# Year 5 - Animals including humans

**NB –** This unit of study will need to be taught in conjunction with the school's sex education policy. This unit involves the children learning about the changes in the human body, including puberty.

**Reference to the Programme of Study 2014**

Pupils should be taught to:

- Describe the changes as humans develop from birth to old age.

**The learning journey: Animals including humans**

| Year group | Statutory Requirements from the Programme of study |
|---|---|
| 1 | • Identify and name a variety of common animals that are birds, fish, amphibians, reptiles and mammals<br>• Identify and name a variety of common animals that are carnivores, herbivores and omnivores.<br>• Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles and mammals, and including pets).<br>• Identify, name draw and label the basic parts of the human body and say which parts of the body is associated with each sense. |
| 2 | • Notice that animals, including humans, have offspring which grow into adults<br>• Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)<br>• Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. |
| 3 | • 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<br>• Identify that humans and some animals have skeletons and muscles for support, protection and movement. |
| 4 | • Describe the simple functions of the basic parts of the digestive system in humans<br>• Identify the different types of teeth in humans and their simple functions<br>• Construct and interpret a variety of food chains, identifying producers, predators and prey. |

| | |
|---|---|
| 5 | • Describe the changes as humans develop from birth to old age. |
| 6 | • Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood<br>• Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function<br>• Describe the ways in which nutrients and water are transported within animals, including humans. |

**How the children should learn science at Upper Key Stage 2**

The principal focus of science teaching in Upper Key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At Upper Key Stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

**Suggestions for Working Scientifically**

Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.

**Further guidance**

These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are **not** expected to cover each aspect for every area of study.

**Planning enquires**. Children should plan different types of enquiry to answer questions.

**Identifying variables**. Children should recognize and control variables where necessary.

**Secondary sources.** Children should recognize when secondary sources will be most useful to research their ideas and begin to separate opinion from fact.

**Using equipment**. They should choose the most appropriate equipment. Children should take measurements, using a range of scientific equipment with increasing accuracy and precision.

**Collecting data.** They should make their own decisions about what observations to make, what measurements to use, and how long make them for.

**Recording. They should choose how to record data.** Children should record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs. They should report and present findings from enquires, including conclusions, causal relationships and explanations of results (in oral and written forms).
**Analysing data**. Children should use test results to make predictions to set up further comparative and fair test. They should use simple models to describe scientific ideas. They should identify scientific evidence that has been used to support or refute ideas or arguments.
**Making Improvements**. They should use their results to identify when further tests and observations might be needed

## Preparation for this unit of study

- Consult the school's sex education policy.

## Resources

- Photos of different stages of human development
- Secondary sources showing the gestation period of animals and their masses as adults.
- Measuring tapes

## Key vocabulary

Gestation

Fetus

Fertilisation

Species

Baby

Toddler

Adolescent

Adult

Elderly person

Puberty

Hormones

Pituitary gland

Testosterone

Estrogen

## Key information for teachers

**Gestation**

For mammals the **gestation period** is the time in which a fetus develops, beginning with fertilization and ending at birth. The duration of this period varies between species.

**Puberty**

Usually, puberty starts between ages 8 and 13 in girls and ages 9 and 15 in boys. When a child's body is ready to begin puberty, their pituitary gland (a pea-shaped gland located at the bottom of your brain) releases special hormones. Depending on whether they a boy or a girl, these hormones go to work on different parts of the body. For boys, the hormones travel through the blood and tell the testes, the two egg-shaped glands in the scrotum, to begin making testosterone and sperm. Testosterone is the hormone that causes most of the changes in a boy's body during puberty. In girls, these hormones target the two ovaries, which contain eggs that have been in the girl's body since she was born. The hormones cause the ovaries to start making another hormone, called estrogen. Together, these hormones prepare a girl's body to start her periods and be able to become pregnant someday. Boys and girls both begin to grow hair under their arms and their pubic areas (on and around the genitals). Eventually, boys also start to grow hair on their faces. Children will also have a growth spurt that lasts for about 2 to 3 years. When that growth spurt is at its peak, some children grow 10 or more centimeters in a year.

