Year 5 Science Summer 1 Plan - Animals, including humans

Unit Rationale

In this unit children will develop their learning from year 4 about how animals, including humans, need to get nutrition from what they eat and how this impacts the different stages in the growth and development of humans. The children will learn about the changes experienced in puberty. Children will develop their skills in working scientifically by researching the gestation periods of other animals and comparing them with humans as well as researching and recording the length and mass of a baby as it grows. This unit teaches about the changes that human beings experience as they develop to late adulthood and tackles some sensitive subjects including puberty and late adulthood and death.

Common misconceptions:

Some children may think:

- All babies grow and develop at the same rate
- There is only one type of graph used in Science
- Puberty starts at the same time for everyone
- Puberty doesn't begin until you are a teenager
- Adulthood starts when you turn 25 years old
- Late adulthood starts when you turn 40 years old
- There's nothing you can do to stop the signs of old age

National Curriculum Objectives

- describe the changes as humans develop to old age.

Cross Curricular Links:

- PSHE, RSE

Disciplinary Knowledge: Working Scientifically

• **Methods used to answer questions** (use of models, classification, correlations and patterns, experimentation, fair testing)
• **Using apparatus and techniques** (accurate measurement, collecting and recording data, carrying out procedures safely and accurately)
• **Data analysis** (processing and presenting data, exploring relationships, communicating results in tables / graphs, identifying correlations)
• **Using evidence to develop explanations** (using evidence / scientific knowledge to draw conclusions, explain laws, models, concepts and findings)

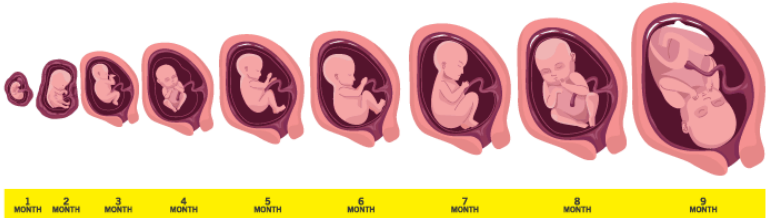
Substantive knowledge:

• Children can explain what gestation periods are for different animals, including humans.
• Children can describe the changes as humans develop from fertilisation to birth.
• Children can explain how babies grow and develop into children.
• Children can describe and explain the main changes that occur during puberty.
• Children can describe and explain the main changes that take place in old age.
• Children can describe and explain the stages of human development.

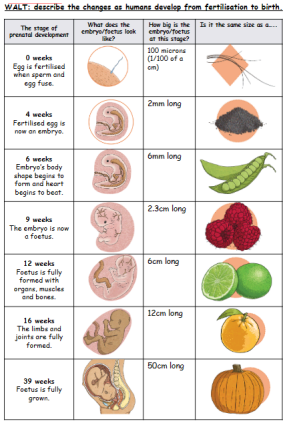
Trips and Visits

Modern Day Links: STEM

Prior learning:	**What next?**
This unit recaps the children's learning from year 1, looking at different types of common animals. It also recaps on year 2 learning that animals, including humans, have offspring, which grow into adults. The concept of life cycles would have been taught in year 2, and this will be built upon in this unit	In year 6, children will be developing their knowledge of the human body by learning to: ● identify and name the main parts of the human circulatory system ● describe the functions of the heart, blood vessels and blood ● recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ● describe the ways in which nutrients and water are transported within animals, including humans

