



# Mendell Primary School

Aspire Challenge Achieve

## Medium Term Plan Science

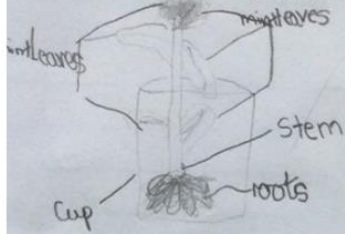


<b>Year Group:</b> 5	<b>Term:</b> Summer 1	<b>Teacher:</b> Miss Keelan	<b>Subject lead:</b> Sarah Bride	<b>Overview:</b> Living Things and their Habitats	<b>Key End Points:</b> By the end of this unit children will be able to:		
<b>Common Misconceptions:</b> <b>Some children may think:</b> <ul style="list-style-type: none"> <li>all plants start out as seeds</li> <li>all plants have flowers</li> <li>plants that grow from bulbs do not have seeds</li> <li>only birds lay eggs.</li> </ul>		<b>Unit key Vocabulary:</b> Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings		<ul style="list-style-type: none"> <li>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> <li>Describe the life process of reproduction in some plants and animals.</li> </ul> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="background-color: #e91e63; color: white; padding: 2px; font-size: 8px;"> <b>Observation over time</b>  <small>Observing changes that occur over a period of time ranging from minutes to months.</small> </div> <div style="background-color: #0070c0; color: white; padding: 2px; font-size: 8px;"> <b>Comparative / fair testing</b>  <small>Changing one variable to see its effect on another, whilst keeping all others the same.</small> </div> <div style="background-color: #70ad47; color: white; padding: 2px; font-size: 8px;"> <b>Research</b>  <small>Using secondary sources of information to answer scientific questions.</small> </div> <div style="background-color: #e91e63; color: white; padding: 2px; font-size: 8px;"> <b>Identifying, grouping and classifying</b>  <small>Making observations to name, sort and organise items.</small> </div> <div style="background-color: #0070c0; color: white; padding: 2px; font-size: 8px;"> <b>Pattern-seeking</b>  <small>Identifying patterns and looking for relationships in enquiries where variables are difficult to control.</small> </div> </div>	<ul style="list-style-type: none"> <li>Describe the life cycles of a bird, amphibian and or insect.</li> <li>Compare the life cycles of 2 of the above</li> <li>Explain how offspring are produced e.g. live, eggs</li> <li>Explain how some young undergo a further change before becoming adults – metamorphosis</li> <li>Describe the sexual reproduction of animals</li> <li>Describe the sexual reproduction of plants</li> <li>Describe the asexual reproduction of plants</li> <li>Explain the difference between asexual and sexual reproduction in plants</li> <li>Give examples of plants that reproduce in both ways</li> </ul>		
<b>Links to other learning:</b>	<b>Prior Learning:</b> <ul style="list-style-type: none"> <li>Notice that animals, including humans, have offspring which grow into adults. <b>(Y2 - Animals, including humans)</b></li> <li>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. <b>(Y3 - Plants)</b></li> </ul>	<b>Future Learning:</b> <ul style="list-style-type: none"> <li>Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. <b>(KS3)</b></li> <li>Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. <b>(KS3)</b></li> </ul>	<b>High Quality Text:</b> <a href="#">Charlotte's Web</a> by E.B. White <b>Scientist to study:</b> David Attenborough - links to free resources requiring a login (Naturalist & TV Presenter James Brodie of Brodie (Reproduction of Plants by Spores)	<b>Risk Assessment/Health and safety</b>  Handling flowers and pollen.	<b>Teacher CPD:</b>  PLAN ASE Shannon Unit of work.  Reach Out CPD - <a href="https://www.reachoutcpd.com/">https://www.reachoutcpd.com/</a> sign up for free.		
<u>Learning Intention</u>	<u>Lesson Outline</u> (Key Questions in colour)			<u>Resources</u>	<u>Vocabulary</u>	<u>Lowest 20% Adaptations</u>	


