in their 'Interactive Skeleton Book'.

Activity 2:

Watch the video of the parts of a plant song and act it out in groups.
https://www.youtube.com/watch?v=qI6OL7_qFgU

Take videos of the children acting it out.

WAGOLL



Challenge:

Children to read the following text on types of plants.

Children to answer the following questions:

1) What are the two types of plants that make seeds?
2) How do flowering plants make seeds?
3) What type of plant has no roots?
4) What is a spore?

		Plenary Use the following BBC Bitesize website to consolidate what the children have found out today. Play the quiz at the end of the webpage. https://www.bbc.co.uk/bitesize/topics/zy66fg8/articles/z2d4g7h
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson 2: I can explore the requirements of plants for life and growth. Working Scientifically	**Prior Assessment Task:** **Ask the question;** ***What is a plant? TTYP*** **On a wipe-board, children to use a 'Quick Write' paragraph to answer the question.** **Children to share their paragraphs.** **Consolidate that p**lants are living things that grow from the soil and turn light from the Sun into food. Plants can be big or small, from giant trees to tiny	Activity 1: Name the things plants need in order to grow, and write a sentence to explain this in their Interactive Skeleton Book.

	Big Questions: **Display this 'Big Question' from Explorify.** https://explorify.uk/en/activities/the-big-question/how-can-you-tell-if-something-is-a-plant Discuss unlike animals, plants tend to live out their life cycle (germinate, grow, reproduce) in one place. The defining character of life is the ability to grow, reproduce and die. How are plants different from other living things? Here are a few examples: • Plants are usually green. • Plants are immobile and do not migrate. • Plants make their own food using sunlight. • Plant cells are different from animal cells. **Introduction:** **Show the children a plant you have brought in from home that was dying and ask the children to discuss what you might have done wrong. Children to share their thinking with their partner.** **Explain to the children that plants need lots of different things to be able to grow. Ask;** ***What do plants need in order to grow? TTYP*** **In pairs, children to make a list of these on their wipe-boards** – pre-assessment: **children learnt this in KS1.** Explain that plants need lots of different things to be able to grow. Plants need: ▪ Water ▪ Nutrients from the soil ▪ Light ▪ Air ▪ Room to grow	SEND: Children to name the 5 things plants need in order to grow and draw an image to represent it. Main Activity: Children add flaps to their Interactive Skeleton Book. On the flap, children to draw an image of the 5 things plants need in order to grow. Under the flap, children to name and write a sentence about each one. WAGOLL Water and nutrients Plants need water to grow and keep healthy. Water helps the plants take in nutrients from the soil. If **you don't** give them enough water, they can wither and die. Sunlight Plants need sunlight to grow and keep healthy. The sun provides warmth and energy for plants to survive. Plants use **the sun's energy to makes their own** food energy in their leaves. If the plant does not get enough sun it can slow its growth and even kill it Air Plants need clean, fresh air. Dirty air caused by smoke, gases, and other pollutants can be harmful to plants.

Resources

A range of plants, including a dying plant.
Wipe-boards
Information about what plants need
Interactive Skeleton Books
Flaps for their books
Flower pots
Mature plant grown from a bulbs
soil/cotton balls
water
saucers
challenge questions

Activity 1:
Provide the children with information about what plants need. Children to share this with their partner.
Discuss what they have found out, and explore any misconceptions.

Children to name the things plants need in order to grow, and write a sentence to explain this in their Interactive Skeleton Book.

Activity 2:
Explain to the children that they are going to investigate to see if plants do need all of these things to grow.
Explain that they will be planting seeds in small groups and taking away one of the things plants need to see if they really need it!

In groups of 4, children to

1) decide on a question to investigate e.g. Will plants grow without water? Will plants grow without light? (1 group will set up and be responsible for one condition.)
2) plan out their investigation using the planning sheet to present this on. Children to also consider how they are going to record their findings.
3) set up their investigation.
4) predict what they think will happen.

Children to record their question, what they will use and their prediction in their journals. Children to also to record which variable they are going to change.

(Children to use mature plants that have grown from bulbs)

Plants use the air to make their own food.

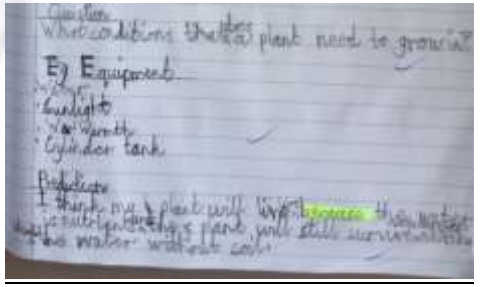
Room to grow

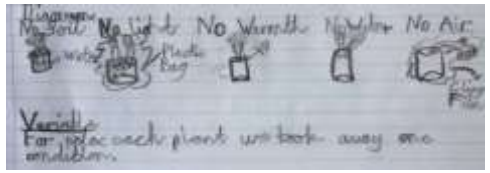
Plants also need enough room to grow. If seeds are planted too close together, they would all be fighting over the water, nutrients, air and light! Some of the plants would not survive.

Activity 2:
Write the question, equipment and prediction into journals.

SEND:
Use a template to present their learning on, and provide a word bank.

Main Activity:
Children to write their investigational question into their books, along with the equipment and their prediction.



		Children to also draw a diagram of what each plant will go without, and which variable they are going to change.  <u>Challenge:</u> Children to read and solve the following question. 

		Plenary Use the following BBC Bitesize website to consolidate what the children have found out today. Play the quiz at the end of the webpage. https://www.bbc.co.uk/bitesize/topics/zy66fg8/articles/zk43f82
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Three: I can explore the requirements of plants for life and growth and how they vary from plant to plant.	**Prior Learning Task:** Watch the following video clip from Explorify. https://explorify.uk/en/activities/whats-going-on/growing-seed Ask: • What do the class think is happening – do they know that **they're** looking at a seed? • Can they describe what the seed looks like? • What do they notice about the soil – is it wet or dry? • Can the class see any similarities between these young plants and the plants they see around school? Ask the children if they can describe what they saw using only one word	Activity 1: Record findings from an investigation SEND: Children to pair up with someone from their group, to support them in creating a table of results.

Working Scientifically:

Hook: their plants from last week

Big Question:

Do all plants need the same amount of water? TTYP

Show the children a cactus. Discuss where cacti grow in the world. Explain that cacti are succulent plants. This means that they have thick tissues that take up and hold large amounts of water. The stored water keeps them alive during dry periods.

Introduction:

Explain to the children that all plants are different, just like all animals are. Some plants thrive in a particular habitat but not in another habitat.

Show images of habitats – pre-assessment; children learnt names of habitats in KS1.

Activity 1:

Give the children images of plants and a description. Children to match them to the habitat.

Discuss why that plant grows in that habitat.

Activity 2:

Ask:

Is soil important in the growing of plants? TTYP – pre-assessment; children learnt about this in previous topic.

Explain that soil provides a place for plants to grow. It holds the roots providing support for plants. It also stores nutrients, or food substances, needed for their growth. It also holds water for the plants.

Explain to the children that they are going to investigate how different soils might affect plant growth.

Ask the children to name the five types of soil. On wipe-boards, children to record the soil types – pre-assessment: children learnt this in previous topic.

Encourage children to articulate their thinking using correct scientific language.

Main Activity:

Children to use the data collected over the week, to create a table of results. Children to write a conclusion on what they have found out.

WAGOLL

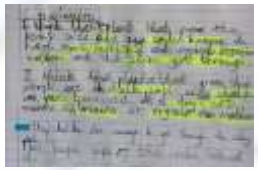
Conclusion

Following the investigation, it is evident that all the plants grew weaker if one of the conditions was removed.

I think sunlight is the most important condition as the plant with no sunlight lost it colour and started to droop. Light helps them to make food. If a plant has no or little energy, like all living things, it will die.

Resources

Plants from the previous lesson
Cacti
Results and notes taken during daily observations
Tables for results
Fact sheet about Plant Survivors
Soils (5 types)
5 plant pots

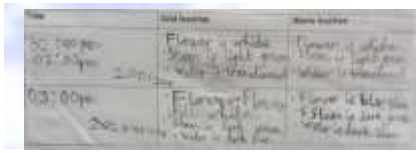
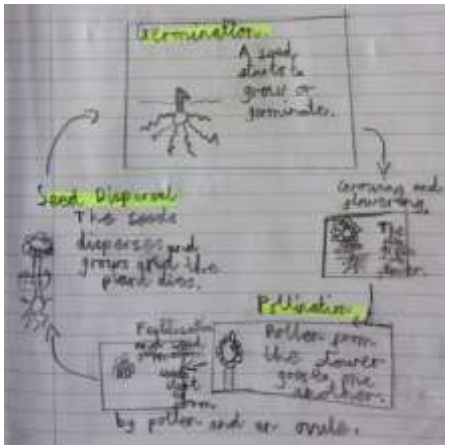
5 plants water	*Take feedback, and discuss the characteristics of each soil.* e.g. Chalky; gritty, dry, dusty Set up investigation with the children (5 plant pots, 5 different soils, 5 plants (same) and all get placed in the same place and given the same amount of water).    *This does not need to be written up as an investigation. The children already are in the process of writing up another investigation, and would make it writing heavy. If you want to record this investigation into journals, here is an example or create a whole class floor book page of evidence, building it up as you work through the investigation. <u>Activity 3:</u> Consolidate the investigation from last week. What were they investigating? How where they ensuring it was a comparative test? What are the variables? What is the control? Invite the children to look at their plants from last week, and complete their final day of observations. Children to share their observations with the rest of the class.	<u>Challenge:</u> Children to read this text from https://www.broadheath.coventry.sch.uk/year-3-autumn-2-reading-challenge-3/  Children to write a fact they have found out about plants on a template of a plant. Children to share these facts with the class. **Plenary**

	Model how to record their results, then children to record what they have found out in their journals in a table format. Activity 4: Invite each group to compare their plant with the control and with those of the other groups. Children to share their observations and explain their reasons for this choice. Children to conclude their findings. Assessment - Can the children explain the importance of sunlight within their conclusion?	Show an image of a cacti, snowdrop and a water lily. Ask the children to spot the Odd One Out. Children to discuss with their partner. Take feedback. Discuss how the needs of these plants vary. Cacti: These adapt to their habitat as they can survive with more sunlight, less water and by growing extra-long roots. These plants also are able to store water. Snowdrop: These adapt to their habitat by having less sunlight and liking the shade. Water Lily: These adapt to their habitat by having no or little soil and lots of water.
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Four I can investigate the way in which water is transported within plants **Working Scientifically:**	**Prior Learning Task:** Give the children some images of plants; invite them to group them. **Some flowers are wild and some are garden flowers. If they don't identify that some are 'wild' and some are 'garden', lead them to this.** Assess whether the children know the difference between wild and garden, if they can identify which are which, and if they can name any of them.	Activity 1: Write up of investigation SEND:

Resources		
Wild & garden plants sorting activity ipads flowering plants (observing stems & leaves, as well as for the investigation) magnifying glasses digital microscope scissors vases/tall bottles water food colouring	**Hook: plants, soil bags, trowels,** **Big Question:** What are roots? What do they do? Why do plants have them? Explain that the roots of a plant have a number of different jobs. • They take up water and nutrients from the soil. • They keep the plant steady. • They keep the plant upright. • **They 'anchor' the plant** Introduction: Explain that we going to collect some weeds from our school grounds so we can look more closely at the roots of a plant. Explain that we are only going to collect weeds as they are unwanted plants – in KS1, children learnt about the difference between garden and wild plants. Explain that when we pull them up, we need to do it carefully so the roots are not damaged. When we are pulling them up, we want to be able to feel how strong the roots are at anchoring the plant into the ground. Take photographs of the children exploring roots and create a PicCollage of their exploration. Activity 1: **Consolidate that fact that roots, take up water and nutrients from the soil.** **Ask:** ***Therefore, how does water travel through a plant?* TTYP.** **Children to share ideas.**	Children to have a template to write on as well as a word back to support them. Children to be guided through the task. Main Activity: Children to write up their investigation and to record their ideas. WAGOLL I am going to investigation how water travels through a plant. I will use: (these can be drawn and labelled) • flowers • vases • food colouring • water Prediction: (children can draw a before and after image to support their written words) I predict the plant will suck up the water with the food colouring in, and it will turn the petals blue. **I don't think the stem will change** colour as it is already coloured. Challenge: What is photosynthesis? Use secondary sources to find out more.