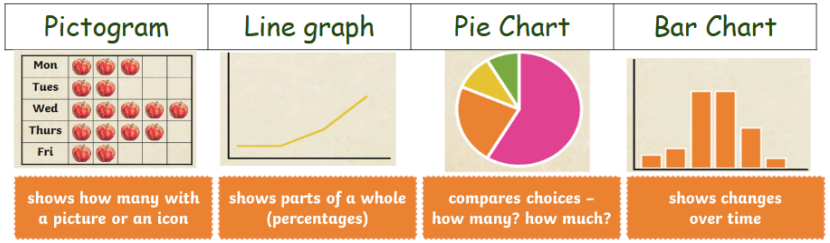
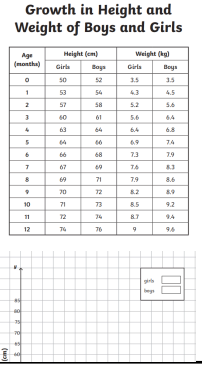
Lesson	WALT	What should the children remember?	Lesson plan and outcome	Key Vocabulary	Key Questions
1	**WALT:** compare gestation periods for different animals, including humans. **Resources:** • Timelines cut out • Animal Gestation Periods Tables • Option: Chromebooks **Scientific Enquiry Skills:** Pattern Seeking, Research	Gestation is the period of time between fertilisation and when the baby is born. The human gestation period is approximately 9 months (or 40 weeks). Different animals have different gestation periods.	(Slide 2) Task 1: Stick KO in books. (Slide 3) Starter: On whiteboards, put main stages of human growth on timeline. These should include: baby, toddler, child, adolescent, adult and elderly person. Answer animated. (Slide 4-7) Introduce the unit and show brief BBC bitesize clip. (Slide 8-9) Task 2: What is gestation? Children to write a definition on whiteboards before showing actual definition. *"Gestation is the period of time between fertilisation and when the baby is born."* Children re-write own definition of gestation in their books.  (Slide 10) Introduce what gestation periods are for humans. (Slide 11-17) Main Task: Research - Do all animals, including humans, have the same gestation period? Children will research different gestation periods for different animals, including humans. Teacher can provide	Gestation Foetus Offspring Pregnancy Fertilisation Embryo Prenatal Growth	Which types of animals do you think will have the longest gestation period? Which will have the shortest? Can you explain your answer? How long is the gestation period for a human?

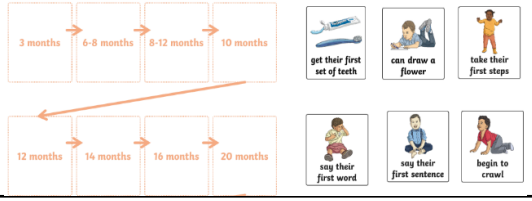
			research for the class (see shared folder) or get students to do their own research (using chromebooks). Results are to be recorded on a timeline. Children can stick the timeline provided in their books and using the Animal Gestation Periods Table, order the animals (see slide 16) or choose their own animals from the list and write the name of each animal in the correct order on the timeline.  ***Challenge**: What do all of these animals have in common?* *Ans: They are all mammals.* (Slide 19) *Extension options:* 1) "Larger animals have a longer gestation period." Is this statement correct? Give evidence from your timeline to support your answer and write it in your books. 2) Children could compare gestation period to the average size of the animal and plot a ***scatter graph***. They will need to complete further research to collect 'average size' data. Link to graph designing software if needed: http://nces.ed.gov/nceskids/createagraph/default.aspx (Slide 20 - 21) Plenary: (Answers on slide) 1. What does fertilisation mean? 2. What does gestation mean? 3. How long is the gestation period for humans? 4. Do all animals have the same gestation period?		

