



Working Scientifically: Across all year groups scientific knowledge and skills are learnt by working scientifically.

There are five key strands linked to **Working Scientifically** that are apparent throughout all of the topics and across all year groups:

Asking Questions and Carrying Out Fair and Comparative Tests:

KS1: Asking simple questions and recognising that they can be answered in different ways.
Performing simple tests.

Y3/4: Asking relevant questions and using different types of scientific enquiries to answer them.
Setting up simple practical enquiries, comparative and fair tests.

Y5/6: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Using test results to make predictions to set up further comparative and fair tests.

Observing and Measuring Changes:

KS1: Observing closely, using simple equipment.

Y3/4: Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Y5/6: Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Identifying, Classifying, Recording and Presenting Data:

KS1: Identifying and classifying.
Gathering and recording data to help in answering questions.

Y3/4: 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.

Y5/6: Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Drawing Conclusions, Noticing Patterns and Presenting Findings:

KS1: Using their observations and ideas to suggest answers to questions.

Y3/4: Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

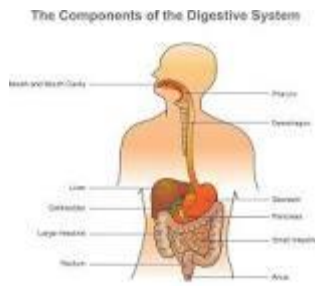
Y5/6: Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.



Using Scientific Evidence and Secondary Sources of Information:



Y3/4: Identifying differences, similarities or changes related to simple scientific ideas and processes.
Using straightforward scientific evidence to answer questions or to support their findings.




Y5/6: Identifying scientific evidence that has been used to support or refute ideas or arguments.




Key Vocabulary		
Tier 1	Tier 2	Tier 3
mouth tongue teeth tooth tooth decay brushing dentist stomach liver digestion digest digestive system humans animals	incisors canines molars premolars plaque acid gum disease calcium balanced diet omnivore carnivore herbivore	predator producer primary consumer secondary consumer tertiary consumer bacteria pancreas gallbladder rectum anus salivary glands oesophagus small intestine large intestine saliva

Lesson	Learning Objective	Brief outline and suggested outcome	Milestone Objectives
1	Through examining a model of the human digestive system, I can name the main body parts involved. 	Ask children if they have heard of the word 'digestion' before. TTYP: What do they think it means? Explain that digestion is the process of breaking down food in our bodies so that we can extract the nutrition from it. Ask them to swallow and trace down their throat to where they think their stomach is. What other parts of their digestive system can they name & locate in their bodies? Show illustration and/or model of the digestive system such as mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions. Children given a picture of a person, to label mouth, oesophagus, stomach, large intestine, small intestine and anus.	Working Scientifically: Drawing Conclusions, Noticing Patterns and Presenting Findings: Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using Scientific Evidence and Secondary Sources of Information: Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings.

		<p><i>SEND: Children label digestive system with key words using a visual prompt to support.</i></p> <p><i>G&T: Children cut out and place the parts in the correct place before labelling using key words. Research some additional detail related to the digestive system.</i></p> <p>Display pictures of the digestive system of other animals. From the diagram they have created and labelled of a human, can they draw comparisons between each?</p>	<p>To understand animals and humans:</p> <p>Describe the simple functions of the basic parts of the digestive system in humans.</p>
<p>2</p> 	<p>Using a practical demonstration, I can make careful observations about how the human digestive system works.</p> <p>I can ask my own questions about what I observe.</p> 	<p>Perform a demonstration of the digestive system using crackers, banana and orange juice as the food, tights, plastic cups and a plastic tub to recreate each stage.</p> <p>Details of the experiment can be found here: https://www.bbc.co.uk/bitesize/topics/zf339j6/articles/zrm48mn#:~:text=The%20clear%20plastic%20bag%20represents,small%20intestine%20inside%20the%20body.</p> <p>Watch: http://kidshealth.org/en/kids/dsmovie.html?WT.ac=en-k-htbw-main-page-h</p> <p>Review the functions of each stage.</p> <p>Following the demonstration, the children will record an explanation of the function of the main parts of the body involved in the digestive process, using diagrams to support their understanding.</p> <p><i>SEND: Give the children simple statements with appropriate pictures to support their understanding.</i></p>	<p>Working Scientifically:</p> <p>Asking Questions and Carrying Out Fair and Comparative Tests:</p> <p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Observing and Measuring Changes:</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Identifying, Classifying, Recording and Presenting Data:</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Drawing Conclusions, Noticing Patterns and Presenting Findings:</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p>

