Unit – Animals, including humans - Nutrition, Skeleton, Muscles

Enquiry: How can animals be sorted and grouped based on their skeletons? / What is a balanced diet and is it important?

Knowledge Progression

-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

Skill Progression

-Asking relevant questions and using different types of scientific enquiries to answer them

-Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

-Talk about criteria for grouping, sorting and classifying (non-statutory).

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

-Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations (non-statutory).

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

-Identifying differences, similarities or changes related to simple scientific ideas and processes

Key Learning

1. **The skull, spine (backbone), ribcage, pelvis and femur are bones within the skeleton:**
    - -The skull protects the brain.
    - -The femur helps humans to stand and move.
    - -The pelvis helps to support the spine.
    - -The spine helps humans to twist and stay upright.
    - -The ribcage protects the heart and lungs.

2. **Skeletons provide support and protection and allow movement:**
    - -Mammals, birds, fish, amphibians and reptiles have a skeleton.
    - -Some animals have a spine (all mammals, birds, fish, reptiles and amphibians have a spine).
    - -Some animals do not have a spine.
    - -Some animals have an exoskeleton.
    - -An exoskeleton provides support and protection

3. **A joint is where two or more bones connect and there are different types of joints in the human body:**
    - -The knees and elbows are hinge joints.
    - -The shoulders and hips are ball-and-socket joints.

4. **Muscles are attached to bones and they work in pairs**
    - -Muscles can only pull on bones and cannot push.
    - -Muscles work in pairs by contracting and relaxing.
    - -Bones, muscles and joints work together to allow movement.

5. **All humans need to eat a healthy, balanced diet to maintain good health.**
    - -All humans need a balanced diet that includes food from all five food groups.
    - -There are a variety of human diets including vegan, vegetarian, pescatarian and omnivorous diets.
    - -People who eat a vegan diet get protein from sources that are not animal products.

6. **Food can be sorted into five food groups – fruit and vegetables, carbohydrates, proteins, dairy products and alternatives and fats and sugars.**
    - -Fruit and vegetables provide the body with essential vitamins.
    - -Carbohydrates provide the body with energy.
    - -Proteins help with muscle growth and repair.
    - -Dairy products contain calcium, which is good for teeth and bones.
    - -Fats can be grouped into healthy and unhealthy fats.

	7. **Animals need the right type and amount of nutrition. They cannot make their own food. Instead, they get their nutrition from what they eat.** -Carnivores are animals that eat other animals. -Herbivores are animals that eat plants. -Omnivores are animals that eat other animals and plants.

Vocabulary

Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine

Misconceptions

-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.

Prior Knowledge

-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 (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 - Animals, including humans)
-Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - 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)

Future Learning

-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)

Possible Activities/Evidence

Key Learning Evidence:
Can name the nutrients found in food
Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients

Vocabulary Evidence:
Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection
Can describe how muscles and joints help them to move

Possible Activities:
Classify food in a range of ways.
Use food labels to explore the nutritional content of a range of food items.
Use secondary sources to find out the types of food that contain the different nutrients.

Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks?
Plan a daily diet to contain a good balance of nutrients.
Explore the nutrients contained in fast food.
Use secondary sources to research the parts and functions of the skeleton.
Investigate patterns asking questions such as: Can people with longer legs run faster?
Can people with bigger hands catch a ball better?
Compare, contrast and classify skeletons of different animals

Possible Evidence of this:
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 answering their enquiry question.
Can give similarities e.g. they all have joints to help the animal move, and differences between skeletons.

MCQs

MCQ 1: Which statements about skeletons are correct?
(Select all that apply)
☐ Skeletons provide support and protection.
☐ All animals have a skeleton made of bones.
☐ The skull protects the brain.
☐ The ribcage protects the heart and lungs.
Correct answers:
☑ Skeletons provide support and protection.
☑ The skull protects the brain.
☑ The ribcage protects the heart and lungs.
Follow-up discussion questions:
- Why might someone think that all animals have a skeleton?
- How would life be different if humans did not have a skeleton?