2	**WALT:** describe the changes as humans develop from fertilisation to birth. **Resources:** • ruler • Optional for size visualisation: poppy seeds, pea, raspberry, lime, orange, pumpkin • Scales with varying weights: 2g, 100g, 3.5kg **Scientific Enquiry Skills:** Observing over time	The gestation period is also known as the ***prenatal*** stage and refers to the time from fertilisation to birth. A foetus is the unborn baby that develops in the female uterus (womb) and will be fully developed after about 40 weeks. The fully grown foetus is close to 50cm long and weighs 3.5kg.	(Slide 2-3) Starter: Quiz Quick with answers (Slide 4) <u>Retrieval:</u> match up task Student can complete on their whiteboards. (Slide 5-7) <u>Introduction:</u> Prenatal Development Introduce the term 'prenatal' and as well as explaining the stage names such as the embryo (0 - 8 weeks), foetus (from 9 weeks onwards). (Slide 9) <u>Main Task</u>: Create a Prenatal Development Timeline. All children will need to receive a blank table to stick directly in their books as well as the images sheet to cut out. • Cut out the images and statements on your handout. • TTYP: Can you match up the correct statement with the stage of prenatal development timeline? (Do not glue in at this point) • Check your answers as we go through the slides. Make any changes as we go. • Lots of opportunity for scaffolding - see file in shared folder. • Get children to glue images in once it has been corrected. *Optional: Prepare a visual example of the size of the embryo/foetus at each stage (see resources list for ideas). Have various weights available for children to measure the weight of various stages of development.* (Slides 10-19) <u>Teacher Input</u>: Outlining Size and Development		gestation growth foetus embryo fertilisation prenatal development	What does prenatal mean? What happens during the prenatal stages? When does an embryo become a foetus? How big is a baby when they're born?

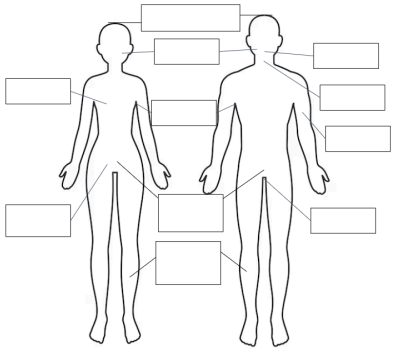
Ambition Collaboration Fairness Respect

			at Weeks 0, 4, 6, 9, 12, 16, 39 and birth. Children to check their answers or change them to match the information on the slides. Encourage children to look at their rulers at each stage to visualise the physical size of the embryo/foetus. (Slide 20) Students check their answers then stick the correct statements on the timeline worksheet. Stick table in books. *Option: Children write a statement summarising what they learnt today. Whole class stick one correct class sheet in their books.* (Slide 21-26) Oracy discussion: Myth or Fact Go through the slides and get children to decide whether they think the statement is a myth (false) or fact (True). Answers are all animated. (Slide 27-28) Plenary Quiz with answers		
3	**WALT:** explain how babies grow and develop into children. **Resources:** • Printed resources (see shared folder): graph templates, data sheet, blank graph paper • Measuring tape • Pencils **Scientific Enquiry**	Important development changes happen from birth to childhood. Babies height and weight compared to age can be measured on a graph. Graphs are used to make data easier to understand.	(Slide 2-3) Starter: Quiz Quick with answers (Slide 4) Big Question (Oracy)- Noticed how babies change as they become toddlers? - Explorify  Use oracy trios with 2 children discussing the big question and the third child summarising. Purpose - generate ideas and opinions (Slide 5) What are the key changes that occur from birth to childhood? Discuss as a class. Before clicking to show some key developments. (Slide 6) Oracy: Growing up: Discuss questions on the slide.	Growth Height Childhood Birth Development Line graph X-axis Y-axis	What are the key changes that occur from birth to childhood? Do babies keep growing at the same rate until they are adults or do they grow at different rates at different points in their lives?

	Skills: Pattern seeking, Comparative and Fair Testing	There are different types of graphs and you must choose the most appropriate graph depending on your data.	use 'onion' grouping. two circles, one inside the other. The inside circle faces the outside circle. Provide sentence stems. Purpose - generate ideas and opinions (Slide 7-9) <u>What is data?</u> Types of graphs. Introducing/re-capping the types of graphs we can use in Science to make the data we collate in experiments clearer to help us come to a conclusion. Can the children match up the correct graph name and picture (Slide 8)  (Slide 10) <u>Oracy</u> discussion on the importance of using graphs in Science to represent data. Paired talk - Purpose - understand and reason *Explain to children that precision in scientific investigations is important in order to ensure we are getting the correct results. Since we typically use models or samples to represent something much bigger, small errors may be magnified into large errors during the experiment.* (Slide 11-12) <u>Plot a graph using pre-recorded data</u> Give a brief introduction into line graphs - best modelled by the teacher under a visualiser/on the board. Hand out the data sheets and pre-labelled graph paper (see shared folder).  Growth in Height and Weight of Boys and Girls		How do you think the height and weight of babies change as they grow? What is data? How do you draw a line graph?