Children's bodies also fill out and change shape during puberty. A boy's shoulders will grow wider and his body will become more muscular. In addition, boys' voices crack and eventually become deeper, their penises grow longer and wider, and their testes get bigger. Girls' bodies usually become curvier. Their hips get wider and their breasts develop, starting with just a little swelling under the nipples.

Another thing that may come with puberty is acne, caused by all the hormones at work in the body. Also, as children enter puberty, the puberty hormones stimulate the glands in their skin, including the sweat glands under their arms. When sweat and bacteria on their skin get together, it can smell pretty bad.

**Becoming old**

As you get older, your skin wrinkles because it becomes thinner and less elastic. It gets drier too as it makes less oil and sweat. Your bones become more visible as you store less fat beneath your skin. Inside the body your bones and muscle become weaker. Your memory gets worse, and your immune system cannot fight disease as easily.

Your body is made up of around 100 million million cells. Some of them, including brain cells, are rarely replaced. Others are constantly replaced, as existing cells multiply to make new ones. However, each cell can only multiply a certain number of times before it dies. As more cells are lost or damaged, you start to show signs of ageing. For example, the fewer skin cells you have, the thinner your skin becomes.

Hormones are your body's chemical messengers. One, called growth hormone (GH), controls bone growth and protein production. GH seems to play a crucial role in ageing: you stop making it somewhere between the ages of 60 and 90. Replacement GH may one day be used to counter some effects of old age, just as some women today use hormone replacement therapy (HRT).

Notes and guidance from the Programme of Study 2014 are indicated in blue.

**Key Scientists**

**Professor Robert Winston (1940 - )** – contemporary scientist

<table>
<tr><th>Learning Expectations</th><th>Possible Tasks</th><th>Resources</th></tr>
<tr>
<td>To be able to describe the changes as humans develop from birth to old age.<br><br>To be able to raise different types of questions (non-statutory).</td>
<td>Hooking the children<br>Drama – Create a scenario for the children whereby aliens have made contact with us. They have been secretly visiting the same houses on Earth over a period of many years. They now want to know what happened to some of the ‘small people’ that they saw 80 years ago. They are a little confused, as on their planet they are born a certain size and shape, and then they stay like this until they finally die.<br><br>Discuss with the children the main stages of human growth. These should include: baby, toddler, child, adolescent, adult and elderly person.<br><br>Recording<br>The children could draw and label the main stages of human growth using a timeline. They could use this recording to help explain to the ‘aliens’ the main stages.<br><br>Raising questions<br>At this point it could be worth asking the children to come up with questions that they might have about the change s that they have recorded. They might want to know what causes the changes, and maybe how quickly the changes happen.</td>
<td>• Photos of different stages of human development</td>
</tr>
<tr>
<td>To be able to describe the changes as humans develop from birth to old age.<br><br>To be able to communicate data using a scatter graph.<br><br>To be able to present conclusions.</td>
<td>Research – How long are the gestation periods of different animals?<br>Explain to the children what ‘gestation’ means.<br>If possible, allow the children to use books and websites to find out about the gestation periods of different animals. Alternatively, provide the children with the table below:
<table>
<tr><th>Animal</th><th>Gestation period (days)</th><th>Animal</th><th>Gestation period (days)</th></tr>
<tr><td>Human</td><td>266</td><td>Cow</td><td>284</td></tr>
<tr><td>Hamster</td><td>16</td><td>Sheep</td><td>150</td></tr>
<tr><td>Cat</td><td>63</td><td>Pig</td><td>114</td></tr>
</table>
</td>
<td>• Secondary sources showing the gestation period of animals and their masses as adults.</td>
</tr>
</table>

| Learning Expectations | Possible Tasks | Resources |
|---|---|---|

To be able to use evidence to refute or support an idea.