			<p>Using Scientific Evidence and Secondary Sources of Information: Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>To understand animals and humans: Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Writing: Composition: To organise writing appropriately: Use organisational devices such as headings and sub headings.</p>
3	<p>Using a model of the human mouth I can make observations and ask questions about the different types of teeth.</p> 	<p>Explain that we will be looking at teeth over the next couple of lessons. TTYP: Children discuss what they already know about teeth, and share some of their ideas. Why do we have different types of teeth? What is their purpose? Explain that today we will be looking at the structure of a human tooth and drawing and annotating a diagram of a human tooth.</p> <p>Show: http://www.crickweb.co.uk/ks2science.html Show: https://www.youtube.com/watch?v=DstSL3l--9I</p> <p>Watch the two clips above and then re-discuss what they have learnt about teeth, supporting the children's understanding using the model that we keep in school. Children use these to try to identify the teeth they have in their own mouths.</p> <p>Children identify the different types of teeth and record their functions using scientific vocabulary. Children produce a key to support their diagrams.</p> <p><i>SEND: Children given a labelled diagram showing the different teeth types and a list of functions to cut and paste in the correct place.</i> <i>G&T: In addition to the main activity children to calculate how many of each tooth type an adult human has and thinking about the functions of these teeth begin to make simple conclusions about why there are more of some than others</i></p>	<p>Working Scientifically: Asking Questions and Carrying Out Fair and Comparative Tests: Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Observing and Measuring Changes: Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Using Scientific Evidence and Secondary Sources of Information: Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>To understand animals and humans: Identify the different types of teeth in humans and their simple functions.</p>

<p>4</p>	<p>Using secondary sources of information, I am beginning to learn the scientific vocabulary associated with parts of the tooth.</p>  <p>This lesson is additional to the National Curriculum requirements and could be used as a plenary to lesson 3.</p>	<p>and the position of them in the human mouth. They could also make comparisons between a typical set of adult teeth compared to a child's.</p> <p>TTYP: Children to discuss and recap what they learnt previously about the different teeth types and their functions. Explain that today we are going to talk about the inside of a tooth and identify the parts (jaw, gum, root, crown, dentine, enamel, pulp).</p> <p>Watch the following clip: https://www.youtube.com/watch?v=rHo_kbOgFcw</p> <p>Children to draw a diagram of the structure of a tooth and label each part.</p>	<p>Working Scientifically: Using Scientific Evidence and Secondary Sources of Information: Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>To understand animals and humans. I can identify the different types of teeth in humans and their simple functions.</p>
<p>5</p> 	<p>I can compare the teeth of animals and humans to identify their differences and similarities.</p> 	<p>TTYP: Do other animals have the same type of teeth as humans? Why? Why not? Feedback ideas using IWB.</p> <p>Discuss what herbivores, carnivores and omnivores are. Remind children of the basic functions of the three types of teeth and relate it to the types of food animals would eat.</p> <p>Show PPT - PDSA displaying pictures of different animals. Show: https://www.kidcyber.com.au/animal-digestion this link explains the difference between herbivores and carnivores. http://news.bbc.co.uk/cbbcnews/hi/find_out/guides/tech/teeth/newsid_3830000/3830561.stm</p> <p>Children given photos of animal skulls and names of animals. Children to pair them up and identify whether the animal is a carnivore, herbivore or omnivore based on the types of teeth they can see.</p>	<p>Working Scientifically: Asking Questions and Carrying Out Fair and Comparative Tests: Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Drawing Conclusions, Noticing Patterns and Presenting Findings: Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using Scientific Evidence and Secondary Sources of Information:</p>