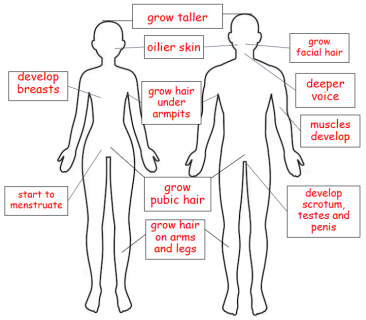
			Model how to plot several points from the data sheet onto the graph paper. (Slide 13) Stick completed graph in books. Children are to write a short summary/conclusion of their results in their books. There are some suggested statements on slide 13 for children to use or discuss their own findings. (Slide 14) Extension Task: Copy another sheet and plot the weight to age points. ***Challenge*** students to draw their own axis and labels using blank graph templates (see shared folder). (Slide 15-17) Experiment: Carry out your own experiment measuring height of everyone in the classroom. Plot a graph comparing height and age (by birthdate) to test the hypothesis: The oldest children in the class will also be the tallest. Optional: Watch this video for explanation of how to draw a line graph: Graphs and charts - Working scientifically - KS3 Science - BBC Bitesize (Slide 18) Optional experiment - measure the heights of children across other year groups in the school and plot a graph using the data collected. (Slide 19-21) Childhood Development Puzzle Children try to match the typical key event to an age in childhood development. Option: print, laminate and cut out image on slide 20 and make 1 x puzzle pack per table. 		

			Children match up image to age. (Slide 22) Summary of childhood development for information/discussion. (Slide 23-24) Plenary Quiz questions with Answers		
4	**WALT:** describe and explain the main changes that occur during puberty. **Resources:** • Post-it notes/paper for questions • Worksheet (see folder) or labelled diagram **Scientific Enquiry Skills:** Identifying, Grouping and Classifying	During adolescence, boys and girls undergo many changes as they move from being a child to being an adult. This period of physical change is called puberty. The physical growth that occurs during puberty enables humans to reproduce in adulthood. Hormones from the brain trigger the start of puberty (age 8-13 for girls and 9-14 for boys).	Disclaimer: This resource is designed to support teaching about *biological* attributes. You should consider whether this content is appropriate for all children in your class, especially children who have DSD/are intersex, or who are transgender. Links for parents if sending information out before the unit:Understanding Puberty (for Parents) | Nemours KidsHealth (Slide 2-3) Starter: Quick Quiz with answers (Slide 4) Ground Rules - set some ground rules for the lesson as we are discussing a sensitive topic for some students. (Slide 5-6) Introduction to topic - introduce the stage of adolescence on your timeline (you may add this stage image/information to your display). (Slide 7) - Key Vocab (Slide 8) Introduction to Puberty Video - https://www.bbc.co.uk/teach/class-clips-video/pshe-ks2-operation-ouch-how-are-babies-made-puberty/zghnf8 2 Raising questions: At this point it could be worth asking children to write any questions they have about the changes that occur	Puberty Adolescence Menstruation Hormones Oestrogen Testosterone Reproduction	What are the main changes that occur during puberty? Why do these changes occur during puberty? What are the similarities and differences between how boys and girls experience puberty during adolescence?

			during adolescence/puberty. Place them in a box for the teacher to assess and answer throughout the unit. (Slide and 10) <u>Task 1</u>: Label the diagram identifying the key physical changes that occur to males and females during puberty. This can be done on the worksheet (option 1) which includes questions at the bottom and can be stuck in the children's books. Alternatively, the teacher can print of just the blank images (option 2) for children to label and stick in books. All files are in the shared folder.  (Slide 11) <u>Table of Changes during Puberty</u> - click on the slide to show the key physical changes that occur to both boys and girls and then separately. There is space on the worksheet to identify changes that happen to both boys and girl i.e; grow taller, increased body hair, oilier skin, etc. Then separate changes i.e; boys - facial hair, deeper voice, develop penis, scrotum and testes and girls - develop breasts and start to menstruate.		