MCQ 2: Which statement best explains the job of muscles?
A) Muscles push bones to make them move.
B) Muscles pull on bones by contracting and relaxing.
C) Muscles protect the organs inside the body.
D) Muscles make bones grow.
Correct answer:
☑ B

MCQ 4: A child says: "All animals have bones inside their bodies."
Which answer is the best response?
A) True, because all animals need support.
B) False, because some animals have exoskeletons and some have no skeleton.
C) True, because all animals are mammals.
D) False, because animals do not need skeletons.
Correct answer:
☑ B
Follow-up discussion questions:
- What is an exoskeleton?
- Can you think of an animal that does not have an internal skeleton?

MCQ 5: Which foods help the body grow and repair muscles?
A) Proteins
B) Carbohydrates
C) Fats and sugars
D) Water only
Correct answer:
☑ A
Follow-up discussion questions:
- Why does the body need different food groups?

Follow-up discussion questions:

- Why is A incorrect?
- How do muscles and bones work together to create movement?

MCQ 3: Which pairs of bones and functions are correct?
(Select all that apply)

☐ Skull – protects the brain.
☐ Femur – helps humans stand and move.
☐ Ribcage – helps us digest food.
☐ Spine – helps us stay upright.

Correct answers:

☑ Skull – protects the brain.
☑ Femur – helps humans stand and move.
☑ Spine – helps us stay upright.

Follow-up discussion questions:

- Why is the ribcage important?
- Why do different bones have different shapes and functions?
- Why would eating only one type of food not be healthy?

MCQ 6: Which statements about animal diets are correct?
(Select all that apply)

☐ Herbivores eat plants.
☐ Carnivores eat other animals.
☐ Omnivores eat plants and animals.
☐ Animals make their own food like plants do.

Correct answers:

☑ Herbivores eat plants.
☑ Carnivores eat other animals.
☑ Omnivores eat plants and animals.

Follow-up discussion questions:

- Why can't animals make their own food?
- How does an animal's diet affect how it survives?

Digging Deepers

Digging Deeper Question 1 (Early in the unit – linking prior learning)
Question:
Humans need to move, but movement is not possible with bones alone. Explain how bones, muscles and joints work together to allow humans to move.
Prompts / hints:
Think about:

- What is the job of the skeleton?
- What is a joint?
- What do muscles do?
- Can muscles push or pull?
- Can you use these words:
  - **skeleton**
  - **joint**
  - **muscle**
  - **contract**
  - **relax**

Sentence stems:

- *Bones help movement by…*
- *A joint is…*

Digging Deeper Question 2 (Later in the unit – linking all key learning)
Question:
A child says: "Eating food is only important because it gives us energy." Do you agree? Explain your answer.
Prompts / hints:
Think about:

- What are the five food groups?
- Do all foods have the same job?
- How does food help our body?
- What does protein do?
- What does calcium do?
- Why do animals need nutrition?

Sentence stems:

- *I agree/disagree because…*
- *Food is important because…*
- *Different food groups have different roles, for example…*
- *Protein helps…*
- *Calcium helps…*

Model answer:

• *Muscles help because…* • *When a muscle contracts…* **Model answer:** Humans can move because bones, muscles and joints work together. The skeleton provides support and bones meet at joints to allow movement. Muscles are attached to bones and pull on them when they contract. Muscles work in pairs because one muscle contracts while the opposite muscle relaxes.	I disagree because food has many important jobs, not just providing energy. Carbohydrates give us energy, but proteins help our muscles grow and repair, and dairy products contain calcium which helps keep bones and teeth strong. Humans need a balanced diet with different food groups to stay healthy.

Unit – Rocks

How can rocks be identified and grouped based on their properties?

Knowledge Progression

-Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.

Skill Progression

-Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

-Talk about criteria for grouping, sorting and classifying (non-statutory).

-Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

Key Learning

- Rocks are natural materials.
- **Granite, pumice, sandstone, chalk, marble and gneiss are all types of rock.**
- **Rocks have different properties.**

-Rocks can be grouped in different ways.

- **Some rocks have grains.**
- **Some rocks have crystals.**
- **Some rocks have layers.**
- Some rocks are light and some are heavy.
- Some rocks are hard.
- Some rocks react with acid.
- Some rocks are brittle.
- Some rocks float and some sink.
- Rocks are used as building materials.
- Rocks have different textures and appearances.
- Rocks change over time

Vocabulary

Granite, pumice, sandstone, chalk, marble, gneiss, crystals, grains, layers, texture, hardness, brittle, reaction, weathering

Misconceptions

-Children may think that all rocks are heavy.