	Explain the journey of water and why this journey is important. Introduce the term, photosynthesis. Use the following BBC Bitesize Website to explore how roots help to make food. https://www.bbc.co.uk/bitesize/topics/zy66fg8/articles/z6pvf82 **Following the video, the children could devise a way in which to remember this e.g. a mnemonic, a song/rhyme or through actions.** <u>Activity 2:</u> Take a stem, and consolidate that the stem is made up of thousands of tiny, thin tubes. These tubes are called xylem (pronounced zy-lem). Each tube runs from the roots to somewhere in the leaf, petal or fruit. These tubes are like straws, they suck up the water and nutrients. If you cut the stem of a flower, the xylem will suck up whatever they are sitting in. Therefore, you keep a cut flower hydrated and fairly healthy for a couple of weeks if you put the right nutrients into the water. Get the children to cut a stem and with a magnifying glass to explore it. What can they see? Using a digital microscope show the children a closer image of the inside of a stem. Invite the children to look at the leaves and identify the little tubes connecting it to the stem, and the tubes into the leaf (the children might identify that this is similar to our blood vessels. These carry blood, oxygen and energy around our body) <u>Activity 3:</u> Explain to the children that we are going to explore how, after a plant have been **cut, plants can continue to 'stay alive' for a little while longer.** Show the children some carnations, food colouring, water and vases, and ask them how we might use these resources to see the water within the plants and to demonstrate that the stem transports water to other parts of the plant. Children to discuss with their partner before discussing further as a whole class.	Present learning as a mind map. **Plenary** Explain to the children that they are going to grow a bean for home learning. Give each child: a seed paper towels tall plastic cup *children will need to add water at home. Model how to set the investigation up but provide an information sheet to take with them. 1) Take a tall plastic cup and wrap some paper towels into a cylinder and place inside. 2) Fill up the bottom quarter of the glass with water. 3) Place a bean between the paper towels and the inside of the glass. 4) Make sure the bean is above **the water and doesn't fall into** it.

	Model how to set up the investigation Children to write up the investigational question, draw what they will need, write a prediction (this can include before and after sketches) Children in groups to set up their own. This investigation will need at least 2-6 hours, so the children will return to it at the start of the following day.	5) Put it on a windowsill for a week or so. You should see the roots with their tiny hairs growing downwards and the shoot growing upwards. Children to take pictures or draw pictures of their bean every day. Children to create a bean diary (provide template for this)
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson five: I can explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal Working Scientifically **Resources** Plastic bottles Pins Soil Dead leaves Food scraps,	**Prior Learning Task:** ***Why are bees important?*** **Children to discuss with their partner, and to summarise in one sentence, why they are important.** **Last term, the children learnt about apiculture in Geography. Within this unit of work, it was discovered that bees not only make honey, they help to pollinate the plants that make food we eat. Without bees we would not have all the plants/food we have** **Hook: flowers, kettle, vases, food colouring** **Big Question:** **Watch the following video on Explorify** **https://explorify.uk/en/activities/whats-going-on/water-colours** **Ask:** ***What were the changes before and after?***	Activity 2: Draw, label and annotate the life cycle of plants. SEND: Using a template, children to draw and label the plants life cycle using either a word bank or word cards. Children to match simple sentences to the correct stage. Stick onto their diagram. Main Activity: Children to draw a plants life cycle. Children to name and label the stages using a word bank. WAGOLL

Scissors Garden canes String Worms	***Why did the flowers change colours?*** ***Which parts of the plant are working?*** ***What does this tell us about the needs of a plant?*** **Consolidate the learning from last week.** **Introduction:** Show the children the carnation, water, vase and food dye again. Ask; Can you think about what might make the water be transported more or less quickly up the stem? Hopefully, the children will mention temperature. Explain to the children that we are going to investigate the effect of temperature. Children set up the investigation with support, and monitor it throughout the lesson. This activity can be recorded as a floor book page of evidence or as a PicCollage.  Activity 1: Explain to the children that all living things have a life cycle. Ask: *What is the life cycle of a human? TTYP* **Take feedback, and ensure all children understand what is meant by 'Life Cycle'.** Ask; *What the life cycle of a plant is?* In pairs, children to draw, label and annotate on a wipe-boards – pre-assessment; children did this in KS1 (they might not remember pollination) Give each group some information to research about the life cycle of a flowering plant.	 HA – can they add more about pollination? Challenge: Why are bees important?

	Children to discuss what they have found out. Consolidate pollination and the two different types of pollination; wind and pollinators. Wind – the wind can blow pollen from one plant to another. Pollinators – insects such as bees, butterflies and flies are attracted to the brightly coloured petals. They land on a flower to drink nectar. When they land, grains of pollen stick to them. Then, when they go to the next flower, the pollen is transferred. Use the information on BBCBitesize and the video to support the teaching of this. https://www.bbc.co.uk/bitesize/topics/zy66fg8/articles/zrrk4xs Following this, children could be flowers and bees, and the bees collect pollen from flowers and drop at other flowers. <u>Activity 2:</u> Model the drawing of a plants lifecycle. In their Interactive Skeleton Book, children to draw, label and annotate the life cycle of a flowering plant. <u>Activity 3:</u> Look at the investigation from the beginning of the lesson. Children to observe changes. Discuss with the children why these differences happened so quickly. Introduce the children to transpiration; the process by which water is pulled from the roots of the plant through the stems and leaves and released through microscopic holes in the leaves called stomata. The water is pulled up, against the force of gravity because of the interplay of two forces: cohesion and adhesion. On a hot day, plants need pull water from the roots quicker because at warmer temperatures water molecules move faster, and the rate of evaporation from stomata is faster too.	Plenary

	When we are hot, we drink more as we transpire more (sweat). We need to replace the water lost from our bodies. Add images and children comments to either their journal, floor book or used within a PicCollage for their journals.	
	Activity 3: Explain that plants make seeds following pollination. Give the children information about the Show the children different seeds. Ask the children to sort the seeds into those that might be carried by wind, animal The children were asked to carry out and present some initial research into how seeds are dispersed. After looking at a selection of seeds the children sorted pictures of different types of seeds and explained why they are suited to certain types of seed dispersal.	Display on the board, key scientific vocabulary for plants e.g. stem, flower, trunk. However, scramble them up. Invite the children to unscramble them. How many can they unscramble before the time runs out? Check, and consolidate the meaning of these words.

SS John Fisher & Thomas More Catholic Primary School

A Voluntary Academy

Year Group: Year 3 & Year 4	Term: Summer 2 (Cycle A)	Topic: Rocks and Soils

National Curriculum Links

Pupils in Key Stage Two 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.

Working Scientifically

- ask relevant questions and using different types of scientific enquiries to answer them
- set up simple practical enquiries, comparative and fair tests
- make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment
- gather, record, classify and present data in a variety of ways to help in answering questions
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- use straightforward scientific evidence to answer questions or to support their findings.

Prior Learning	Future Learning
• Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance) • The composition of the Earth. (KS3) • The structure of the Earth. (KS3) • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. (KS3)

Sustainable Development Goals & Social Teaching Strands

Sustainable Development Global Goals would be perfect to fit with this unit of learning:

These Catholic Social Teaching strands would be perfect to fit with this unit of learning:

Applied Write Opportunities	Enrichment Opportunities
• Instructional texts on how to make a compost bin or the process of fossilisation • An explanation text on fossilisation.	• Invite a gardener into school to discuss the importance of composting.

Assessment Opportunities

- Can name some types of rock and give physical features of each
- Can explain how a fossil is formed
- Can explain that soils are made from rocks and also contain living/dead matter
- Can classify rocks in a range of different ways, using appropriate vocabulary
- Can devise tests to explore the properties of rocks and use data to rank the rocks
- Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily
- Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc.
- Can identify plant/animal matter and rocks in samples of soil

Key Vocabulary

Tier Two:

natural, man-made, rock, stone, pebble, boulder, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, **sandy/chalk/clay soil, compost, Earth's crust, pores, holes, dense, top soil, bedrock, decay**

Tier Three:

crystals, grain, geologist, palaeontologist, igneous, sedimentary, metaphoric, weathering, erosion, mantle, permeable, impermeable, porous, cementing, compacting, humus, organic material, biodiversity,

Knowledge and Skills Objectives	Activity	Differentiation
Lesson One I know what rocks are and how I can group them. Working Scientifically	**Prior Assessment Task:** Give every child a small rock sample to examine. Explain that these are a clue to our next exciting science project. Ask; • What are they? Are they all the same? • Do you know the names of any rocks? • Where did they come from? • How were they made? What are they made of? • What is made out of rock, and why? • Is rock natural or man-made? **Record children's ideas on flip chart paper, Notability or other. Refer to this** when preparing and planning weekly lessons, and amend. **Hook:** **A selection of rocks, magnifying glasses, books about rocks** **Big Questions:** ***What is a geologist? What do they do? Why is their job important? TTYP*** Explain that geologists are scientists who study what the earth is made from. They will be particularly concentrating on rocks. *What is a rock?* TTYP Explain to the children that rocks are made of minerals.	SEN - children to read questions and circle the correct answer to the following questions; What is a rock? Where would you find rock? Why is brick not a rock? Children to have pictures of three different types of rocks they observed. Match key vocabulary/phrases to each picture e.g. it can be scratched. Main Activity Children to journal the answer to these questions; What is a rock? Where would you find rock? Why is brick not a rock? Describe three different types of rock you have observed today using the word bank for support. WAGOLL A rock is made up of lots of different minerals that have been forced together.

To help them understand, ask them to imagine a cake. The cake is made of flour, butter, sugar and eggs. The cake is like a rock, and the flour, butter, sugar and eggs are the minerals. – Rocks are made of minerals – Minerals are not made of rocks.

Introduction:

Give each group a model of the Earth made of playdough, and ask them to cut the earth in half. Children to discuss what they see. What do they think the different colours represent?

Introduce the Earth crust (the outer layer). Discuss with the children that the Earth crust is made of rock and rock is all across the surface of the Earth, even under the water!

Next, introduce the mantle (the layer underneath the crust). Discuss with the children that the mantle is mostly molten rock – put a picture of molten rock on the IWB to support understanding.