Boys and Girls	Girls only	Boys only
• oilier skin • grow pubic hair • grow hair under armpits • grow hair on arms and legs • grow taller	• start to menstruate • develop breasts	• grow facial hair • develop scrotum, testes and penis • deeper voice • muscles develop

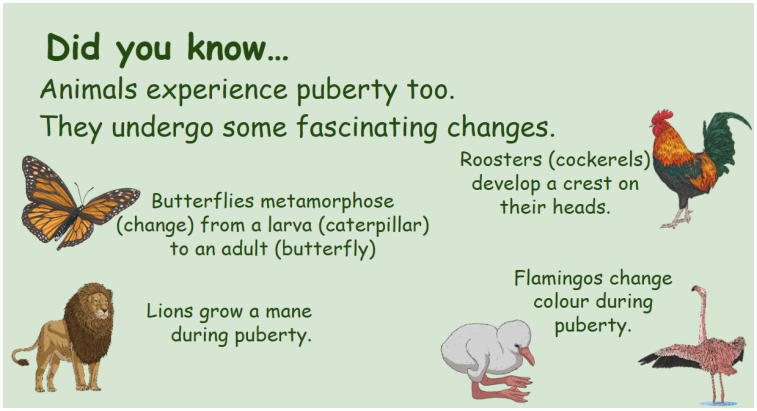
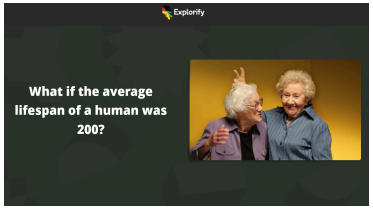
(Slide 12) Answers to worksheet/labelled diagram.

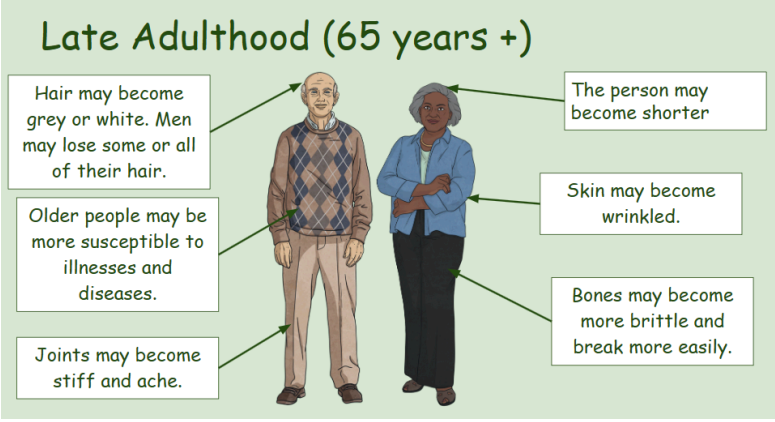


(Slide 13-19) Science behind puberty - opportunity to discuss why these changes occur in boys/girls during puberty.
If completing the worksheet, pause to give children time to answer the questions:

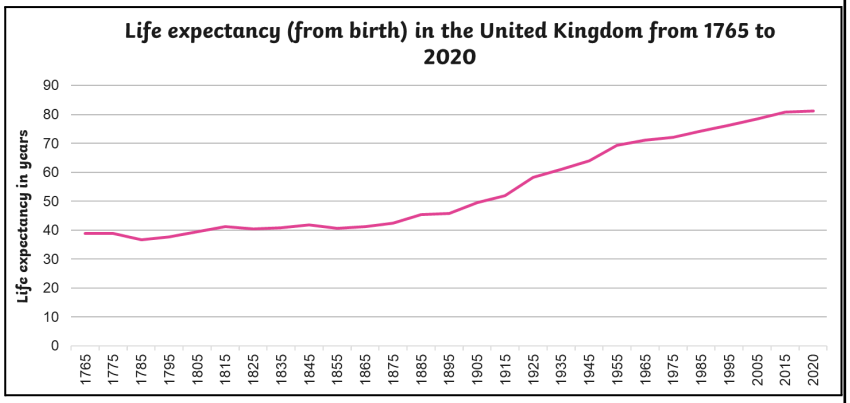
1. Name two changes the both boys and girls experience during puberty:
2. How do boys develop differently from girls?
3. How do girls develop differently from boys?
4. Why does puberty occur?
5. Which changes are the most important?