1	<p>L.I. I can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways.</p>  	<p><b>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and recording information.</b></p> <p>Complete vocabulary check as pre assessment – repeat at the end of the unit.</p> <p>Prior learning/pre assessment thought shower children will add to this at the end of the unit – <b>what do you already know about living things and their habitats?</b></p> <p>Use the following questions to prompt the children who struggle to recall prior key learning.</p> <p><b>What is a plants lifecycle?</b>  <b>How do humans and animals change over time?</b>  <b>What habitats can you name? What animals life there and why?</b></p> <p><b>What do you already know about plants and their life cycle?</b></p> <p><b>Explorify:</b> <a href="https://explorify.uk/en/activities/whats-going-on/growing-seed">https://explorify.uk/en/activities/whats-going-on/growing-seed</a></p> <p><b>What parts of a plants life cycle are shown? Can you name all four stages?</b> (y3 prior learning)</p> <p><b>How do all plants begin their life cycle? – as a seed or bulb.</b></p> <p><b>What do we call that stage when a seed begins to grow? – germination</b></p> <p><b>What do seeds need to germinate?</b></p> <p><b>Word of the week:</b> asexual and sexual plant reproduction.</p> <p><b>Big Question: How do plants reproduce?</b></p> <p>Many plants reproduce by developing <b>seeds</b>.</p> <p>Seeds will <b>germinate</b> provided they have the appropriate conditions, e.g. enough water and warmth. This stage of the life cycle is called <b>germination</b>. <b>Roots</b> grow first, followed by a <b>shoot with leaves</b>.</p> <p>Read this section of BBC bitesize and watch the video clip.  <a href="https://www.bbc.co.uk/bitesize/topics/zgssgk7/articles/zyv3jty">https://www.bbc.co.uk/bitesize/topics/zgssgk7/articles/zyv3jty</a></p> <ul style="list-style-type: none"> <li>• <b>What are the main life cycle stages for a flowering plant?</b></li> <li>• <b>How are non-flowering plants different?</b></li> </ul> <p>Explain that this is known as sexual reproduction: <b>Sexual plant reproduction</b> is when a plant reproduces by forming seeds or spores.</p> <p>Now compare this to asexual reproduction using the PowerPoint resource: <b>Asexual plant reproduction</b> is when a plant reproduces by making a copy of the parent plant. Share examples from the PowerPoint about bulbs, tubers, runners and side shoots.</p> <p>Task 1: ask the children to create a detailed diagram of an asexual plants reproductive cycle and a sexually plant reproductive cycle. Children may wish to choose a plant that can reproduce in both ways and show how on their reproductive cycle diagram.</p>	<p>Vocabulary list, PowerPoint, clear plastic cups, mint plant.</p>	<p><b>Asexual plant reproduction, bulb, tuber, runner, sexual plant reproduction, germination, pollination, fertilisation.</b></p>	
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Task 2: show the children how to take cuttings from a mint plant and put them in water. explain that they will observe what happens over the next few weeks and record their findings.  
 End result: make observations each week and complete this example on lesson 4 or 5 depending on time.

Draw a labelled diagram of one of the mint cuttings now below.



**Taking cuttings of mint**



**New beginnings**  
 Take a closer look at this eve object by zooming in and out differently.

You can grow mint from seed but most gardeners take cuttings. Why do you think this might be?



Maybe "so they can grow them quicker and so it is easier for the farmers. ~~the~~ gardeners to plant