There isn't a need to teach about the other layers. These are not important in the creation of rocks, and this knowledge and understanding will be taught in more detail in the Y4 topic Earthquakes and Volcanoes.

Use cocktail sticks and strips of paper, children to label the model of the Earth (crust & mantle).

Activity 1:

Ask;

Are all rocks the same?

Which of these are rocks?

Which are not rocks? What are they? How do you know?

Rocks are found on the surface of the Earth, known as the Earth crust.

All rocks are natural. Some materials behave like a rock such as brick and cement. However, these are not rocks as these are man-made.

There are lots of different types of rocks.

Here are three examples of rocks:

This is a white rock. It is very light. When I scratched it, white powder appeared on my fingers. Therefore, this rock is soft and can be easily crumble. When the rock was placed in water, I saw bubbles come from tiny holes in the rock known as pores.

Challenge:

Read about the three different types of rock; sedimentary, igneous and metamorphic.

Resources

Selection of rocks
Magnifying glasses
Books about rocks
Playdough Earths
Numbered cards

Reading material on the three different types of rocks	Give the groups a selection of different rocks (about 3) with a number stuck on them. Ideally, each number should be the same for each table i.e. all number 3s are sandstone. Children to explore and discuss the rocks characteristics e.g. appearance and texture. Children to share their initial observations. <u>Activity 2:</u> Provide children with a wider selection of different rocks including man-made substances which are like rock (e.g. brick and cement) and magnifying glasses. Invite them to study the rocks further and discuss them. Give the children key question stems to guide their discussions encouraging new vocabulary; • What colour is the rock? • Does the colour of the rock change when you put water on it? • Are there any shapes or patterns on the rock? • What does your rock feel like? • What does your rock look like it is made out of? • Can you scratch your rock? • Is the rock lighter or heavier than other rocks of a similar size? • Can you see crystals in the rock? • Does your rock have holes in it? Children to share their observations, and support them to extract the new vocabulary. **Some children might know the term, 'permeable'. This will be taught in another** lesson, however, if it is raised, do discuss this with them. <u>Activity 3:</u> Invite the children to sort the rocks into groups. Discuss the reasons for the sorting e.g. these are all shiny, these have sparkly bits in them, these have layers etc. Ask the children if all the rocks in one group belong to the same type (family of rock). How many types of rocks do they think there are? **Explain t**here are three types of rock: sedimentary, igneous and metamorphic	 Can the children identify which type of rock their chosen rocks above are? **Plenary** Consolidate that different types of rocks have different properties. Use Explorify – Zoom in and Zoom Out activity (notes how to use it on website) https://explorify.uk/en/activities/zoom-in-zoom-out/mysterious-material Start by asking everyone:

	Each type of rock is formed in a different way. Watch together the following video. https://www.bbc.co.uk/bitesize/topics/z9bbkqt/articles/zsgkdmn or/and https://www.youtube.com/watch?v=2LwUV4VL1eY Children to look at the rocks on their table, and identify which rocks are sedimentary, igneous and metaphoric. Activity 4: Ask; *What words would you use to describe rocks?* Allow children to use talk partners, and feed back to the rest of the class. Create a word bank. **Model looking at a rock, and using children's vocabulary suggestions to write** description next to sample number. Ensure the children know that all rocks are natural, and the other things are man-made – they may share some characteristics of rocks, but they are not rocks. Discuss which samples were natural and which were man-made.	What do they think the image is and why? What does the image remind them of and why? Every time you zoom out, ask the class: Can they describe the colours, shapes and textures? What do they think the image is now – have they changed their minds? *Add all new vocabulary to working wall with images.
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Two I know the properties of different rocks and how they can be used. **Working Scientifically:**	**Prior Learning Task:** Give each group a selection of rocks, and invite the children to sort them into the three different types of rocks; sedimentary, metamorphic and igneous and their properties. Listen carefully to the discussion – are they using the correct terminology and are they using reasoning? Hook: a selection of rocks and name cards Big Question: *Can you name any rocks?* TTYP	SEN: Stick an image of a rock into their books. Using a word bank, write three facts about the rock; 1) Name of rock 2) 1 or 2 characteristics e.g. porous 3) A use e.g. graves Main Activity: Children to include several facts describing its appearance, texture, properties and use of each rock.

Resources

Selection of rocks
Name cards of the 3 different types of rocks
Fact cards
Uses of cards

Gather ideas from the children, and encourage them to justify their thinking e.g. I think this rock is chalk as I can write with it, and it is light and soft. Children might mention silver, gold or diamonds – these are rocks!

Introduction:
Explain that some rocks are harder than others.
Show the children granite. Explain that granite is a very hard rock. This makes it a **good material for building as it doesn't wear away easily.**
Show the children marble. Explain that marble is another hard rock. It has an attractive texture and colour and it can be cut and polished. Because of this, it is used to make floor tiles and wall tiles. Some statues are made from marble too.
Show the children chalk. Explain that chalk is a soft rock that wears away easily. This makes it ideal for making chalk sticks to write on blackboards. With the chalk, show the children sandstone. Explain that both these materials let water soak through them. They are called permeable rocks.
Show the children slate. Explain that slate does not let water soak through them. They are called impermeable rocks. Slate also splits easily into thin sheets. This makes it ideal for making roof tiles.

*if there are more rocks that you feel important to introduce, do so.

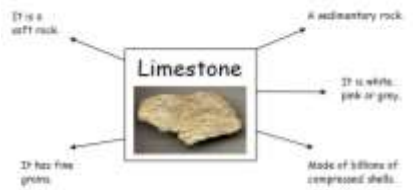
Activity 1:
Place the following rocks (marble, chalk, sandstone, granite, slate) on the table along with name cards and a description of their properties; invite the children in **groups to match the rocks to their names. Discuss the children's reasons** for the matching.

Activity 2:
Explain that we use rocks for lots of different things every day and you probably **don't even realise! We use rocks in lots of different ways. They are useful building** materials, and are often used in the construction of roads and buildings.

Give children examples of the everyday things rocks are used for. Children to identify the object made from rock and what it is used for. Children to discuss why that rock has been selected for that purpose.

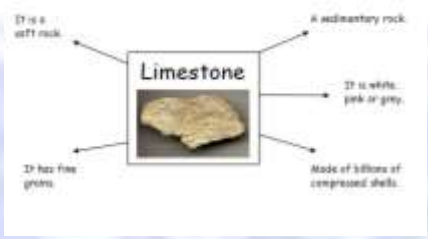
Activity 3:

WAGOLL



Challenge:
Children to research other uses of rocks on chrome books or ipads. Feedback to class.

Plenary

	Children to create a mind map about each rock. Mind map to include the properties and uses of the rock, and why type of rock it is.  	Unscramble the rock names; provide children with the names or rocks all scrambled up. Children to work together to unscramble them. Children to reflect on one thing they have learnt today.
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Three I know the properties of different rocks and how they can be used. **Working Scientifically:** I can ask relevant questions and using different types of scientific enquiries to answer them I can make systematic and careful observations. I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	**Prior Learning Task:** Use Explorify – Odd One Out https://explorify.uk/en/activities/odd-one-out/building-with-rocks (notes to accompany activity is on the website. Show the three images above and ask everyone to come up with as many similarities and differences as they can. If they get stuck, prompt them to think about: appearance, what they do, where they might be found **Hook: a selection of permeable and impermeable rocks, large containers, water** **Big Question:** **Ask the children;** ***Can rocks allow water and air in to them?* TTYP** **Consolidate the term, permeable and impermeable, if discussed in previous lessons.** Introduction:	All children in mixed ability groups: Go outside and children collect 10 rocks. Put their rocks into a container with a water-tight lid. Fill the container with water and put lid on tightly. Take it in turns to shake the container whilst counting up to 100. When they have finished, they should sieve the contents of the container into a second container – so the rocks will be in the sieve, and the water will be in another container. Discuss any changes they notice to the rocks, and to the water.

I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions I can identify differences, similarities or changes related to simple scientific ideas and processes I can use straightforward scientific evidence to answer questions or to support their findings.	Explain they will be investigating rocks and water in a bit more detail. You will have two clear containers of water, like the children will. Model putting one permeable rock (e.g. sandstone) and one impermeable rock (e.g. granite) each into the containers of water, and look closely at the bubbles which form. Describe both the bubbles, and where they come from on both samples. <u>Activity 1:</u> Children to set up their own investigate, observe and describe what they have seen Discuss what the children have found, and why they think this is. Why do you think some rocks have more bubbles than others? What do you think this means? Explain to the children that some rocks have holes between the grains, and this lets air or water into them. When you put these rocks into the water, the air is less dense than the water, so it rises up as a bubble. This is called a permeable rock. Other rocks do not have spaces between the grains, so their bubbles might be air that was in a crack on the surface. These are impermeable rocks. Encourage the groups to order their rocks from most bubbly to least bubbly – sorting them by permeability. Record their findings in their books. <u>Activity 2:</u> Hold up a rock and ask the question; *Do you think this rock will change today? This week? This year? By the time you are a grandma or grandpa? TTYP* **Discuss the children's answers. Explain that even though it looks like rocks don't** change to us, actually, over hundreds and thousands of years, rocks do change. Ask the question; Can you think how a rock might change? What could happen to it? TTYP	Children to record what is weathering and erosion in their books. <u>WAGOLL</u> Weathering is the breaking down or dissolving of rocks on the surface of the Earth, wearing it away over time. Erosion is the transportation of natural materials following weathering. This usually happens by wind or water. Children could draw images to show this. <u>SEN:</u> Create a simple poster e.g W is for weathering. It breaks down rocks E is for erosion. It takes rocks away. <u>Challenge:</u> What is deposition? Give the children a poster about weathering, erosion and deposition to find out more about them. Create a poster. 
Resources		Plenary

Large containers Permeable and impermeable rocks Post-it notes & hairdryer or wood and sandpaper, Water tight containers Water Poster for reading	Compile a class list of ways a rock could be made to change. Show weathering and erosion clip, pausing at specific points to discuss. https://www.youtube.com/watch?v=exS9gFXgib0 Consolidate that through weathering – wind, water, plants and chemical – the rock is eroded, and fragments break off and are carried away. This could also be demonstrated either; a) putting post-it notes on a child, and using a hair-dryer or fan to blow them off – so the so the post-its represent rock fragments, and the fan is the wind. b) using a piece of wood and sandpaper. Consolidate that some rocks are more durable than others (hard wearing). Watch the following short video. https://www.bbc.co.uk/bitesize/clips/zt3ygk7	Ask; What do you think happens to the fragments of rock following the process of weathering, erosion and deposition? Show compacting and cementing clip https://www.youtube.com/watch?v=mSZu3SG69LY Discuss what compacting and cementing is, and how many rocks especially sedimentary rocks have been formed this way.
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Four I can explain the process of fossilisation. Working Scientifically	**Prior Learning Task:** Use Explorify – **Big Question, 'Do rocks stays the same forever' (notes to** accompany this are on the website) https://explorify.uk/en/activities/the-big-question/do-rocks-stay-the-same-forever **Listen to the children's responses. Are they using the words, weathering,** erosion, deposition, cementing and compacting. *Year 4 perhaps bring in the rock cycle if you feel they will understand it. **Hook: fossils, magnifying glass** **Big Question:** **Ask the question;**	All children working together in pairs, Make fossils 1. Put flattened clay in bottom of cups. 2. Make an impression using a plastic creature. 3. Fill with plaster of Paris and mix carefully. 4. Leave to set for 24 hours. Peel off the cup, and the clay, and you are left with a pretend fossil which the children can then paint. WAGOLL

Resources

Animal figures
Plants
Plastercine/playdough/clay
Bowls
Plaster of Paris
Ordering of the fossilisation process sheets

What are fossils? What kind of fossils are there?
Children are likely to know about dinosaur fossils, but may not be aware that other living things can become fossils too.
Discuss the children's answers.