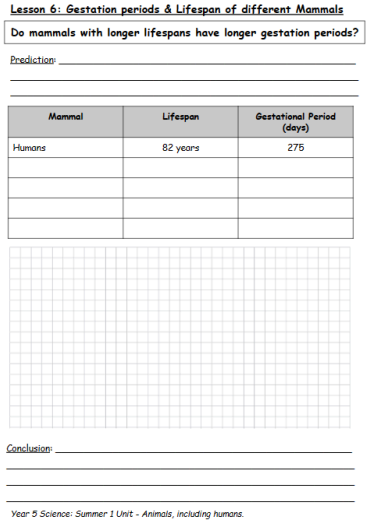
(Slide 20) Did you know? Fascinating facts about changes other animals go through during puberty.

			 (Slide 21-22) Plenary: Quiz Questions - matching worksheet questions. Give children a chance to answer questions before going through the answers (Slide 21)		
5	**WALT:** identify the changes that take place during adulthood and old age. **Resources:** • Graph paper (see shared file) **Scientific Enquiry Skills:** Identifying, Grouping and Classifying	By adulthood, Puberty has finished by adulthood and an the body is fully developed. Humans are at their peak physical fitness during early adulthood. During late adulthood (65 years +) health and fitness deteriorates. A healthy, active lifestyle can delay the onset of old age.	Once again, this area will need to be treated with care as we discuss lifespans raising thoughts or discussions on death of someone who is in late adulthood. Some children might have recently lost grandparent/great grandparent, or have elderly relations in poor health. (Slide 2-3) Starter: Quick Quiz with answers (Slide 4) Big Question: The average lifespan of a human was 200? - Explorify  In pairs, discuss what might be a Plus, Minus and Interesting way to think about the "What is the average lifespan of a human was 200? They could think about: • *What are some of the changes as humans develop to old age?* • *What further changes might occur if humans lived to 200 years?* • *What impact would a rising population have on the environment?*	(Late) Adulthood Susceptible Illnesses Diseases Brittle Calcium Elasticity Cartilage	At what age do you reach adulthood? When does late adulthood start? Why do people in late adulthood appear to shrink? Why do people in late adulthood have wrinkles/stiff joints/brittle bones?

			Oracy - paired talk - Purpose - generate ideas and opinions (Slide 5) Adulthood - discuss the question: How are adults different to adolescents? Get children to answer on a whiteboard before showing some examples of answers. (Slide 6) Late Adulthood changes Get children to think about what changes they have noticed in someone aged 65+. They could draw a person aged 65 years + on their whiteboard and label it with physical changes that happen in later life. (Slide 7) Late Adulthood change answered - click to find out some key physical changes that occur during this period of the Human lifecycle. Get children to suggest other ideas too.  (Slide 8-12) Science behind Ageing - Opportunity to discuss why these changes occur as well as ways for you to prevent or delay these changes by making important lifestyle changes earlier in		Why are people in late adulthood more susceptible to illness and disease? How can an individual delay the physical changes that occur in late adulthood?