-Children may think that all rocks are hard.

-Children may think that all rocks are the same. Allow children to use hand lenses to observe crystals, grains and layers closely.

-Children may think that all rocks are hard and cannot break easily.

-Children may think that all rocks are heavy and therefore will sink.

-Children may think that only large buildings are made from rocks. Gravestones, cobbles, walls, tiles and stairs are also examples of structures made from different rock types.

Prior Knowledge

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)

Future Learning

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)

Possible Activities/Evidence

- Give children examples of granite, pumice, sandstone, chalk, marble and gneiss.

  Children use hand lenses to observe the rocks closely, then describe their appearance and features.

  Children could draw their findings and observations.



- Children could take their hand lenses outside to observe rocks in their school setting. This could include the school building as well as stones and pebbles.

- Children should group rocks in different ways.

  Begin by asking children to group the rocks into two simple categories, such as "soft rocks" and "hard rocks".



  Allow children to observe the rocks closely before sorting them into each group. Ask them to identify the rocks in each category.

  Repeat this process, choosing two different categories. Then allow children to choose their own categories for sorting.

  This could be extended by asking children to sort the rocks into more than two categories or to guess the sorting rule of another child.

- Children work in groups to test the hardness of the rocks using a nail. The harder a rock is, the less likely it can be scratched by the nail.

  Ask children to arrange the rocks in order of hardness.
- Children should then test to see whether the rocks float or sink.

  Encourage children to make predictions about whether each rock will float or sink before testing.
- Finally, children test to see whether the rocks react with acid (vinegar) or not.

  Children use a pipette to measure the same amount of vinegar to be dropped onto the rocks each time.

  Ask them to observe closely.

  Do they notice any changes on the surface of the rock?

  Has there been a reaction?

- Children should carry out a rock survey in their local area.

  Ask children to name a building or structure.



  They observe the rock closely using hand lenses.

  Ask children to touch and feel the rock (if appropriate) and describe its appearance and texture.

  Children can record their observations in a simple table.
- If appropriate, visit a graveyard to observe how rocks change over time.

  Do not allow children to touch the gravestones.

  Children could identify a new gravestone and an old gravestone.

  What is the difference between the gravestones?

  What do you think has happened to the rock over time?

Digging Deeper:

Early in the unit (linking to prior learning – e.g., materials or properties):
"How can we tell the difference between rocks just by looking at them or touching them?"

- Why it works:
  - Links to prior learning about materials and their properties (hard/soft, heavy/light, textures).
  - Encourages children to make observations and compare materials, not just name rocks.
  - Can lead naturally into sorting rocks by appearance, texture, or weight.

Follow-up prompts:

- Which rocks feel smooth or rough?
- Can you see any grains, crystals, or layers?
- Is it heavy or light?
- Could it float in water?

Model answer:
We can tell rocks apart by looking closely at their colour, texture, and patterns. Some rocks have **grains** like sandstone, some have **crystals** like granite, and some

Towards the end of the unit (bringing key learning together):
"Why do people choose different rocks for different purposes, like building, art, or roads?"

- Why it works:
  - Brings together properties (hardness, layers, crystals, acid reaction, weight) and uses.
  - Requires children to explain connections between rock features and their suitability for different purposes.
  - Encourages reasoning and application rather than recall.

Follow-up prompts:

- Which rocks are hard enough for buildings or roads?
- Which rocks have interesting patterns for art?
- Which rocks would wear away easily if used outside?
- How does the texture, weight, or brittleness of a rock affect what we use it for?

Model answer:
People choose rocks depending on their **properties**. Hard rocks like granite are used for roads and buildings because they **don't wear away easily**. Soft rocks like

have **layers** like gneiss. We can also feel the rocks: some are **smooth**, some are **rough**, some are **hard**, and some are **soft**. Pumice is very **light** and even floats in water, but granite is heavy. By observing and touching, we can group rocks with similar properties together.	chalk or sandstone are used less for building because they are **brittle**. Some rocks have **beautiful patterns or colours**, like marble, which makes them good for art or sculpture. Rocks that react with acid, like limestone, might not be good for outside buildings because they can **erode easily**. By looking at and testing rocks, we can decide which rock is best for each purpose.