		<p><i>SEND:</i> Children given pictures of three labelled animal skulls. With support, children to answer the following questions: Do all three have any teeth that are the same? Which type of teeth? Why do you think they have the type of teeth that you stated above in common?</p> <p><i>G&T:</i> Children to be given pictures of three labelled animal skulls. Children to answer the following questions: Are there any types of teeth that all three have in common? Why do they have these in common? Explain any differences that you have found between the types of teeth the animals have:</p> <p><i>Contact Science Advisor from University of Worcester for examples of animal skulls we can loan to show the children.</i></p> <p><u>Making Animal and/or Human Teeth</u> Children to make animal and/or teeth using modelling clay (Play Doh). See link for demonstration. https://www.youtube.com/watch?app=desktop&v=dh2EIOEhy0w Use this as an opportunity to discuss the shapes of the teeth, where they are located and their functions. Make links to animal's teeth. E.g. Carnivores have large canines as they need to tear through meat.</p> 	<p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>To understand animals and humans: Identify that animals including humans, need the right types and amounts of nutrition; that they cannot make their own food and get nutrition from what they eat.</p> <p>Identify the different types of teeth in humans and their simple functions.</p>
<p>6</p> 	<p>I can generate some of my own ideas on how to extend a fair test to observe the effects of tooth decay.</p> 	<p>Note: Test a week or so prior to the lesson to check timings. Part one before the investigation may need to be carried out in the morning or the day before.</p> <p>Resources: eggs/egg shells; drinks (coke, fruit juice, water and vinegar)</p> <p>Ask the children what happens if they don't look after their teeth. Explore different types of tooth decay and make the link between decay and high sugar content. Explore diets around the world and why some populations have healthier teeth than others.</p> <p>Experiment: Leave an egg (or egg shell) in some different types of solutions e.g. coke, fruit juice, vinegar and water.</p> <p>Aim and prediction Discuss what investigation we could carry out using the equipment. Explain to the children what they will be doing.</p>	<p>Working Scientifically: Asking Questions and Carrying Out Fair and Comparative Tests: Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Observing and Measuring Changes: Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a</p>

Revise how the outer part of our teeth is enamel.
Explain that the outer part of the egg shell is like the enamel on our teeth (although enamel is thicker and much more durable than the egg shell).
TTYP: Children discuss what might happen to the egg shells and record their predictions.

Method
TTYP: What would we need to do to make a 'fair test'? Plan a fair test, with these conditions being the same:

- The size of the eggs
- The type of eggs (animal they come from)
- The age of the eggs
- The amount of each solution in each container
- How we put the eggs into each container
- How long we leave the eggs in the solution

Discuss how changing these variables would be unfair and why this is the case.

Children to investigate and make observations. Compare with their predictions and draw simple conclusions.

To extend the experiment further, children can complete the same process but clean each egg with toothpaste first, to replicate how cleaning our teeth offers some protection. Will it offer protection to the egg? Observe whether the effects of the solutions are the same.

Conclusion
Think about:

- Did our predictions match our results? Why/why not?
- What scientific language could we use?
- Evaluation - how could the investigation be improved/extended?
- Reliability

Further predictions - what can we conclude would happen to our teeth if we left them without brushing, as we did with the eggs?

SEND: Support the children to set up their experiments correctly so that they can make accurate observations.

range of equipment, including thermometers and data loggers.

Identifying, Classifying, Recording and Presenting Data:
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.


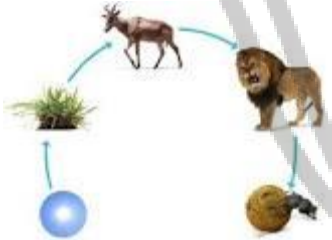
Drawing Conclusions, Noticing Patterns and Presenting Findings:
Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Using Scientific Evidence and Secondary Sources of Information:
Identifying differences, similarities or changes related to simple scientific ideas and processes.

Using straightforward scientific evidence to answer questions or to support their findings.

To understand animals and humans:
Identify the different types of teeth in humans and their simple functions.

		<p><i>G&T: Children to generate ideas for the class on how they could extend the investigation. For example, could we in some way protect the egg, such as painting it before putting it into the solution or cover it with toothpaste? Make predictions, experiment and discuss whether it would give similar protection as cleaning our teeth, or is that different?</i></p>	<p>Writing: Composition: To use paragraphs: Organise paragraphs around a theme. To organise writing appropriately: Use organisational devices such as headings and subheadings.</p>
<p>7/8</p> 	<p>By exploring food chains, I have some understanding of the relationship between different organisms.</p> 	<p>TTYP: children discuss what they know about food chains. Share ideas using IWB.</p> <p>Explain that an organism is a living thing. Explain the following links in a food chain: Make sure the children understand that a food chain is the transfer of energy from one organism to another and that all living things need energy for growth and health. Within a food chain some living things create the energy (producer) and some use the energy (consumer). The transfer of energy is reflected with the use of arrows when drawing a food chain. Plants are producers of energy, as they make their own food using, among other things, sunlight. Therefore, the sun is often at the start of a food chain, as without it, plants can't produce their own food. Animals are consumers, because they have to eat other animals and plants.</p> <ul style="list-style-type: none"> • producers - these are the start of many food chains and make their own food • primary consumers - these are next in the food chain and feed on producers • secondary consumers - these are next in the food chain and feed on primary consumers • tertiary consumers - these are next in the food chain and feed on secondary consumers (there is not always as tertiary consumer in a food chain). • the last animal, which might be a secondary or a tertiary consumer, is described as being at the top of the food chain and is not eaten by any other animal • By exploring a range of food chains with the children, identify that it is usually an omnivore or a carnivore at the top of the food chain. Why do the children think this is? • Explore the terms predator and prey and identify these in different food chains. 	<p>Working Scientifically: Using Scientific Evidence and Secondary Sources of Information: Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>To understand animals and humans: Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat.</p>