Introduction:
Explain to the children that fossils are the preserved remains of plants or animals however most animals and plants do not become fossils when they die. Most fossils only occur in sedimentary rocks. Some have been found in other natural materials, such as, amber.
Fossils help us to find out about the organisms that lived a long time ago.
A palaeontologist searches for and investigates fossils, of which, Mary Annings is known as one of the early fossil hunters. The depth a fossil is found within rock can help us to work out how long ago it died

Show this video:
http://www.youtube.com/watch?v=3rkGu0BItKM or
https://www.youtube.com/watch?v=z58igGHuX2I
pausing at key points to discuss.

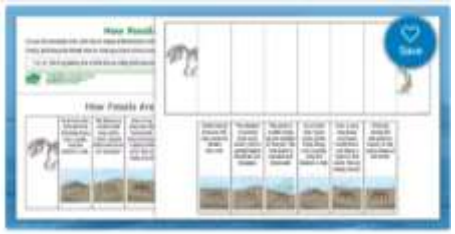
Activity 1:
Explain to the children that they are going to make a cast fossil.
Model how to create it using the correct terms such as cavity, decay, casting.

Children in pairs to have a go at creating their own cast model of either an animal or a plant.

Activity 2:
Children to either order the fossilisation process or produce a written explanation on how fossils are formed.

When an animal dies, its skeleton settles on the sea floor. It then gets buried by sediment or dirt, and over time the sediment surrounding the skeleton thickens and begins to turn into sedimentary rock.
The flesh of the animal rots, and eventually the skeleton dissolves and a mould or cavity is formed. A cavity is like a hole or a space where once the animal was.
Water finds away into the cavity, depositing minerals that eventually solidify and create a cast. Due to weathering and erosion, **the Earth's** surface becomes exposed and so do the remains.

Or complete this activity



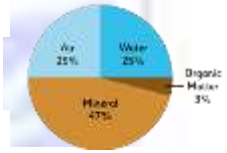
Challenge:
Find out about Mary Anning and her discoveries.

Plenary

		Consolidate how fossils are formed. https://www.bbc.co.uk/bitesize/topics/z9bbkqt/articles/z2ym2p3 Discuss with the children that there are other types of fossils. Discuss the differences between some of these, and the impact fossils have had on the understanding of animals and plants.
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson Five I know what soil is and can identify different soil types. Working Scientifically	**Prior Learning Task:** Use Explorify – Odd One Out, Frozen in Time (notes to accompany activity are on the website). https://explorify.uk/en/activities/odd-one-out/frozen-in-time Hook: What am I questions leading to the answer – soil!	All children Follow instructions to make a model of the layer of soil. Main Activity Children to record what is in soil and record the difference and similarities between soil types.

Big Question
Ask the children ;
What is soil? **TTYP**

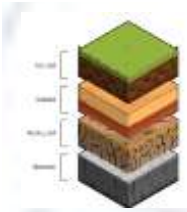
Introduction:



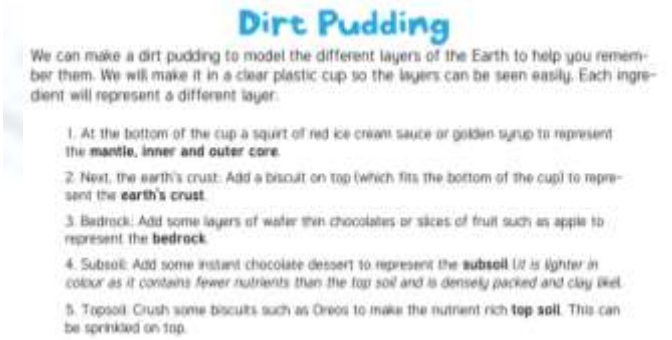
Explain soil is the uppermost layer of the Earth. It is a mixture of different things; tiny particles of rock, organic matter (like rotten apple cores), air and water.

There are lots of different types of soils. Different soils have different properties, and lots happen within the ground to make soil.
Show the children the layers of soil model. Discuss the different layers (refer back to the playdough Earth from the first lesson)

Watch the following video:
https://www.bbc.co.uk/bitesize/topics/zjty4wx/articles/ztvbk2p



Activity 1:
Explain to the children that they are going to make a model of the different layers of soil. Use the following recipe for dirt pudding to guide the children.



Dirt Pudding

We can make a dirt pudding to model the different layers of the Earth to help you remember them. We will make it in a clear plastic cup so the layers can be seen easily. Each ingredient will represent a different layer.

1. At the bottom of the cup a squirt of red ice cream sauce or golden syrup to represent the **mantle, inner and outer core**.
2. Next, the earth's crust: Add a biscuit on top (which fits the bottom of the cup) to represent the **earth's crust**.
3. Bedrock: Add some layers of wafer thin chocolates or slices of fruit such as apple to represent the **bedrock**.
4. Subsoil: Add some instant chocolate dessert to represent the **subsoil**. *It is lighter in colour as it contains fewer nutrients than the top soil and is densely packed and clay like.*
5. Topsoil: Crush some biscuits such as Oreos to make the nutrient rich **top soil**. This can be sprinkled on top.

SEN:
Children could simple record what they have learn like the following examples.

WAGOLL
Soil is found in the uppermost layer of the Earth. Soil is made up of five layers; organic materials (humus), top soil, subsoil, rocky soil and bedrock. Soil is made up of a mixture of things. In soil there is;

Draw and label images

Resources Lots of soil samples Plastic gloves Water Dirt pudding ingredients,	<u>Activity 2:</u> Explain to the children that we are going to explore the soils in our school grounds, and to show the difference between the different types of soil. Give the children in groups a selection of different soils and ask them to look through the soil to see what it is made up off. Can the children especially identify water? Discuss how water is absorbed but is there. Children to observe the appearance and texture of the soils. Discuss their observations and explore further; Colour: Black or Dark Brown - This soil can usually grow plants easily and is fertile. Plain Brown or Yellow - This soil has a low level of nutrients and organic matter making it more difficult to grow plants. It is not very fertile and mulch or compost would need to be added to make it more fertile. Red - the red colour is because oxygen reacts with the minerals, such as iron, which **can make the soil look a reddish, 'rusty' colour.** This soil has been exposed to the weather for a long time and will drain water well. To help plants grow, this soil must have nutrients and organic matter added to it. Texture: Soil texture means how coarse or fine a soil is. This means finding out how much sand, silt and clay it contains You can find out soil texture by using the ribboning technique. Explain what this technique is, and investigate the different textures of soil. Ribbon Technique Method 1. Get soil samples from different parts of the school grounds. 2. Remove any sticks, stones and leaves.	There are lots of different soil types. Sand – has large particles and it does not hold water well. Plants cannot grow well in this type of soil. Clay – Clay has a smooth texture and can hold water, although it holds it too well. Plants cannot grow well in clay. Loam – Loam has a mixture of clay, silt, sand and humus. It can hold water well and therefore, plants trove in this soil. <u>Challenge:</u> Devise a quiz all about soil. Provide children with example question types.

	3. Slow add water to the soil. If it gets too wet, add more soil. 4. Roll the soil into a ball. Feel the ball with your fingers to find out if it is gritty (sand), silky (silt) or plastic/sticky (clay). If it starts to fall apart and you cannot make a ball, the soil is very sandy. 5. Next, roll the ball between your hands to start making a ribbon. 6. If the ribbon starts to fall apart, you have sandy loam. 7. If you can create a short ribbon before it starts falling apart, then the soil is another type of loam. 8. If you can make a long ribbon, then there is definitely clay in the soil. Following the investigation, discuss the best soil texture for growing plants is loam, which is a mixture of clay, silt and sand. Did we find examples of loom in our school ground? If so where was it? <u>Activity 3:</u> Watch this video to consolidate all the learning from today. https://www.youtube.com/watch?v=if29mjcd5bc	**Plenary** Children who completed the challenge could present their questions to the class or lead a quiz on the different soils – invent one or use https://quizizz.com/admin/quiz/6015a5993a0790001b06ef87/soil-grade-3

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Five I know why soil is important. Working Scientifically **Resources** Plastic bottles Pins Soil Dead leaves Food scraps, Scissors Garden canes String Worms	**Prior Learning Task:** What are the ingredients of soil? Children to make a shopping list for soil. Discuss the list the children have created. Which do they think is the most important and why? **Hook: Compost bin** **Big Question:** ***Why is soil important?* TTYP** **Link back to the previous lesson on the fact that without soil, there would be no life (links nicely to food chains)** **Introduction:** Explain to the children that protecting and restoring our soil can play a crucial role in tackling climate change. Soil is very good at absorbing carbon dioxide from the atmosphere and storing it away as carbon. Recap what the children learn about **carbon dioxide in the Food and Farming topic, and why this isn't good for the future** of the Earth. Soil can hold 3 times the amount of carbon as the atmosphere. There are 10 billion tonnes of carbon stored in UK soils. A type of wet, boggy soil called peat is especially good at this. This type of soil is found in natural areas called peatlands, bogs or moors. Peatlands can lock up five times more carbon than forests.	All children to work in pairs or groups: Make a composter. Follow instructions to make their composter. Observe each week, and then at the end of the school year, add to the soil (if decomposed). Main Activity: Children to journal what they have learnt about the importance of soil. WAGOLL Soil is very important for life. Without soil, plants will not be able to grow and animals will have no plants to feed from. Soil also absorbs carbon dioxide from the atmosphere which will help our fight against climate change. Therefore it is crucial we protect and restore our soil, so that life can be **sustained and our planet's climate doesn't get any hotter.** One way in which we can help is by using composters. The animals and

	Activity 1: What can we do to help? Explain that leaving leaves and dead plants for longer is best. By doing so, we will be privding homes for insects which will help to increase the biodiversity in your green space. Each class will corner off a part of the field/soil area. In this area, the children will put leaves and dead plants on it. They can observe over time what happens to the leaves and dead plants. Activity 2: What can we do to help? Explain that we can help by feeding soil with compost made up from old bits of dead plants and fallen leaves, or food that has decayed which we call organic matter. Each class to go and have a look at the compost bins in the school garden, and explain the purpose of using them. Discuss how we can use them to help support the restoring of soil. Activity 3: Make our own compost. Watch the following video https://www.google.com/search?q=make+your+own+compost+bin+kids&rlz=1C1GCEV_en-GBGB980GB984&ei=-6piYv_zJ5TrgAbEiYmYAg&ved=0ahUKEwi_3fnr4Kf3AhWUNcAKHcREAiMQ4dUDCA8&uact=5&oq=make+your+own+compost+bin+kids&gs_lcp=Cgdnd3Mtd2l6EAM6BwgAEEcQsAM6BwgAELADEEM6BAgAEA06BggAEBYQHkoECEEYAEoECEYYAFD2AViuCGC3CmgBcAF4AIABvASIAZYNkgEJMi0xLjEuMS4xmAEAoAEByAEKwAEB&sclient=gws-wiz#kpvalbx=_AKtiYrioAtDUgQai-4HYDw15	bacteria inside a composter break down dead plants and leaves, and foods into a rich, nutritious soil. We can spread compost onto our gardens to feed the soil, and to restore it so it can continue to do its amazing thing! Challenge Children to create a poster about composting. **Plenary** Play the great composting quiz from BBC bitesize. https://www.bbc.co.uk/bitesize/articles/zj27wnb Consolidate all learning on rocks, soils and fossils. Children to take an end of term test.

