Subject: Science Year 4: Digestion and food

NC/PoS:

- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators, and prey.

Prior Learning (what pupils already know and can do)

Before starting this unit, check the children can recall the following key facts from units *Science, Year 2, Animals: Life cycles and health* and *Science, Year 3, Animals: Movement and nutrition*:

- Humans need air/oxygen, food/nutrients and water to survive.
- The life processes include movement, reproduction, sensitivity, growth, excretion and nutrition.
- The seven nutrient groups are carbohydrates, protein, fats and oil, fibre, vitamins, minerals and water.
- Muscles cause movement in our bodies.
- The skeleton protects and supports the body.
- Animals get their food from what they have eaten.
- Know carnivores, herbivores and omnivores have different diets.

End Goals (what pupils MUST know and remember)

- Know that the digestive system breaks down food.
- Know the digestive system consists of mouth, tongue, oesophagus, stomach, small intestine, and large intestine
- Know the digestive system of a chicken includes mouth, tongue, oesophagus, stomach, small intestine, and large intestine
- Know the digestive system of most reptiles and amphibians include mouth, oesophagus, stomach, small intestine, and large intestine
- Know the digestive system of a salmon includes mouth, teeth, tongue, oesophagus, stomach, intestine
- Know that some animals have more than one stomach to aid digestion e.g. alligator, cow
- Know teeth are used to chew the food and break it up into bits
- Know the tongue helps to chew the food and swallow it
- Know that the oesophagus transports food to the stomach
- Know that in the stomach the food is churned up and broken down further
- Know in the small intestine the nutrients from the food are absorbed into the blood which transports them around the body
- Know in the large intestine water is absorbed into the body
- Know the four front teeth in both the upper and lower jaws are called incisors and are used to cut food.
- Know there are four canines in the mouth which tear food and form the corners of the mouth.
- Know the premolars are designed to crush and grind food.
- Know the molars, have broader and flatter surfaces and grind food.
- Know energy passes along the food chain
- Know all food chains, start with a plant which is a producer as it makes its own food
- Know that animals that eat plants are primary consumers
- Know that primary consumers may be eaten by secondary consumers or predators

Key Vocabulary: food chain, producer, consumer, predator, energy, prey, dependency, molars, premolars, incisors, canines, herbivores, carnivores, omnivores, diet, enamel, liquid, acidic, stains, weakens, mouth, saliva, tongue, teeth, oesophagus, stomach, small and large intestine, rectum, anus, digests, lubricates, pancreas, liver, gallbladder, acid, dissolve, dentist, nurse, orthodontist, gastroenterologist

Session 1: review prior learning

Name the 7 types of nutrients needed to fuel the body. How do they help the body? What is the job of the skeleton? Why is exercise and hygiene important? What do we call animals that just eat meat? Plants, fruit, and vegetables? Both?

LO: To recognise the different types of human teeth and their roles in eating.

From Kapow lesson 2: Human teeth

Children learn teeth are used to chew the food and break it up into bits and the tongue helps to chew the food and swallow it. There are four canines in the mouth which tear food and form the corners of the mouth. The premolars are designed to crush and grind food. The molars, have broader and flatter surfaces and grind food. The four front teeth in both the upper and lower jaws are called incisors and are used to cut food.

Display slide 1 of the *Presentation: Human teeth*. Introduce the terms **incisor**, **canine**, **premolar** and **molar** using the diagram.

Play the video using the link: BBC Bitesize - Types of teeth to reinforce the roles of the different human teeth.

Provide children with the *Activity: Labelling teeth* (one each). Ask the children to complete the key by adding the names of the teeth and their function by the side of each tooth image. Explain that the children should colour each type of tooth in the mouth, coordinating with their key. Those who are able should only cut out the top and bottom sets of teeth from the sheet to stick in their books and create their own key. (the missing teeth part of the sheet can be cut off- but discuss as a class which teeth are missing and how this would affect a person's eating).

Vocabulary: canine, chew, incisor, jaw, molar, palaeontologist, premolar, tooth

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Session 2: Recap and recall: The role of different human teeth.

LO: To describe the function of the human digestive system.

Working scientifically LO: To evaluate a model.