2 L.I. I can explain how flowering

**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and recording information.**

For a flower dissection you will need a flower with

**Sexual reproduction, stamen,**

<p>plants are pollinated in different ways. Identify the different parts of a flower which are involved in pollination.</p>  	<p><b>Prior learning:</b>  <b>What type of reproduction is seed or spore formation? – sexual</b>  <b>What is asexual plant reproduction?</b>  <b>What is the lifecycle of a plant?</b></p> <p><b>Big Question: what parts of a flowering plant are involved in pollination?</b></p> <p><b>What do we already know about pollination?</b> – children should recall examples of insect pollinators from Year 3</p> <p>Talk or think about what you already know about pollen. Watch these two clips. <a href="https://www.bbc.co.uk/programmes/p00lx94l">https://www.bbc.co.uk/programmes/p00lx94l</a></p> <ul style="list-style-type: none"> <li>• Which type of tree has catkins?</li> <li>• What happens to the pollen?</li> </ul> <p><a href="https://www.bbc.co.uk/programmes/p006997b">https://www.bbc.co.uk/programmes/p006997b</a></p> <ul style="list-style-type: none"> <li>• Why do some people get hay fever?</li> </ul> <p>Using the PowerPoint resource share with the children how many flowering trees and grasses are pollinated by wind. Introduce the male and female parts at this point.</p> <p><b>What other ways we know pollination occurs?</b> – insects – share the PowerPoint information. Now watch the following clip. Ask the children to jot down any differences they notice between insect pollination and the wind pollination.  <a href="https://www.bbc.co.uk/bitesize/clips/zfx76sg">https://www.bbc.co.uk/bitesize/clips/zfx76sg</a></p> <p>The children may notice the following:  Many <b>insect-pollinated</b> flowers:</p> <ul style="list-style-type: none"> <li>• have brightly coloured petals that attract insects.</li> <li>• produce nectar that insects feed on.</li> <li>• have a central <b>stigma</b> (sticky tip of the female part of the flower) surrounded by several <b>stamens</b> (the male part of the flower).</li> </ul> <p>Many <b>wind-pollinated</b> flowers of grasses or trees:</p> <ul style="list-style-type: none"> <li>• have dull colours and do not produce nectar.</li> <li>• have feathery stigmas and hanging stamens.</li> </ul> <p>Investigating insect pollinated plants: Task 1:  Allow the children time to go out onto the school field and observe the flowering plants that grow on school grounds. The children can take pictures of two types of plants and consider the following questions:  <b>What colour and shape are the petals? Can you see both a stigma and stamen?</b> The children can also use their iPad to identify the plant either using the Seek APP or recommended websites on the PowerPoint resource. Children can make notes back in class of their observations see example below:</p>	<p>clearly visible male and female parts such as a tulip, lily or daffodil.</p>	<p><b>stigma, pollination.</b></p>	
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**Possible learning outcome:** I can conduct a survey of flowers and compare different flowers.  
 "I found seven different plants with flowers: primrose, forget-me-not, bluebell, daisy, cowslip, cow parsley and a plant with small white flowers called greater stitchwort (I found the name using Seek app)."

Comparing the primrose and the forget-me-not.



"Some of the primroses had pink and dark yellow petals, others had light and dark yellow petals."

"The primrose and forget-me-not had the same shape of flower with a tiny hole in the centre of the petals. It was hard to see the stigma and stamens inside the hole."



"The forget-me-not had tiny blue petals with yellow at the centre."

Comparing the greater stitchwort and the bluebell.



"The greater stitchwort had open white petals. I could see yellow stamens and a tiny stigma in the centre of the flower."

"The greater stitchwort and the bluebell had different shaped flowers but they both had visible stigmas and stamens."



"The bluebell had cone-shaped blue petals. I could see about seven long stamens and one stigma in the centre of the flower."

Task 2: provide the children with a tulip, lily or daffodil in pairs and ask them to dissect it and label the different parts of the reproductive system in a flowering plant. **Is there a link to the amount of petals and stamens?**

**Possible learning outcome:** I can identify the different parts of a flower which are involved in pollination.




**Exit pass: Explorify - what if there were no insects?**

3 L.I. I can explain how the seeds of

**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is setting up a simple test, observing, measuring, evaluating the investigation and posing further questions to investigate.**

Some paper, scissors, pencil and a ruler.