	Children in groups or pairs to make their own compost bin. You could even add some worms to it! Revisit it every week. At the end of the school academic year, observe the changes that have happened, and if decomposed, spread onto soil.	

SS John Fisher & Thomas More Catholic Primary School

A Voluntary Academy

Year Group: Year 3 & Year 4	Term: Autumn 1 (Cycle A)	Topic: The Musculoskeletal System and Nutrition

National Curriculum Links

Pupils in Key Stage Two should be taught to:

- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- identify that humans and some other animals have skeletons and muscles for support, protection and movement

Working Scientifically

- ask relevant questions and using different types of scientific enquiries to answer them
- set up simple practical enquiries, comparative and fair tests
- make systematic and careful observations and, where appropriate, taking accurate measurements using standard units and a range of equipment
- gather, record, classify and present data in a variety of ways to help in answering questions
- record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identify differences, similarities or changes related to simple scientific ideas and processes
- use straightforward scientific evidence to answer questions or to support their findings.

Prior Learning	Future Learning
• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals, including humans) • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans) • Describe and compare the structure of a variety of common animals (Y1 - Animals, including humans) • Find out about and describe the basic needs of animals, including humans, for survival (Y2 - Animals, including humans)	• Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans) • Identify the different types of teeth in humans and their simple functions. (Y4 - Animals, including humans) • Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans) • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans)

• Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)	

Common Misconceptions

Some children may think:

- **certain whole food groups like fats are 'bad' for you**
- **certain specific foods, like cheese are also 'bad' for you**
- **diet and fruit drinks are 'good' for you**
- snakes are similar to worms, so they must also be invertebrates
- invertebrates have no form of skeleton.

Sustainable Development Goals & Catholic Social Teaching

These Sustainable Development Global Goals would be perfect to fit with this unit of learning:

These Catholic Social Teaching strands would be perfect to fit with this unit of learning:

Applied Write Opportunities	Enrichment Opportunities
A leaflet about healthy diets A poster about healthy eating	A visit from a dietitian. Visit a food outlet and watch them make food.

Assessment Opportunities

- Can classify food into those that are high or low in particular nutrients
- Can answer their questions about nutrients in food, based on their gathered evidence
- **Can talk about the nutrient content of their daily plan • Use their data to look for patterns (or lack of them) when answerin**g their enquiry question
- Can give similarities e.g. they all have joints to help the animal move, and differences between skeletons

Key Vocabulary

Tier Two:

skeleton, bones, muscle, heart, lungs, brain, skull, jaw, ribs, hip, leg, arm, neck, foot, toe, hand, shoulder/shoulder blade, breast bone, calf, knee cap, wrist, forearm, ankle, spine, backbone, elbow, thigh, shin, joints, organs, face, torso, energy, relax, diet, fat, sugar, salt, dairy, fruit, vegetables, meat, fish

Tier Three:

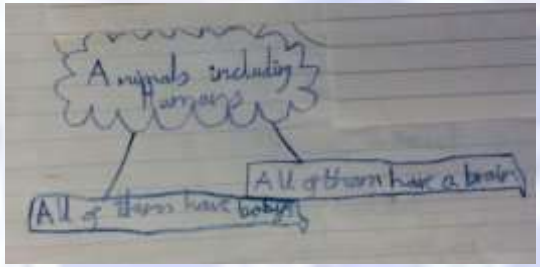
pelvis, cranium, sternum, vertebrae, humorous, metatarsals, reproductive organs, tendons, musculoskeletal**, voluntary, involuntary, contracts,** facial, biceps, triceps, quadriceps, hamstrings, abdominals. Deltoids, pectorals, gluteus maximus, vertebrate, endoskeleton, invertebrate, exoskeleton, hydrostatic skeleton, herbivore, carnivore, omnivore, protein, carbohydrates, starches, nutrition, nutrients,

Knowledge and Skills Objectives	Activity	Differentiation
Lesson One I can compare the characteristics of animals. Working Scientifically:	**Starter Question:** **Ask the children;** ***Which is the odd one out and why?*** **Discuss with Talking Partners before discussing as a whole class.** **Introduction:** **Following the presentation of the images and discussion, children to be asked to think about what the animals all have in common, and whether they also have this in common with humans.**	SEND: Year 3: Sorting images and facts Take **photographs of each group's** findings Year 4: Sorting images and facts

Resources

Images of a mouse, worm and snail
Animal sorting cards
Animal fact cards
Text book for additional reading

<u>Activity 1:</u>
Children to create a mind map of their thinking (words and images). Spend time listening to the children talk about what they already know.



<u>Activity 2:</u>
Next, ask the children to think about the differences between animals, including humans. Children to discuss these ideas with their Talking Partner.
Discuss with the children how animals differ e.g. some have tails, some have no legs, some have beaks – Can they recall from KS1 the different animal groups (amphibians, reptiles, mammals, fish, birds & insects). Record what the children know on the board.

Then, give out some animal cards to groups of children. Ask the children to sort them according to their characteristics. Listen carefully to the group's discussion, and especially for any misconceptions.

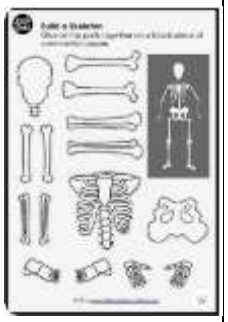
Following this, give out fact cards about each animal group for the children to sort and add to the images.

Take photographs of each group's findings

<u>Challenge:</u>
Children to read more about the animal groups and their characteristics.
Use text book:

Plenary

Consolidate the similarities between animals, and then the differences. Discuss the animal groups and some of the additional facts they have learnt through the challenge (if the challenge **hasn't been done, read the text to the** children and discuss)

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Two I can explain why a skeleton is important to us. **Working Scientifically:**	Starter Question: Ask the children; *What is inside us?* Ask the children in groups to add and label as many body parts as they can to their outline, trying to put them in the correct positions. (Hopefully someone will mention bones and a skeleton or you may need to prompt them). Listen to the **group's discussions carefully and use** this activity as a pre-assessment of what children already know and any misconceptions. Introduction: **Ask the children;** ***What is a skeleton?*** ***Why do we need bones?*** ***What would happen if we didn't have one?*** Discuss with Talking Partners before discussing as a whole class. Ask the children to hold up their paper outlines and drop them – discuss what **happened. Explain our bodies would flop like this if we didn't have a skeleton.** We need a skeleton to support us. Our skeleton is made up of 206 different bones (an adult) of all shapes and sizes that join together to make our skeleton. When we are a baby we have about 300 bones. The bones are much softer and need to fuse together. Ask the children, what bones can they feel on their own bodies? Give time for the children to explore their bones. What can they feel? Do the children know any names of their bones? If they do, on a large image of the skeletal system, label what the children know (pre-assessment).	SEND: Children to have a skeleton already cut out and only in a few parts (skull, ribs, 2 legs and 2 arms) Children to have pre-made labels to attach. Children to be given sentence starters to support their answers. Year 3: Children to have access to a word bank to support their spelling of scientific words. Children to write simple sentences explaining how the body supports us and what it would be like to have no skeleton. Children to answer the questions with some scientific reasoning. Year 4: Children to include a more descriptive explanation of how the skeleton 

Resources

Life-size paper outline of a person.
Colouring pens
Large image of a skeleton
Plastic bones
Trays
Sands
Bone matching sheet
Bone vocabulary cards
Large model skeleton
Worksheet of skeleton
Glue
Scissors
Pancake (shape of a person)
Biscuits (shape of a person)

Activity 1

Explain to the children that you have set up an archaeological dig with plastic bones buried in sand. In small groups, they are going to dig up the bones and match them to the human skeleton. Once they have matched the bones, children used the worksheet to name the bones. Listen carefully to the children as they discuss the bones, and their reasoning behind their ideas.

Take photographs of the children doing this task.

Following this activity, use a life-size model of a skeleton, label the bones with **the children. Then play a version of 'Simple Simon' –** Simple Simon says, touch **your ribs... your skull...**

Children to build a skeleton; children to cut out the bones and put them together to make a human skeleton. Then, children to label the skeleton using a word bank (ribs, spine, pelvis, skull).

Activity 2:

Use a pancake and a hard biscuit to reinforce what our body would be like with and without bones.

Discuss how the bones give us shape. If we had no bones we would be a blob of muscle on the floor. Support is one of the vital jobs of our skeleton.

Give the children 2 questions to discuss in small groups.

1) What would it be like if you had no skeleton? Explain.
2) Do you think a fabric skeleton would work? Explain

supports us, and what it would be like to have no skeleton.
Children to answer the questions with increasing scientific reasoning.

Challenge:
Children to explore x-rays of skeletons. Can they identify which part of the body the x-ray shows?

Plenary

Consolidate the importance of a skeleton as a support for us.

Play the following video. Invite the children to join in with the video.
https://www.youtube.com/watch?v=i3CvuCyAsz8
At the end of the video ask the children; Can you think of another reason why we have a skeleton? (move)

	Discuss these questions as a whole class. Then the children to record their understanding of the role of a skeleton for support into their journals.	

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Three I can explain why a skeleton is important to us and how it works. **Working Scientifically:**	**Starter Question:** **Ask the children;** ***Why is a skeleton important?*** **Discuss with Talking Partners before discussing as a whole class.** **Introduction:** Explain to children that a human skeleton not only supports us and allows the body to move, it protects our vital organs. Ask the children what is meant by **'vital organs'. Show the children images of our vital organs. Ask the children** where these might be in our body? Discuss as a whole class. In the life-size skeleton, place representational images or objects of these organs within the skeleton frame. Activity 1: Explain to the children that they are going to sort bones that they found during the archaeological dig. Explain that they are going to sort the bones that protect **us and those bones that don't. Children to sort them.** **Take photographs of the children's findings and listen carefully to the children's** discussions; discussing any misconceptions. Following the activity, discuss which bones protect; • the skull (cranium) protecting our brain. • the ribs protecting our lungs and heart • the vertebrae protects our spinal cord	SEND: Children to have fewer bones to sort. Children to build joints using construction toys. Year 3: Children to have major bones to sort along with labels. Children to label the images of joints and sort them according to how they move. Year 4: Children to have a range of bones with no labels but a reference vocabulary mat for them to use to find the names of the bones. Children to label the images of joints and sort them according to how they move. Children to research about the joints and write about each joint and how they move.