Give each pupil a small piece of bread and ask them to hold it in their mouth without chewing or swallowing for about 30 seconds.

Ask them:

- **What nutrient group does the bread contain the most?** (Carbohydrates.)
- **How has the bread changed?** (Answers may include that it became wet, soft, slippery or sweet.)
- **Why has the bread changed?** (Saliva in our mouths has started breaking down the bread's carbohydrates into sugars. This is an example of digestion.)

Children learn that the digestive system breaks down food and the digestive system consists of mouth, tongue, oesophagus, stomach, small intestine, and large intestine. The tongue helps to chew the food and swallow it. The oesophagus transports food to the stomach. In the stomach the food is churned up and broken down further. In the small intestine the nutrients from the food are absorbed into the blood which transports them around the body. In the large intestine, water is absorbed into the body.

Use the equipment for modelling the digestive system; follow the *Teacher video: Modelling the digestive system* to demonstrate it to the children. Alternatively, play the *Pupil video: Modelling the digestive system*. Can also share some interesting facts: it takes about seven seconds for food to travel from your mouth to your stomach.

A woman's small intestine is longer than a man's.

Your stomach acid would be able to dissolve metal.

If you stretched out your whole digestive system, it would be 29 feet long.

In their books, children write the function of the digestive system using the key vocabulary (can refer to the model or draw a diagram to help them) and then answer the following questions.

Evaluate:

What parts of the model worked well?
What parts of the model do not represent the real body well?
If time allows look at the 'Observing the digestive system in the past' section.
Vocabulary: absorb, diagram, digest, digestive system, evaluate, faeces. large intestine, model, nutrient, oesophagus, saliva, small intestine, stomach, tooth, tongue

Session 3: Recap and recall: The digestive system- display the *Presentation: True or false?* and ask the children to decide with a partner if each statement is true or false.
LO: To explain how to care for our teeth.
Working scientifically LO: To plan an enquiry by considering which variables should be changed, measured and controlled.
From Kapow lesson 3: Investigating dental hygiene,
Enquiry question: How do different liquids affect the enamel of teeth?
Display slide 1 of the *Presentation: Egg demonstration*, which shows a picture of six eggshells before being soaked in different drinks.
Ask the following questions:

- **Besides the drink the egg is soaking in, what else could affect how the shells change?** (Answers may include how long the eggs are left for; the amount of the drink they are left in; whether the eggs from different animals are used.)
- **What should be kept the same (the control variables) to ensure only the different drinks affect the shells?** (Leave the eggs in the drink for the same length of time; use the same volume of each drink; use eggs from the same carton.)
- **Why has one shell been left unsoaked?** (To check if the drinks affect the shell; to compare the other eggs to.)

With this in mind children must plan their own enquiry by answering the following questions:

- **What variable will be changed?** (the type of liquid- have the liquids suggested and if possible a few more: milk, tea, sugar solution, diet coke) direct the children to choose a range of different liquids- acidic, sugary, natural
- **What variable will be measured/recorded?** (changes to the shell- observation)
- **What variables should be kept the same? (**amount of liquid, length of time soaked, type of egg)

Choose the investigation planned by one of the children/groups (can plan in groups if you prefer) and carry out their investigation as a class.
Highlight that is why it is important to clean teeth!

Vocabulary: enamel, liquid, acidic, stains, weakens

Session 4: Recap: what can damage the enamel on teeth? How can you prevent this?
Display slide 4 of the *Presentation: Egg demonstration* from the previous lesson and discuss the results along with the results from the class investigation.
LO: To recognise that differences in teeth relate to an animal's diet.
Working scientifically LO: To group animals based on their diet.
Use the attention grabber from *Lesson 4: Teeth of carnivores, herbivores and omnivores*
Looking for clues to decide who the skull belongs to, using evidence from the image and previous learning about types of teeth.
Play the video using the link: BBC Teach - How do different animals use their teeth to eat? (up to 2:35).
Ask the children:

- **How can you tell if a skull or tooth is from a carnivore?** (Canines are larger and sharper; molars may also be sharper.)
- **How can you tell if a skull is from a herbivore?** (Incisors for biting plants; large molars for grinding; the jaw sometimes moves sideways for further grinding.)
- **How can you tell if a skull is from an omnivore?** (Mixture of incisors, canines

and molars.)
NB: An animal's teeth are designed to suit the diet that they eat.
Remind the children that the feeding relationship between animals is shown as a food chain. Play the video using the link: Food Chain Song to revise the ordering and drawing of food chains.
Watch to up to 2.36 and https://www.youtube.com/watch?v=YWwoQInSEeI
Distribute images from the *Resource: Animal faces* around the room.
Hand out the *Activity: Diet and food chain results* (one between two). Ask the children to move around the classroom and record whether they think each animal is a herbivore, carnivore or omnivore and what evidence they have used to make their decision.
In their books, children write the key features of herbivores, omnivores and carnivores and give examples of each.
Vocabulary: molars, premolars, incisors, canines, herbivores, carnivores, omnivores, diet

Session 5: Recap and recall: Food chains: Use the *Presentation: Spot the mistakes* and ask the children to identify errors and suggest corrections.
LO: To recognise producers, predators and prey in food chains.
Working scientifically LO: To analyse patterns and form conclusions using scientific knowledge.
Children learn energy passes along the food chain. All food chains, start with a plant which is a producer as it makes its own food. Animals that eat plants are primary consumers. Primary consumers may be eaten by secondary consumers or predators.
Use the link: BBC Bitesize - Woodland Food Chain Challenge to revise the ordering and drawing of food chains. Introduce the keywords **producer**, **prey** and **predator.**
Use the Main Event section of Lesson 5: Producers, predators and prey in food chains to study predator-prey cycles. Use the *Presentation: Predator-prey cycles* to analyse patterns and form conclusions based on the line graphs on slide 6 and 7.

- **When was the snowshoe hare population the smallest?**
- **When was the snowshoe hare population the largest?**
- **What may have caused the population size to change?**
- **How do the lines for the snowshoe hare and lynx compare?**
- **Where on the graph is the population of hares decreasing?**
- **What happens to the lynx population if there is not enough food?**

Children to write a conclusion based on the evidence using the key vocabulary.

Vocabulary: food chain, hunt, population, predator, prey, producer, consumer, relationship

Session 6: Recap and recall: Display the *Presentation: Scoring digestion and diet keywords*. Explain to the children that the number on each letter tile shows its score.
LO: To recognise that animal poo can give us clues about digestion, teeth and diet.
Working scientifically LO: To construct a results table for recording observations.
Discuss with the class:
When we are doing experiments in Science, why do we draw a results table?
Share the link: BBC Earth - Steve Backshall's poo clue on Videolink and ask:

- **What kind of evidence did Steve Backshall use?**
- **How did he describe the poo?**
- **How might this evidence be useful?**

Distribute the *Resource: Poo clue images* (and handmade samples if possible) around the room for the children to examine. Place a magnifying glass next to each sample if available.

Discuss with the class:

When we are doing experiments in Science, why do we draw a results table?

Ask the children to tell their partner what they think should be considered when drawing a results table. Take feedback and demonstrate the following key points on the board:

- A results table should be drawn in pencil with a ruler.
- The left-hand side of the table is for the variable being changed.
- The right-hand side of the table is for the variable being measured, which may be numbers or written observations.
- The heading of each side of the table should show what information is being written down.
- Units are written in the heading.

From Lesson 6: Poo clues show the class the *Presentation: Recording poo clues* and tell the children they will gather evidence about different animal faeces to discover information about the animals that left them.

Explain that:

- There will be different samples to look at. The poo sample is the **variable** being changed.
- They will record information about the poo sample. The observations are the **variable** being measured.

They will need to record their observations in a results table.

Vocabulary: diet, dung, evidence, record, results table, sample

Link to career scientist:

Dentist/ orthodontist https://www.youtube.com/watch?v=CIHc2B06PFc

Nurse https://www.youtube.com/watch?v=zkhvoJsH_5k

A gastroenterologist is a specialist with expertise in the disorders and diseases that affect the digestive system

Scientists who have helped develop understanding in this field: William Beaumont, a surgeon in the US army 1785-1853