Show children a group of animals and ask them to think about which animal may eat one of the other animals.
Draw an example of a food chain with the labels above, for the children to refer to in the following activity.
Explain how each link in a food chain is crucial; if one link is removed, all of the animals above that point will find it harder to survive because their food supply will be reduced or taken away altogether. Ensure the children realise that a food chain shows the link between animals and a plant but that for instance an owl does not only eat a mouse, it does have other sources of food. But if mice suddenly became rare, obviously it would make it harder for the owl to survive.

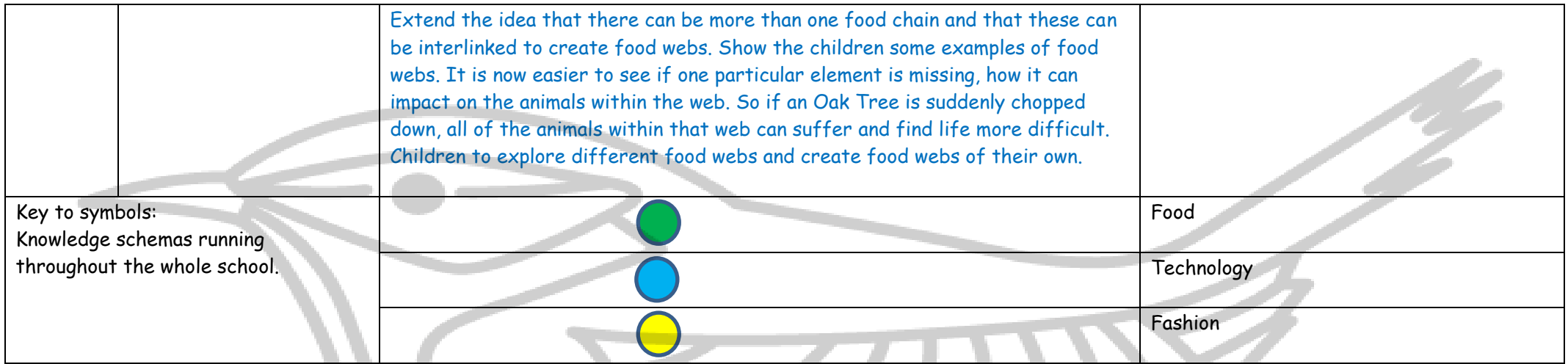
Give each child a card with an organism on it, as well as information on what that organism eats or is eaten by.
Children need to find the other organisms in their food chain and arrange themselves into the correct order.
Once all groups are complete, children need to read out their card and describe their place in the food chain e.g. I am a crab and I am eaten by a seal. I am a primary consumer.
Demonstrate the problem of one link in a food chain being removed with each group e.g. if there are no crabs, the seal will not have as many opportunities to eat.




Give the children a set of pictures to cut out and create a food chain from. Eg grass - rabbit - fox. Repeat with an ocean food chain. Eg sea weed - fish - larger fish - shark. Compare the children's food chains. Are they all the same?

SEND: With support, children label the levels of two food chains with the labels of producers, primary consumers, secondary consumers.

G&T: Ask the children to compare the food chains around the classroom. What type of organism is always at the end? Is it always a carnivore? Where do humans fit into a food chain? The end of a food chain can be referred to as the top predator or alpha predator or apex predator. Are humans always the top predator?

Reinforce the children's knowledge through role play, asking the children to be the sun, plants and different animals etc.



		Extend the idea that there can be more than one food chain and that these can be interlinked to create food webs. Show the children some examples of food webs. It is now easier to see if one particular element is missing, how it can impact on the animals within the web. So if an Oak Tree is suddenly chopped down, all of the animals within that web can suffer and find life more difficult. Children to explore different food webs and create food webs of their own.	
Key to symbols: Knowledge schemas running throughout the whole school.			Food
			Technology
			Fashion