Resources Large human skeleton A dress up costume of a skeleton Bones for sorting Construction toys Worksheet	• the pelvis protects the reproductive organs. **Get the children to feel for these bones in their body. (Add these labels to the large model skeleton if not already in place.)** **Watch the following video to consolidate children's knowledge and understanding of the role of the skeleton** https://www.bbc.co.uk/bitesize/topics/z9339j6/articles/zqfdpbk **Activity 2:** **Discuss with the children that our skeleton helps us to move, but how can bones move?** **Discuss with their talking partner before discussing as a whole class.** Explain that where two bones meet it is known as a joint. Bones form joints and act as levers, allowing muscles to pull on them to produce movement. Give time for the children to explore their own joints and the movements our muscles allow us to do. Children to discuss their ideas. Discuss the knee joint; it allows your leg to move forwards and backwards like a hinge in a door. That is why it is called a hinge joint. Look at an image of this hinge joint and use the large life-size skeleton to show this too. Can the children think of any other hinge joints in the body? (elbow, hand, foot and ankle) Explain that bones are held in place of a joint by a strong threads called a ligament, Next, discuss the hip joint; this joint is the most moveable joint in the body as it allows movement in all directions. Look at an image of this ball and socket joint and use the large life-size skeleton to show this too. Can the children think of any other ball and socket joints in the body? (shoulder)	Challenge: Children to answer these questions. ***How does the skeleton support the body?.*** ***How does the skeleton protect our organs?*** ***How does the skeleton help us to move?*** **Plenary** Consolidate what the children have learnt about the human skeleton. Watch the following video to help them to understand the skeletal system and introduce the muscular system – together making the musculoskeletal system. https://www.youtube.com/watch?v=f3lQYZ7OSFA

	Put on the tables construction toys for children to make a hinge joint and a ball and socket joint. Take photographs of the children making these. Then, using the worksheet below, children to name the different joints in their body. 	

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Four I can explain how my muscles work. Working Scientifically:	**Starter Question:** **Ask the question;** ***How does our body move?*** **Children to discuss with their Talking Partner before discussing as a whole class.** **Introduction:** **Explain to the children that today they are going to learn more about the muscles. Watch the following video to support the learning of muscles in our body.** https://www.youtube.com/watch?v=3haTJCOkyxA Activity 1: Explain that muscles are attached to bones by tendons (like elastic bands) and help the bones to move. When a muscle contracts (bunches up), it gets shorter and so pulls on the bone it is attached to. When a muscle relaxes, it goes back to its normal size. 	SEND: Children to be supported in the making of the muscle model. Children to verbally explain how muscles work. Children could be the time keeper for the activity if they are unable to complete the exercise. Year 3: Work in pairs when constructing the arm model. Children to explain how muscles work to another pair of children. Can they explain using some scientific vocabulary? Year 4:

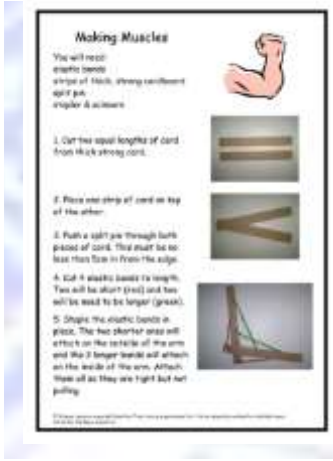
Resources

a large human skeleton
rubber bands
toilet rolls
cardboard
sticky tape
balloons
images of voluntary and involuntary muscles

Muscles can only pull and cannot push. Therefore muscles have to work in pairs to move a joint. One muscle will contract and pull a bone one way and another muscle will contract and pull it the other.
Watch these video to support the understanding of how muscles work.
https://www.bbc.co.uk/bitesize/clips/zj2kjxs
https://www.bbc.co.uk/bitesize/topics/z9339j6/articles/zpbxb82

Children to make a model of the arm muscles contracting and relaxing.
There are two ways of doing this;

1) The first one involves cardboard tubes and balloons. The instructions can be found on this website.
Have the resources prepared for the children so the construction of the model **doesn't take too long.**
https://kidsactivitiesblog.com/17436/how-do-muscles-work



2) This is an alternative method.

Take photographs of the children making this model.
On completion of the activity, invite children to explain how our muscles work, and in their journals to write about how muscles work.

Plenary

Children to explain to another child how their muscles work.

Challenge:
Research different muscles in the body using Usborne Readers Text.

Play Walk and Talk – the children move around the classroom whilst listening to some music. When the music stops, the children pair up. Then they are given a question to discuss. When the music starts, the children move again. Children have to pair with someone different every time.

Questions to ask:
How many bones are there in the body?
How many muscles are there in the body?
Which bone is the largest bone in the body?
What are the three jobs of a skeleton?
Which bone protects the brain?
Which bones protects the heart?

		Where can the smallest bones in the body be found? How do our muscles work? etc

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Five I can name my muscles and explain differences between them. Working Scientifically:	**Starter Question:** **Ask the children ;** ***How many muscles do I have?*** ***What are my muscles called?*** **Children to discuss with their Talking Partner before discussing as a whole class.** Introduction: Display an image of the skeleton with muscle jigsaw pieces to place over the top. Discuss with the children how many muscles are in our body (over 600 muscles) and the importance of muscles. Activity 1: Introduce the muscles one by one to the children; placing the muscle jigsaw pieces on top of the skeleton with a label. Some children may have heard of these muscles through sport and when warming up in PE, and may know the **abbreviations e.g. abs, pecks, glutes…** Teach them; Face – facial Arms –biceps and triceps Legs - quadriceps and hamstrings Torso – abdominals, deltoids, pectorals, and gluteus maximus (These muscles could be referred to in PE lessons during warm up and cool down activities).	SEND: Children to attach pre-labelled muscles onto a skeleton. Children to sort and stick muscles into a Venn diagram. Year 3: Children to attach muscles to the skeleton and label them using a word mat to support them. Children to draw a table and list 6 different muscles. Children to explain using simple sentences. Year 4: Children to attach muscles to the skeleton and label them using both scientific and everyday words e.g. bottom/Gluteus maximus Children to draw a table and list 8-10 different muscles (building on their knowledge from previous year). Children

Resources Image of skeleton Jigsaw muscle pieces Muscle labels Worksheet of skeleton and muscles Activity cards to perform Involuntary and voluntary muscle cards for sorting.	**Play 'Simple Simon' type of game using the muscles.** Children to use their own jigsaw pieces of the muscles, and stick on top of the skeleton. Children then to label them. <u>Activity 2:</u> In groups, give them activity cards to perform. Children then to perform the task and following it, discuss which muscles they used. Take photographs of the children doing this activity. <u>Activity 3:</u> Explain to the children that some muscles are voluntary and some muscles are involuntary. Discuss the meaning of these words. Voluntary – we can move them. Involuntary – **we can't move them, they work without our control.** Display two images of muscles e.g. heart and the upper arm. Children to choose which muscle is voluntary and which is involuntary. Repeat with further examples. Give children picture cards of voluntary and involuntary muscles with labels. **Invite the children to sort the images. Listen carefully to the children's** discussions, and discuss any misconceptions. Next, ask the children the question; *Is a smile voluntary or involuntary?* Discuss their thinking. Children to record this understanding into their journals in a table format and record what is meant by voluntary and involuntary.	to explain using more detail and increasing scientific language. <u>Challenge:</u> Children to devise a mini workout that exercises all the muscles learnt today. **Plenary** Watch this video to consolidate all they know about the musculoskeletal system. https://www.youtube.com/watch?v=ynVRDsDC-84 **Play 'Simple Simon' game again.**

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Six **I know skeletons differ between animals.** **Working Scientifically:**	**Starter Question:** **Ask the children.** ***Do all animals have a skeleton?*** Discuss with Talking Partners before discussing as a whole class. Introduction: Recap that our skeleton is made of bones and bones grow as we grow. Explain **that we belong to a group of animals called 'vertebrates'. Explain that** these animals have a skeleton inside their body with a spine (backbone) and bones. The animals are said to have an endoskeleton. They include all mammals, birds, reptiles, amphibians and fish. **Get the children to think of which animals are mammals, birds, reptiles, amphibians and fish. This will reinforce their Knowledge and understanding from lesson 1.** **Look back at their learning from Lesson 1.** Activity 1: Explain to the children that they are going to look at images of animal skeletons. Can they guess which animal it belongs too? Show the children images showing animal skeletons. Children to try and name them. Give all children animal images and skeleton images. Get the children to match them and stick them into their journals. Discuss how they know the skeleton matches the animal. Activity 2: Following the first activity, give the children pictures of these skeletons and ask to sort them in different ways. **Listen carefully to the children's discussions, and discuss any misconceptions e.g. I didn't know** a snake has a skeleton.  Once the children have sorted them, invite groups to swap tables and try to figure out how their friends have sorted the animals. Repeat this.	SEND: Match 1 of each animal type. Children to sort fewer skeletons and give verbal explanations. Compare two images and give verbal explanations Year 3: Match several animals including one **that you wouldn't expect to have an** endoskeleton. Children to have several images to sort. Compare two animals and give some detailed comparisons using conjunctions e.g. however, but, also, and with some naming of bones. Year 4: Match several animals including an odd one out. Children to have a larger number of skeletons including a few with exoskeletons in the mix to deepen their thinking and reasoning. Compare two animals using more scientific detail e.g. names of bones, position e.g. backwards Challenge;

Resources Images of animal and their skeletons Animal skeletons to sort and animal skeletons to stick into their book Sorting hoops Animal pictures (pairs)	Take photographs of the children sorting the images. Activity 3: **Next, show the children two pictures of animal skeletons and in pairs discuss the similarities and differences.** **Children to write a comparison between the 2 images.** **Repeat with two more images.** 	Read more about endoskeletons. Write three facts about them. **Plenary** Explain to the children that they have been learning about animals with a skeleton on the inside. Inform them that some animals have a skeleton on the outside or some animals have no skeleton at all. Ask them to think about which animals might have a skeleton on the outside or have no skeleton. Children to make a list of animals. This will form a prediction for the next lesson.

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Seven **I know skeletons differ between animals.** **Working Scientifically:**	**Starter Question:** **Ask the children.** ***Do all animals have a skeleton?*** Discuss with Talking Partners before discussing as a whole class. Introduction: Consolidate the learning from the previous lesson on endoskeletons. Explain to the children that not all animals have a skeleton on the inside. Some animals have a skeleton on the outside; some have a shell and some have no skeleton at	SEND: Children to be given headings and 1 of each to match. Read with them the information. Using feature cards, match to the animal group. Children to sort the first and second questions.

Resources

Sorting cards and titles
Worksheets on invertebrates
Classification key worksheets

all. These animals are called invertebrate.
Those with a skeleton on the outside have an exoskeleton and those with no skeleton have a hydrostatic skeleton.

Activity 1:
Watch the following video to explain what happens to animals with an exoskeleton.
https://vimeo.com/37438364 Then give the children images of animals and get them to sort them according to their characteristics. Take photographs of **the children's findings.**

Discuss children's ideas and their reasons for this decision.

Activity 2:
Watch the following video to explore invertebrates in more detail.
https://www.youtube.com/watch?v=rzxFTrktN1c
Give the children information cards about the different types of invertebrates. Discuss the features of these animals and what they have found out. Children to list the key features of different invertebrates.

