Unit – Animals, including humans (changes)

Enquiry Question: Are there patterns linking gestation periods and lifespans?

Knowledge Progression

-Describe the changes as humans develop to old age.

Skill Progression

-Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
-Explore ideas and raise different kinds of questions (non-statutory)
-Identifying scientific evidence that has been used to support or refute ideas or arguments
-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

Key Learning

- Humans follow the same life cycle: **foetus → baby → child → adolescent → adult → elderly adult**.
- A **foetus develops in the womb** before birth.
- Babies depend on adults; humans become more independent as they grow.
- **Puberty**, controlled by **hormones**, prepares the body for reproduction.
- Humans continue to change throughout adulthood and old age.
- Humans are **mammals** because they give birth to live young and feed them milk.
- **Gestation** is the time a foetus develops before birth; human gestation is about **nine months**.
- Different mammals have different gestation periods and lifespans, and patterns can be identified from data, although there are anomalies.

Vocabulary

puberty, foetus, womb, adolescent, hormone, reproduce/reproduction, offspring, gestation, lifespan, life expectancy, correlation anomaly

Misconceptions

- A baby grows in a mother's tummy/stomach
- A **foetus** and a **baby** are the same thing
- Everyone reaches developmental milestones (e.g. walking, talking, puberty) at the **same age**
- Puberty begins at the **same age** for everyone and happens suddenly
- Boys and girls experience **exactly the same** changes during puberty
- Everyone ages in the **same way** and has the same life expectancy
- All mammals have the **same gestation period**
- A longer gestation period **always** means a longer lifespan

Prior Knowledge

Children should already know that:

- **Animals, including humans, grow and change** as they get older. (EYFS/KS1)
- **Young animals grow into adults**, and adults produce offspring. (Year 2)
- Humans need the **right amounts of nutrition, exercise and rest** to stay healthy. (Year 2)
- The **skeleton and muscles** support the body and enable movement. (Year 3)

- Humans are a type of **animal (mammal)**. (Year 1/2)
- Living things have **life processes** and eventually die. (EYFS/KS1)
- Scientific data can be **presented and interpreted** using tables and graphs. (Working Scientifically, Lower KS2)

Future Learning

Future Knowledge

- Explain how offspring inherit characteristics from their parents (Year 6).
- Understand adaptation and evolution over time (Year 6).
- Learn about the human reproductive system, fertilisation and pregnancy (KS3).
- Understand the role of hormones in controlling body processes (KS3).
- Explain growth and development using cells, genetics and body systems (KS3).

Possible Activities/Evidence

Possible Activities

- Human life cycle investigation
    - Create a timeline of the six stages of the human life cycle using images, research and discussion.
    - Children investigate the key features and changes at each stage and present findings.
- Growth and development data investigation
    - Compare measurements (e.g. height/mass) of children at different ages/year groups.
    - Interpret data showing how babies grow during their first year.
    - Plot and analyse line graphs to show changes in growth over time.
- Baby and childhood development
    - Explore photographs and examples of milestones to identify how humans change from babies to children.
    - Discuss how babies communicate needs and become increasingly independent.
- Puberty sorting activity
    - Sort and classify physical and emotional changes during puberty into:
        - changes affecting males
        - changes affecting females
        - changes affecting everyone
    - Discuss the role of hormones in controlling changes.
- Ageing investigation
    - Compare images of humans at different life stages and identify physical changes linked to ageing.
    - Discuss ways people can maintain health as they get older.
- Mammal comparison investigation
    - Research and compare gestation periods of different mammals.
    - Present data using tables, graphs or charts.
    - Identify patterns between animal size, gestation period and lifespan.
- Pattern seeking enquiry
    - Investigate: *"Are there patterns linking gestation periods and lifespans?"*
    - Analyse data, identify correlations and explain anomalies.
- Working scientifically opportunities
    - Collect, record and present data.
    - Interpret graphs and tables.
    - Identify patterns and anomalies.
    - Draw conclusions from evidence.

MCQ Questions:

MCQ 1: Which statements about the human life cycle are correct?
(Select all that apply)

☐ All humans go through the same stages of the life cycle in the same order.
☐ A baby and a foetus are the same thing.
☐ A foetus develops inside the womb before birth.
☐ Humans stop changing once they become adults.

Correct answers:

☑ All humans go through the same stages of the life cycle in the same order.
☑ A foetus develops inside the womb before birth.

Follow-up discussion questions:

- Why might someone think a foetus and a baby are the same thing?
- What changes happen to humans after they become adults?

MCQ 2: Where does a human foetus develop before birth?

A) The stomach
B) The womb
C) The heart
D) The lungs

Correct answer:

☑ B) The womb

Follow-up discussion questions:

- Why might someone choose the stomach as their answer?
- What is the difference between a foetus and a baby?

MCQ 3: Which statement best explains puberty?

A) It is when children learn new skills such as walking and talking.
B) It is when the body changes from a child's body into an adult body capable of reproduction.
C) It is when the body stops growing completely.
D) It happens at exactly the same age for everyone.

Correct answer:

☑ B

Follow-up discussion questions:

- Why is D incorrect?
- What are some changes that happen during puberty?