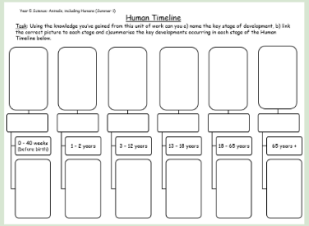
			life. (Slide 13) Optional Video - What happens when you age? - BBC Reel click on the link to watch the video showing the work of the Massachuttes Institute of Technology in developing products to support someone in late adulthood go about their daily lives.  (Slide 14) - Design a leaflet/poster - Children can create an informative poster/leaflet designed for humans in the late adult stage of their lifespan informing them on how they can stay fit and healthy and deter the physical changes that happen during this period. You may want to talk about: • Older adults should follow a healthy, nutritious diet, which may help combat bone brittleness. • Older adults should continue to enjoy exercise in a safe way. • Older adults may need to be careful to avoid falls if their bones have become more brittle. • Older adults should continue to enjoy hobbies and have active and fulfilling lives. (Slide 15) Re-visit the Big Question: The average lifespan of a human was 200? - Explorify • *Has their opinion changed following the lesson? Why? Why not?*		

			(Slide 16-17) Plenary Quiz questions with answers		
6	**WALT:** assess our knowledge on animals, including humans. **Resources:** • Worksheets printed • print out of quiz (see shared drive) • optional chromebooks - if doing own research **Scientific Enquiry Skills:** Identifying, Grouping and Classifying, Research	Human life expectancy has increased due to improved healthcare, hygiene, living conditions, understanding of health living and diet and better access to food and water. The eight distinct stages of the human life cycle are: prenatal, infancy, childhood, adolescence, adulthood, late adulthood.	(Slide 2-3) Starter: Quick Quiz with answers (Slide 4-7) Introduce Life Expectancy - discuss data on graph provided.  (Slide 6) Oracy: *Why do you think the life expectancy of humans has increased?* Get students to discuss in small groups and share answers. (Slide 7) Answers for increased Life Expectancy - discuss with children and compare to their ideas. See Teachers notes for more detail: Medicine has improved over the years, meaning that more illnesses and health conditions are treatable and that people live longer. Living conditions have also improved, with much better access to food and water. Humans now have a better understanding of diet, hygiene and	Life expectancy Lifespan Prediction Research Graph Anomaly Conclusion Human timeline	Why do humans have a greater life expectancy now than 100 years ago? Do mammals with longer lifespans have longer gestation periods? Can you name all the key stages of the human life cycle? Can you identify key developments in each stage of the human lifecycle?

			healthy living, meaning we can keep ourselves healthier for longer. (Slide 8 - 13) <u>Main Research Task</u>: Do mammals with longer lifespans have longer gestation periods? Children are going to do some research to answer the question above. The research required is saved in the shared folder or children can do their own research using chromebooks (be careful as average lifespan and gestation slightly can vary depending on the site used). Hand out worksheet (1 per child) - see shared folder - and get them to fill it in as you go through the slides. 1. Make a prediction 2. Complete the table - using research/fact files 3. Draw a graph to show your data 4. Check for anomalies 5. Write a conclusion for your results.  Lesson 6: Gestation periods & Lifespan of different Mammals Do mammals with longer lifespans have longer gestation periods? Prediction: _____ Mammal | Lifespan | Gestational Period (days) Humans | 82 years | 275 Conclusion: _____ Year 5 Science: Summer 1 Unit - Animals, including humans. (Slide 14-) End of Unit Quiz: Re-create the Human Timeline Children are given a hand out sheet - see shared folder - to complete labelling the stages of the lifespan with key developments in that stage. There are various scaffolded options - choose the one that would best suit your classes needs.		

Task: Stages of Human Growth and Development Activity Sheet

1. Using the worksheets available and the knowledge you have gained from this unit, complete the Human Timeline.



Mark the work in class.
Stick the sheet in books when complete.

(Slide 19) Plenary Quiz and Answers

Plenary Quiz

Link the key term to the definition:

Key word	Definition
Gestation	A developing offspring from embryo (approximately 9 weeks) til birth.
Fertilisation	To produce offspring.
Reproduce	The period of time between fertilisation and birth i.e; the length of pregnancy.
Foetus	The period of physical change that happens during adolescence.
Hormones	The process of the male (sperm) and female (egg) sex cells fusing together.
Puberty	Your body's chemical messengers that control puberty.