| | | | |
|---|---|---|---|
| Grey squirrel | 44 | Mouse | 21 |
| Rabbit | 31 | Horse | 336 |

Gestation period of humans compared to other animals can be found on many websites, including:

http://www.vaughns-1-pagers.com/biology/gestation-periods.htm

http://www.factophile.com/show.content?action=view&pageid=6

Recording

The children could either create their own table showing similar information to the one above, but clearly ordering the animals according to the lengths of the gestation periods, or they could have a copy of the table above and number the animals according to the length of the gestation periods.

**Pattern-seeking – Is their a relationship between the mass of adult animal and the length of the gestation period?**

**Research** – The children could either research the mass of adult animals, or use the information below.

| Animal | Mass (Kg) | Animal | Mass (Kg) |
|---|---|---|---|
| Human | 70 | Cow | 753 |
| Hamster | 0.2 | Sheep | 100 |
| Cat | 4 | Pig | 250 |
| Grey squirrel | 0.6 | Mouse | 0.1 |
| Rabbit | 1 | Horse | 450 |

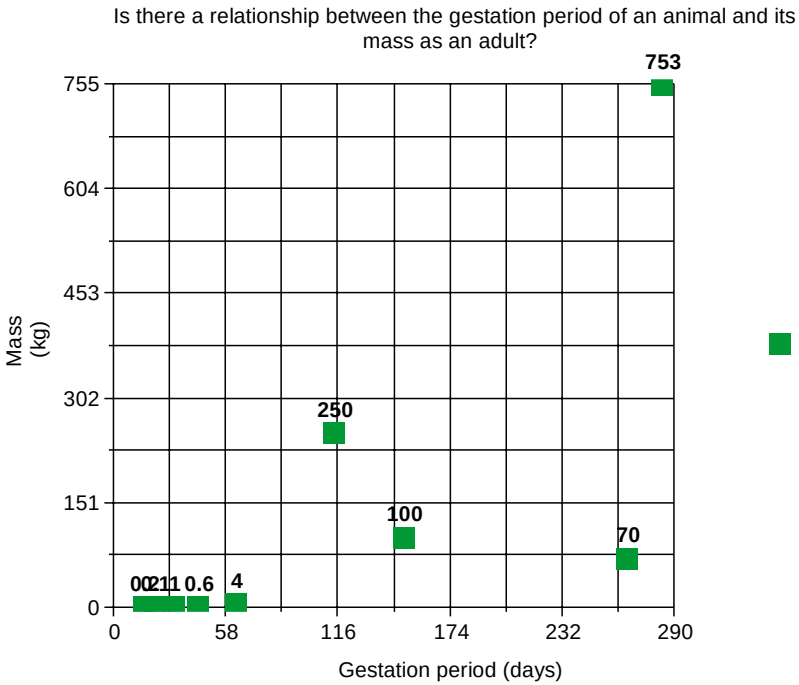
**Recording**

The children could either draw or use a piece of software to produce a scatter graph; plotting the

| Learning Expectations | Possible Tasks | Resources |
|---|---|---|

gestation period of an animal against its mass.
http://nces.ed.gov/nceskids/createagraph/default.aspx

The graph will probably look similar to the one below:



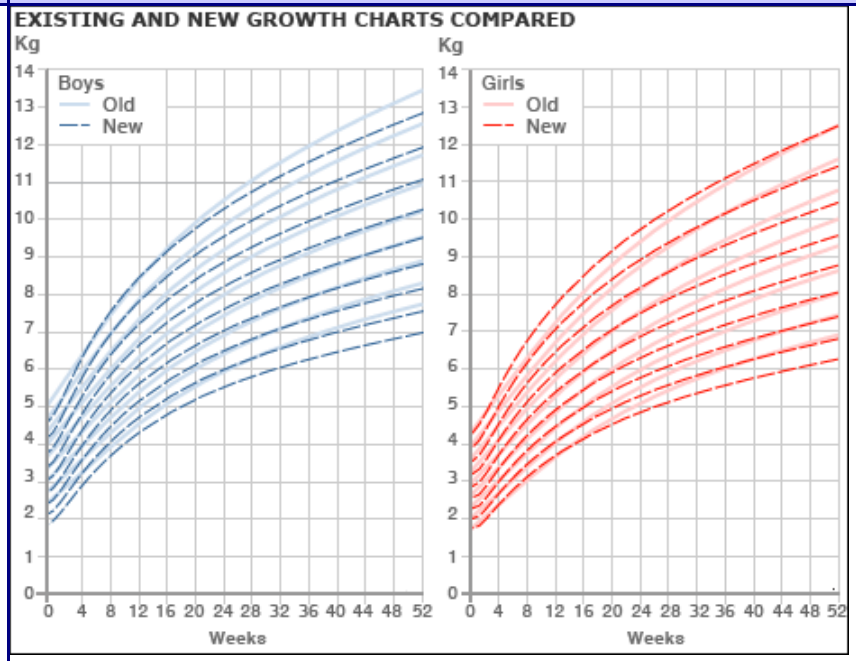

**Developing a conclusion**

**Recording**

The children might be able to draw a best fit line through their graph. They should have an opportunity to write ay relationship that they have discovered. They could then use their graphs to predict the gestation periods of animals that are of a particular mass. Finally, they could use secondary sources to find out whether their predictions are close.

| Learning Expectations | Possible Tasks | Resources |
|---|---|---|
| | **Further research**<br>The children could research broader; finding the gestation periods and mass of a range of animals, including some of the largest ones on the planet | |
| To be able to describe the changes as humans develop from birth to old age.<br><br>To be able to record data within tables.<br><br>To be able to present conclusions.<br><br>To be able to use evidence to refute or support an idea. | Data analysis – How does the weight of a baby change?<br>Hook – In 2009 a new chart on baby growth was introduced. These new charts are based on the advice that babies should be breast fed for 6 months and then supplemented with food for another 6 months. The older charts were based on formula-fed babies. This could mean that more children in the last few years will be classified as overweight.<br>The newspaper report of this event can be found at:<br>http://news.bbc.co.uk/1/hi/health/8035784.stm<br><br>The two charts are shown below: | • |

| Learning Expectations | Possible Tasks | Resources |
|---|---|---|




Ensure that children have a real sense of what the different masses feel like. Allot them to hold different amounts of mass; possibly starting around 2Kg and going up to 14kg.

You could ask the children to use the graphs to complete the table below (Choices about the babies' mass and their ages now have been completed for boys 'A', 'B' and 'C'. Children can decide on their own for boys 'D' and 'E') The children could also make their own table for the girls. The children could then make up scenarios of babies of different ages having a variety of masses, and then use the charts to decide whether they are a healthy mass.

<table>
<tr><th>Learning Expectations</th><th>Possible Tasks</th><th>Resources</th></tr>
<tr><td></td><td>
<table>
<tr><td>Boy</td><td>Mass at birth (Kg)</td><td>Age now (weeks)</td><td>Expected mass using old chart (Kg)</td><td>Expected mass using new chart (Kg)</td><td></td></tr>
<tr><td>A</td><td>4.5</td><td>8</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td>3</td><td>20</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td>2</td><td>40</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Recording<br>Ask the children to write various statements about the babies that they have created, relating it to both of the growth charts. For example, ‘If boy ‘A’ was 2 Kg when he was born, then, according to both growth charts, he would probably be overweight if he was 11Kg when he was a year old.’
</td><td></td></tr>
<tr><td>To be able to describe the changes as humans develop from birth to old age.<br><br>To be able to record data using line graphs.<br><br>To be able to present conclusions.</td><td>Data analysis – How does the length of a baby change over time?<br>Provide the children with the table below. Ask them to transfer this information into a line graph; plotting the length of the baby over time.<br>Source – World Health Organisation<br><br>
<table>
<tr><td>Age of baby (months)</td><td>Boy length (cm)</td><td>Girl length (cm)</td></tr>
<tr><td>Birth (0)</td><td>48.5 – 51.0</td><td>48.0 – 50.3</td></tr>
<tr><td>3</td><td>59.9 – 62.7</td><td>58.4 – 61.2</td></tr>
<tr><td>6</td><td>66.3 – 69.0</td><td>64.2 – 67.3</td></tr>
<tr><td>9</td><td>70.3 – 73.4</td><td>68.6 – 71.9</td></tr>
</table>
Using their line graphs, the children could work out the probable length of babies when they are 4 months, 7 months, etc</td><td>•</td></tr>
</table>