MCQ 4: Which statements about puberty are true?
(Select all that apply)

☐ Hormones control the changes that happen during puberty.
☐ Everyone experiences puberty at exactly the same time.
☐ Some changes happen to both males and females.
☐ Puberty happens quickly over a few days.

Correct answers:

☑ Hormones control the changes that happen during puberty.
☑ Some changes happen to both males and females.

Follow-up discussion questions:

- Why might puberty happen at different times for different people?
- What role do hormones play during puberty?

MCQ 5: Why are humans classed as mammals?

A) Humans have hair, give birth to live young and feed their young milk.
B) Humans are the only animals that grow and change.
C) Humans lay eggs and care for their young.
D) Humans have bones and can move.

Correct answer:

☑ A

Follow-up discussion questions:

- Which features make an animal a mammal?
- Why are birds not classed as mammals?

MCQ 6: Scientists investigated gestation periods and lifespans of different mammals. Which conclusion is the best?

A) All mammals with a longer gestation period always live longer.
B) There is often a pattern that mammals with longer gestation periods have longer lifespans, but there are exceptions.
C) Gestation period and lifespan are not related at all.
D) Humans have the longest gestation period because they live the longest.

Correct answer:

☑ B

Follow-up discussion questions:

- Why do scientists need to look at patterns rather than just one example?
- What does it mean if an animal is an anomaly?

Digging Deeper Qs	

Digging Deeper Question 1 (Early in the unit – linking to prior learning)
Question:
Humans are animals, but what makes humans a type of mammal? Use what you know about living things to explain your answer.
Why this works:
• Activates prior learning about animal groups and characteristics of mammals.
• Provides a foundation for later learning about gestation, offspring and human development.
Model answer:
Humans are mammals because they have the key characteristics of mammals. Humans are warm-blooded, have hair, give birth to live young and feed their babies with milk. Humans also grow and change through different stages of their life cycle, from a foetus to an elderly adult.
 	
Prompts / hints to support children
Think about:
• What features do all mammals share?
• How do mammals produce their young?
• How do mammals feed their young?
• What happens to humans as they grow and develop?
• Can you use these scientific words in your answer:
  ○ mammal
  ○ offspring
  ○ live young
  ○ milk
  ○ life cycle
Possible sentence stems
• *Humans are mammals because…*
• *One characteristic of mammals is…*
• *This means humans are mammals because…*
• *Unlike some other animals, mammals…*
	Digging Deeper Question 2 (Later in the unit – synthesising key learning)
	A scientist says: "Animals that have longer gestation periods always live longer." Do you agree? Explain your answer using examples and scientific vocabulary.
	Why this works:
	• Brings together learning about mammals, gestation, lifespan, patterns and anomalies.
	• Requires pupils to evaluate a statement rather than recall a fact.
	Model answer:
	I partly agree because there is often a pattern that mammals with longer gestation periods have longer lifespans. For example, elephants have a long gestation period and a long lifespan. However, it is not always true because there are anomalies. Humans have a gestation period of around nine months but can live for many decades, so their lifespan is much longer than their gestation period would suggest. Scientists need to look at lots of data before deciding if there is a pattern.
	
	Prompts / hints to support children
	Think about:
	• What does **gestation** mean?
	• What does **lifespan** mean?
	• What pattern did you notice when comparing mammals?
	• Can you give an example that supports the scientist's idea?
	• Can you find an example that does not fit the pattern?
	• What scientific word describes something that does not fit a pattern?
	• Can you explain why scientists need to use lots of data?
	Possible sentence stems
	• *I agree/disagree because…*
	• *Gestation means…*
	• *The pattern scientists noticed was…*
	• *For example…*
	• *However, this is not always true because…*
	• *This is an anomaly because…*

Unit – Evolution and inheritance
Knowledge Progression
-Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. -Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. -Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Skill Progression
-Observing and raising questions about local animals and how they are adapted to the environment. -Comparing how some living things adapt to survive in extreme conditions, e.g. cactuses, penguins and camels. -Analysing the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.
Key Learning
All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.
Vocabulary
Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils
Misconceptions
-Adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life -Offspring most resemble their parents of the same sex, so that sons look like fathers -All characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited -Cavemen and dinosaurs were alive at the same time.
Prior Knowledge / Connected Learning
-Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. (Y2 - Living things and their habitats) -Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) -Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) -Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) -Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) -Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)
Future Learning

-Heredity as the process by which genetic information is transmitted from one generation to the next. (KS3)
-A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. (KS3)
-The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. (KS3)
-Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. (KS3)

Possible Activities/Evidence

-Design a new plant or animal to live in a particular habitat.
-Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity.
-Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution.
-Make observations of fossils to identify living things that lived on Earth millions of years ago.
-Identify features in animals and plants that are passed on to offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs.
-Compare the ideas of Charles Darwin and Alfred Wallace on evolution.
-Research the work of Mary Anning and how this provided evidence of evolution.

-Can identify characteristics that will make a plant or animal suited or not suited to a particular habitat .
-Can link the patterns seen in the model to real examples.
-Can explain why the dominant colour of the peppered moth changed over a very short period of time.