Activity 3:
Introduce the children to a classification key. Teach the children how to use a

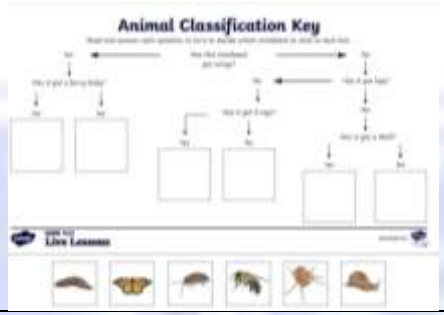
Year 3:
Children to sort animals with headings.
Children to write simple features using bullet points.
Follow all the questions to complete the classification key.

Year 4:
Children to sort without headings.
Children to consider headings and write their own.
Children to explain in more detail the features of the animals.
Children to complete the missing question on the classification key.

Challenge:
Children to create their own classification key.

Plenary

Consolidate all learning on skeletons and especially vertebrates and invertebrates.
Play What am I?
Ask questions and children to answer using yes or no.

	classification key. Children to follow the instructions on the classification key and solve.  	

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Eight I can investigate ideas about the musculoskeletal system of animals. Working Scientifically:	**Starter Question:** **Ask the children;** *Do you think someone with a long femur bone can jump further than someone who has a shorter femur bone?* Children to discuss this with their Talking Partner before discussing as a whole class. *Why do you think some people have stronger leg muscles than others?* Children to discuss this with their Talking Partner before discussing as a whole class. Introduction: Explain that now we have learnt a lot about skeletons, we are going to investigate parts of it. Activity 1: *Do you think someone with a long femur bone can jump further than someone who has a shorter femur bone?*	SEND: Support them in participating in the investigation as a team, and in the recording of results. Support them in the participating in the investigation as a team, and in the recording of results. Make a scatter graph with playdough or on peg boards. Year 3: Children to be given some scaffolding when writing their conclusion. Children to have a pre-drawn scatter-graph to support them. Year 4:

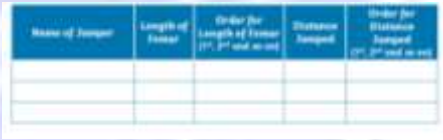
Resources

Femur bone
Rulers
Metre sticks
Chalk
Space (outside or the hall)
Data recording sheets x2
Femur cards for ordering
Scatter-graph worksheets
Investigation vocabulary cards

*home learning data – how many hours of exercise do I do in a week?

Discuss how to investigate this – children to discuss in small groups how they could do this. As a whole class, create a method e.g.

1) **Measure everyone's femur. (How are we going to measure? What are we going to use to measure this? How can we ensure we have measured accurately?)**
2) **Put the femur size in order. (Who has the longest is 1st, the next longest is 2nd etc...)**
3) **Create a space for jumping and ensure everyone starts at the same point. (Discuss fair testing)**
4) **Everyone jumps. (How? Two feet together?)**
5) **Distance jumped to be recorded.**
6) **Compare results**
7) **Work out if the question can be answered.**



Following this, get the children to predict their ideas about this investigational question. Write this in their journal.
Present the children with a table to record their findings on, and then carry out the investigation. Children to stick this into their journal.

After the investigation, children to use different sized femur cut-outs, and place them in the position they jumped. Invite the children to discuss what they have found out. Children to stick cut-outs into their journal and to write about what they have found out and why.

<u>Activity 2:</u>
Why do you think some people have stronger leg muscles than others? **(The planning for this investigation comes from the following website - https://slideplayer.com/slide/13077859/)**

What is your hunch? This hunch is called a prediction! Children to share their ideas before writing this in their journal.

Children to write their conclusion with increasing independence and use of scientific understanding.
Draw own scatter-graph.

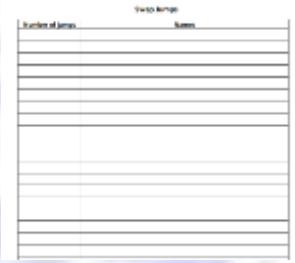
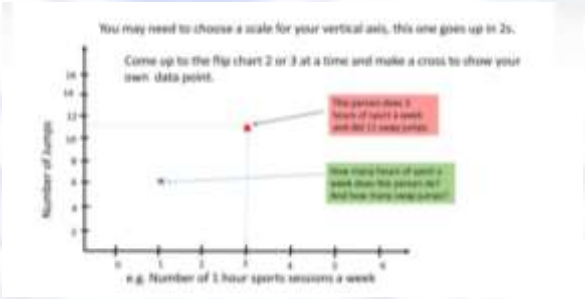
<u>Challenge:</u>
Children to devise their own questions to investigation on the body, and consider how they would carry out this.

Plenary

Consolidate the scientific words;
Prediction (hunch)
Method (how we are going to do it)
Data (what we measured)
Results (what we found out)
Conclusion (what we discovered – did we answer our question)

Give children vocabulary cards, and children to put them in order of what scientists do first, second etc..

Discuss why scientists do these.

	Next, explain how scientists need to collect data and why. Discuss how we could find out this information. (The children are going to do squat jumps until they can't jump any longer). Together devise the method. Following this, discuss how they could record the information they found out, and create a table together. The children to then draw this table into their journal.  All children get in pairs, and whilst one squat jumps the other counts the number of jumps. Then swop over. Add all the data from the class. Ask why are some children able to do perform more squat jumps than others? Perhaps there is a link between the number of jumps and the amount or type of exercise they do in a week. How could we find this out? What could we count? e.g. the number of hours of sport they do, the frequency of exercise... (Year 4 could be split into 2 groups – half the class count the number of hours of exercise and the other half look at the type of exercise) Children to calculate the number of hours/type of exercise they do in a week – link with parents regarding clubs outside of school and add to playtime/lunchtime allowance. Model how to create a scatter-graph to show data. Children to create a scatter-graph in their journal to show their findings. Discuss what the children have found out. Children to write about their findings.  	

Knowledge and Skills Objectives	Activity	Differentiation
Lesson Nine I know the differences between animal diets and why food is important for us. **Working Scientifically:**	Starter Question: Ask the question; *What makes your muscles bigger?* Children to discuss with their Talking Partner before discussing as a whole class. Introduction: **Explain that when we are born we don't get more muscles, they just get bigger.** The more we use them, the bigger and more flexible we can get. If they are not used and suddenly are without them being warmed up, our muscles will get tired and sore. Link this **back to last week's learning and investigation.** Explain that is also true of other animals too. They need a lot of muscles, just like we do. However, animals have to develop muscles to help them survive. **Discuss what 'survive' means and explain that wit**hout strong muscles the animals will be at risk to predators. Activity 1: Explain to the children that in order to have strong bones and build muscles we need to eat and drink well. Animals have to have a good diet. A diet is the kinds of food that a person or animal eats. Animals have different diets. Ask the children if the can name the three different diets of animals. (They learnt about carnivores, omnivores and herbivores in KS1). Children to discuss with their TP before discussing as a whole class. Explain how herbivores have specialised digestive systems, as plant matter is very hard to break down into energy. Herbivores often graze for long periods throughout the day, so that they can get as much energy as possible. By looking at the shape of the jaws and teeth of animals you can often see if they are	SEND: Children to sort 2 of each animal. Support them when using an iPad. Year 3: Children to sort animals and give verbal explanations to support their ideas. Give children a specific website to use for their research. Year 4: Children to sort animals and give a written detailed explanation to support their ideas. Children to search by asking questions into a search engine. Challenge: Children to use pages 14-15 to create a simple food chain. This reinforces their understanding of food chains from KS1. For children in Year 4, a food web could be created instead.
Resources animal figures matching cards for sorting ipads		Plenary

Book; Who Eats who?	carnivores, herbivores or omnivores. Animals use a range of techniques to obtain their food and then eat it. Some animals have special skills or body parts to allow them to catch and eat their food. Ask the children if they think of different adaptations that animals have to eat their food. Children to watch the following video to support their understanding of animal diets. https://www.bbc.co.uk/bitesize/clips/zxrmp39 Following this, children to sing, The Animal Diet song (to the tune of The farmer wants a child). **'A carnivore eats meat,** A carnivore eats meat, Roar, roar, roar and ROAR, A carnivore eats meat. A herbivore eats plants, A herbivore eats plants, munch, munch, munch and MUNCH, A herbivore eats plants. A omnivore eats both, A omnivore eats both, roar, munch, roar and MUNCH, **A omnivore eats both'.** Display images of animals and disuss which diet they like and how they know this (links to the teeth unit). Children to discuss with their Talking Partner before discussing as a whole class. Give each small group a set of animal cards and get the children to sort them according to their diet. Include some challenging animals e.g spiders, bird.	Ask the children; *Why is food important?* *What is your favourite food?* Children to share ideas.

	Listen carefully to the group's discussions, and make note of any misconceptions. Take photographs of the group's findings. Take feedback from each group, and allow discussions about the more challenging animals to take place. Give the children ipads to check their thinking. In their journal, children to match animals to their food. <u>Activity 2:</u> **Consolidate children's knowledge and understanding of** food chains, and who eats who. Give out copies of the text, Who Eats Who? This book is on Oxford Owl. Children to share this text with their Talking Partner.  Following the reading of this text, discuss what would happen if something is missing in a food chain. Ask the children if we are missing something, what might happen to us? (weaker muscles and bones).	

Knowledge and Skills Objectives	Activity	Differentiation

Lesson Ten

I know what foods humans need to eat to be healthy.

Working Scientifically:

Resources

A range of food items or sorting cards
Sorting hoops
Odd one out strips

Starter Questions:
Ask the question;
Why do we need to eat food?
Children to discuss with their TP before discussing as a whole class.
Consolidate from the previous lesson that in order to grow strong bones and muscles, we need to eat and drink well.

Introduction:
Explain to the children that we need to eat to get the nutrition we need to move and to grow. Plants can make their own food by changing sunlight into sugars but humans and other animals have to eat to get the energy they need. Therefore we need to eat lots of different types of foods to keep our bodies healthy.

Activity 1:
Ask the children to draw or write down what they ate for breakfast that morning or for their meal the evening before. Discuss if they know what food groups the different foods they ate belong to and whether they think it was a healthy meal and why?

Activity 2:
Introduce the children to the 5 main food groups; dairy (protein), fruit and vegetables, starches (carbohydrates), meat and fish (protein), fats and sugars and explain what each one is.
Give the children images or food items and get them to sort them into groups, such as, sausages, chicken and burgers could be put together and labelled as **'meat'.**
(Children would have studied healthy and unhealthy foods in KS1 so should have some understanding of food groups and what is good for us).

Activity3:
Explain to the children that animals (including humans) need a balanced diet. A balanced diet supplies the nutrients your body needs to work effectively. Without

SEND:
Children to have fewer cards to sort.
Children to circle the odd one out and verbally to suggest reasons for this.

Year 3:
Children to sort a range of foods with labels.
Children to circle and suggest a reason for being the odd one out.

Year 4:
Children to sort a range of food and create own headings for them.
Children to circle and suggest multiple reasons for being the odd one out.

Challenge:
Children to research the diets of people with specific dietary requirement e.g. diary intolerance, vegetarian.

Children to make a list of foods these people can eat.