| Learning Expectations | Possible Tasks | Resources |
|---|---|---|
| To be able to describe the changes as humans develop from birth to old age.<br><br>To be able to plan an enquiry that will answer a scientific question. | **Survey – What is the height of children of different ages?**<br><br>The children must decide what type of enquiry this is (i.e. a survey).<br>The children could decide how to do this scientific enquiry. They could make decisions as to the ages of children that they want to include in their survey, the number of children from each age that they will measure, and the method by which they will display their findings. | • Measuring tapes |
| To be able to describe the changes as humans develop from birth to old age. | **Puberty – What happens to the human body during puberty?**<br><br>This is obviously an area that will need to be covered with great care as it is something that will be affecting some of the children. You will also need to take into consideration the school's policy on sex education.<br><br>To supplement the learning it might be wise to provide resources that the children can read in their own time. The NHS has recommended the following on their website: 'What's happening to me?' (girls) and 'What's happening to me?' (boys), published by Usborne Children's Book,. These are two books about puberty that are ideal for children aged nine and above.<br><br>Other resources that could be used to help children understand puberty better can be found linked to the NHS website - http://www.nhs.uk/Livewell/puberty/Pages/Pubertyinfoforchildren.aspx<br><br>A short video of children talking through puberty can be found at: http://www.nhs.uk/Livewell/puberty/Pages/pubertyhome.aspx<br><br>**Recording**<br><br>The children could draw their own information posters for older children who have reached puberty. The posters could explain the changes that are likely to happen to them. | • |

| Learning Expectations | Possible Tasks | Resources |
|---|---|---|
| To be able to describe the changes as humans develop from birth to old age. | **Research - Becoming old – What happens to adults as they become older?**<br>Once again, this area will need to be treated with care, as some children might have recently lost grand parent/great grandparent, or have elderly relations in poor health.<br>In order to encourage children to recognise the parts of the body that change as you get older, visit the science museum website and click on the ear. A few short videos will show how features such as the ear and nose change as adults become older. http://www.sciencemuseum.org.uk/whoami/findoutmore/yourbody/whatisageing/whathappensasyouage.aspx<br>**Recording**<br>Linking back to the 'aliens', the children could be asked to draw them a poster that clearly shows the things about the human body that change as adults become old. | • |

# Year 5 – Animals including humans

## Assessing children's knowledge and understanding of the nature, processes and methods of science

| Learning expectation | Group 1 (lower ability) | Group 2 (average ability) | Group 3 (higher ability) | Comments |
|---|---|---|---|---|
| To be able to describe the changes as humans develop from birth to old age. | | | | |
| To be able to raise different types of questions (non-statutory). | | | | |
| To be able to communicate data using a scatter graph. | | | | |
| To be able to present conclusions. | | | | |
| To be able to use evidence to refute or support an idea. | | | | |
| To be able to record data within tables. | | | | |
| To be able to record | | | | |

| | | | | |
|---|---|---|---|---|
| data using line graphs. | | | | |

| **Children <u>below</u> the learning expectations** | **Children <u>above</u> the learning expectations** |
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