Plenary

Discuss what is meant by vegetarian, vegan, or lacto-intolerance. If any of the children in the class have a specific

	balanced nutrition, your body is more prone to disease, infection, fatigue, and low performance. Children who don't get enough healthy foods may face growth and developmental problems, poor academic performance, and frequent infections. Ask the children; *What is a balanced diet?* *What food should we be eating?* *What food should we not eat or not eat a lot of it?* Children to discuss with the TP before discussing as a whole class. Record **children's ideas and reasons for future reference.** **Watch the following video to support the children's understanding** of balanced diets. https://www.bbc.co.uk/bitesize/topics/zrffr82/articles/zppvv4j Show the children three images of food. Children to discuss which food item they though were the odd one out and why. In their journals, children to stick in strips of three foods and write about which they believe is the odd one out and why.	allergy, such as, nuts, ask the children to share their own experiences of what having this allergy/tolerance means to them and what they have to do **differently to everyone else who doesn't** has the allergy/tolerance.
Knowledge and Skills Objectives	Activity	Differentiation
Lesson 10 I know what the right types and amount of nutrition I need to be healthy. Working Scientifically I can ask relevant questions and begin to use different	Hook: a range of food packaging Starter Question Ask the children; *How do I know which of these cereals is healthier for me?* Children to discuss with their Talking Partner before discussing as a whole class. Introduction:	Task 1 Food packaging SEN: Ask them to look for a food high in fat, a food high in sugar and a food that is very good for us (all or mostly green) Year 3: Children will not understand percentages and their knowledge of

types of scientific enquiries to answer them. I can make careful observations. I can record findings using simple scientific language, drawings and labelled diagrams I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Explain to the children that to help us, many food manufactures have to inform us of what is in our food. Display an example of a food label showing the energy, portion size, fat, saturates, sugar and salt. Discuss why this information is important to know; we **need to eat less fat, sugar and salt as these are not good for our body's health.** Discuss the colour coding on the labels. Show the children the nutritional information on the packaging of the cereal. Get them to explore what information they can see and what this. Go back to the original question; which cereal is healthier for me, and discuss.  Task 1: Children to look at a range of different labels and discuss with their Talking Partner whether the food is good for us or whether we should have a little of it. **Listen carefully to the children's discussions, and discuss any misconceptions.** Take photographs of children exploring packaging. Task 2: Introduce the children to the food pyramid. Children to discuss what they notice about the image with their Talking Partner before discussing as a whole class what each segment or layer informs us. Children to be given food items and place them on a large food pyramid. Discuss their ideas or any foods that are confusing to place due to multiple ingredients e.g. pizza. 	weight might be limiting. Ensure this is explored as part of the lesson so that they understand why something is green, yellow or red. Children to find a food high in fat, high in sugar, a food low in all areas and a food that is high in most areas. Year 4: Children will have some knowledge of weight and maybe of percentages. With Year 4 talk about the daily consumption of fats and sugars, to support the understanding of why something is green, yellow or red. To make this activity more challenging; children can have just the labels and match them to an image of the food. Task 2 Making a food pyramid SEN: Give 1 or 2 foods from each food group to place onto the pyramid Year 3: Give them 3 or 4 foods from each food group to place onto the pyramid. Year 4: Give them a few extra images that present a bit more of a challenge e.g. pizza, Challenge: Children to look at a selection of menus and consider which menu is balanced.
Resources		

Labels Different cereal packets Images of the food pyramid Large food pyramid and food items Cut and stick food pyramid	Give children their own food pyramid and images. Children to stick them or write them on the correct part of the plate or the pyramid.	**Plenary** Play corners. Hold up a food item and children to move to the correct food group. Consolidate what they have learnt about food so far.
Knowledge and Skills Objectives	**Activity**	**Differentiation**
<u>Lesson 11</u> I can explain why some foods are good for me. <u>Working Scientifically</u> I can ask relevant questions and using different types of scientific enquiries to answer them I can set up simple practical enquiries.	<u>Hook:</u> Food packaging, foods, plates, knives, forks, spoons, craft materials <u>Starter Question:</u> Ask the children; *How will I know if a food is good for me or not?* *How do I know if I am eating too much or too little?* Children to discuss this with their Talking Partner before discussing as a whole class. <u>Introduction:</u>	<u>Task 1</u> Reading fact cards All children to work in mixed ability pairs. <u>Task 2</u> Using the McDonalds counter app <u>SEN:</u> Guide them in the use of the app and discuss verbally what they found out. Children could add a colour to show the amount of sugar, fat, salt etc.

I can make systematic and careful observations and, where appropriate, taking accurate measurements using standard units and a range of equipment.

I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

I can use straightforward scientific evidence to answer questions or to support their findings.

Resources

Fact cards
Ipads

Explain to the children that they are going to find out more about food. Consolidate what the children learnt about food groups in the previous lesson, and how much of these foods we should be eating.

Task 1:
Place around the classroom fact cards about the different food groups. Children to rotate around them, sharing what they have found out with their Talking Partners.
Invite children to share information they have found out e.g. We need to eat 5 portions of fruit or vegetables a day.

Task 2:
Talk about what might happen to our bodies if we consume too much energy or too much salt, sugar, and fat. However, reassure the children that we can still have a little bit of those foods but not often.

Discuss with the children about calories:
A calorie is a unit of measurement.
A calorie is a unit of energy. When you hear something contains 100 calories, it's a way of describing how much energy your body could get from eating or drinking it.
Are Calories Bad for You?
Calories aren't bad for you. Your body needs calories for energy. But eating too many calories — and not burning enough of them off through activity — can lead to weight gain.
Most foods and drinks contain calories.

lettuce	peanuts
(1 cup has less than 10 calories)	(½ cup has over 400 calories)

Some people watch their calories if they are trying to lose weight. Most kids don't need to do this, but all kids can benefit from eating a healthy, balanced diet that includes the right number of calories — not too many, not too few. But how do you know how many calories you need?

Year 3: Children to work with their Talking Partner. Children to draw and make a simple label for the food through colour coding the amounts.
Year 4: The children could add additional information to their label e.g weight or percentage

Task 3

Measuring fats and sugars
All children to work in mixed ability groups.

Challenge
Children to draw their own balanced meal based on what they have learnt.

Plenary

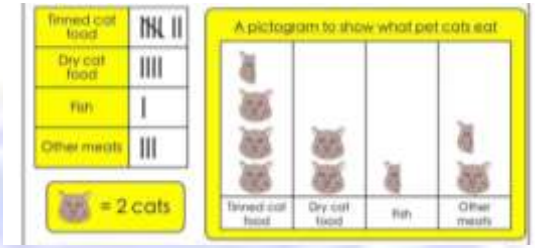
Consolidate all learning on what foods helps us to grow, stay strong and build good muscles.

Consolidate the reasons for a balanced diet, and what might happen to our

Pre-made labels for children to complete Foods Fat Sugar Plastic cups Teaspoons Sheet of recording	How Many Calories Do Kids Need? Kids come in all sizes and each person's body burns energy (calories) at different rates, so there isn't one perfect number of calories that every kid should eat. But there is a recommended range for most kids between 6 and 12 years old: 1,600 to 2,200 per day, depending on how active they are. Introduce the children to the McDonalds Counter, and how to use it to find out the nutrition in their foods. Children to select a meal an adult might eat and discuss what they have found out about it. Discuss whether this amount would be a green, yellow or red, and why. Can they find a healthier alternative? Why is this mean healthier? Children to record their findings in their journal. <u>Task 3:</u> Following on from that activity, explain that we are going to look at what fats and sugars are in our foods. Explain what is a recommended daily amount of sugar and fat is for children and adults. Then give the children a list of foods (full-**fat coke, biscuit, McDonald's ch**ips, crisps etc.) and get the children to predict how many teaspoons of fat or sugar are in them. Children to work in small groups; place sugar or fat for the children to measure out. Go through each food and inform the groups of how much sugar or fat is in the product. Children to measure it out. Discuss if this amount is within the daily amount or not. Discuss why eating too much of a food will not be good for us e.g. a chocolate chip cookie has 2 Tsp of sugar. If we have 3 biscuits we would have eaten our recommended daily amount. Take photographs of the children measuring. In their journal, children to place their prediction and their findings. Children to write about a food that surprised them and why.	**bodies if we don't provide it with the** right balance of nutrients. To support healthy living as a whole, watch this video https://www.bbc.co.uk/bitesize/topics/zrffr82/articles/ztsqfcw

Knowledge and Skills Objectives	Activity	Differentiation
Lesson 12 I can make healthy choices. Working scientifically	Hook: packed lunch items, plates, knives, forks, spoons, bowls, Starter Question: Ask the children; *What is a balanced meal?* Children to discuss this with their Talking Partner before discussing as a whole class. Introduction Explain to the children that today they are going to make a healthy sandwich. **Go 'shopping' with the children. Ask the children;** Which bread would be good for our lunch? Which filling would be good for our lunch? Which snack would be good for our lunch too? Task 1: Children to rotate around activities in this lesson: 1) Make their sandwich (teacher led) 2) Draw and annotate their healthy lunch and give reasons for their choices (put into journal along with photograph) 3) Research about vitamins, calcium etc. and why these are good for us. 4) Enjoy reading some science books on food, bones and muscles. **Take photographs of the children's sandwiches.**	All children to rotate around activities When all the children have made their sandwiches, children can eat them.
Resources		**Plenary**
A range of sandwich breads and fillings including lettuce, tomato, cucumber and carrot Design sheets Ipads		Discuss what vitamins, calcium etc. are and why some foods advertise that they are high in these. Why is eating or drinking something high in vitamin C

Text books		good for us or why is calcium good for me.
Knowledge and Skills Objectives	**Activity**	**Differentiation**
Lesson 13 I can make healthy choices for my pet. Working scientifically	Hook: pets and pet food Starter Question: Ask the children; *Do animals eat the same food?* Children to discuss with their Talking Partner before discussing as a whole class. Introduction: Explain to the children that animals need to eat to get nutrients just like we do. However, animals cannot go to supermarkets to get their food. So where do they get their food from? Task 1: Look at pictures of animals and discuss where they get their food from. This links to the lesson on animal diets. Next ask the children if they have any pets and what they like to eat. Make a list of the pets and the foods they eat. Choose two children who have the same pet, and ask the question; Do your pets like the same food? Through this discussion, illicit that there are different types of animal foods and that the same pets can actually prefer different types of food. Look at packaging from different foods dogs eat; what is in the food? Which do they think is better for a dog and why?	Task 1 Collect data and present it. SEN: Use a template for collecting data and a pictograph. Use 1 image for each vote. Year 3: Create own tally chart. Use a template for the pictograph. Year 4: Draw their own tally chart and pictograph templates. Task 2 Assessment

Resources Packaging of dog food Images of dogs for pictograph Template of a pictograph Assessment sheets	Present the children with a questionnaire about cats and their food preferences; 15 cat owners were asked what kind of food their cats ate. The results were recorded as a tally chart and then turned into a pictogram.  Explain that we are going to conduct our own research but this time about dogs. Make a list of foods dogs like to eat. (Year 3 could look at dogs and Year 4 could look at another animal) Following this, the children are going to ask members of staff if they have a dog and if so which of the foods listed do they prefer. Children to complete a tally chart as they collect the data. Next, using an image of a dog and 1 dog represents 2 votes, children to create a pictograph. Once the pictograph has been completed, children to state which food was the most popular or least popular, and what does this tell us about dogs. <u>Task 2:</u> End of topic assessment	