**Sexual plant reproduction, seed dispersal**

<p>plants are dispersed in different ways. I can investigate a model for seed dispersal.</p> 	<p><b>Prior learning:</b>  <b>What is the male part of a flowering plant called? – stamen</b>  <b>What is the female part of a flowering plant called? – stigma</b>  <b>What do wind pollinated plants not produce? – nectar</b></p> <p><b>What do you already know about seeds dispersal?</b> – (Y3 prior knowledge wind, animal)  Watch this clip from 'Life of Plants'. <a href="https://www.bbc.co.uk/programmes/p00lxwk5">https://www.bbc.co.uk/programmes/p00lxwk5</a> - <b>How do you think the birdcage plant disperses its seeds?</b> Seeds need to travel away from the parent plant so they can find a new place to germinate. This is called <b>seed dispersal</b>.  Think or talk about different types of seed dispersal you already know about.</p> <p>Watch Explorify: what's going on? Super Seeds – explain to the children there are other ways plants disperse of their seeds. Allow the children 10mins research time to find out if there are any more interesting ways plants disperse their seeds - <a href="https://www.youtube.com/watch?v=aC3pQ9RU9YA">https://www.youtube.com/watch?v=aC3pQ9RU9YA</a> = wind, water, animal drippings, animal fur, bursting. After their research which method of seed dispersal do they think works the best?</p> <p><b>Big Question: what is the best helicopter design to disperse seeds?</b></p> <p>You will be investigating a model seed helicopter to explore how different factors might affect its flight.  <b>Planning your investigation:</b> allow children to make decisions as a group – groups may choose different variables.  Which factors (variables) might affect the flight of your seed helicopter?</p> <ul style="list-style-type: none"> <li>• Length of the wing?</li> <li>• Width of the wing?</li> <li>• Size or weight of the 'seed'?</li> </ul> <p>Choose <b>one factor (variable) to change</b>.  Make three or four different helicopters.  Think about how you are going to <b>collect and record your results</b> to find out which is the best for dispersing your seeds.</p>	<p>Sticky tack / Blu tack or paperclips, stop watch, PowerPoint with helicopter templates for LA.</p>	<p><b>and pollination.</b></p>	
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You may have chosen to investigate the width of the wing or the size of the seed.

You may have tested each helicopter more than once and calculated an average value for the time taken to fall.

You may have noticed the helicopters with smaller wings spin faster. When the wing gets too long it may not spin well, so will fall quickly.

**Possible learning outcome.** I can investigate a model helicopter design for dispersing seeds.

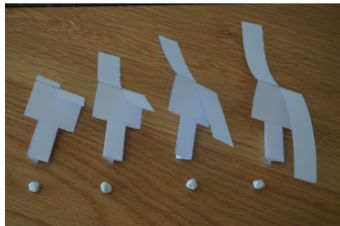
**My question:** Does the wing length of a helicopter affect the time it takes to fall to the ground?

**Planning a fair test:**

I will change the wing length.

I will keep these factors (variables) the same: the width of the wing, the size of the seed and the height of drop.

I will measure the time it takes for each helicopter to reach the ground.



**Results:**

Length of wing (in cm)	Time taken to fall (in seconds)
2	1.02
4	1.32
6	1.98
8	1.97

I found out that my helicopters with longer wings fell to the ground more slowly than those with shorter wings. The 6cm and 8cm wing took about the same time to fall, so I wondered what would happen with an even longer wing.

I made a new helicopter with a 10cm wing length. It did not spin very well and fell to the ground in 1.68 seconds.



I think seed helicopters which fall slowly are more likely to disperse seeds the furthest. In my design, the best helicopters had medium length wings of 6cm and 8 cm because they fell the slowest.

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Encourage children to evaluate their investigation and pose further questions see example: would a longer wing help? Ensure they make a conclusion again see example above.

4

L.I. I can use secondary sources to find out about the life cycles of animals. I can describe some

**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and recording information.**

**Prior learning: what do we already know about how animals reproduce?**

- Which animals lay eggs? (Y1)
- Which animals give birth to live young? (Y1)
- What animal types can you name?

Think or talk about how some animals start their lives and how they change as they grow. (Y2)

**Big Question: how are the life cycles of an insect and amphibian different?**

PowerPoint, iPad.

**Reproduce, sexual reproduction, fertilise, egg, sperm, life cycle and metamorphosis.**

differences between the life cycles of different animals.



Explain that most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg.

Watch this clip: <https://www.bbc.co.uk/bitesize/topics/zgssgk7/articles/z9xb39q>

- In many animals, the egg develops inside the female and they **give birth to live young**. They are called **mammals**. (Humans are mammals too!)
- Most other animals **lay eggs**. These include **reptiles, birds, fish, amphibians** (e.g. frogs and toads) and **insects**.

**Odd one out:** Frog, butterfly and osprey - do they have any similarities or differences? Which is the odd one out? – Children will give a variety of reasons, frog doesn't have wings, osprey's young looks like the parent, all lay eggs. Now watch the following video and ask the children to observe the differences in their life cycles. <https://www.bbc.co.uk/teach/class-clips-video/science-ks2-ks3-the-life-cycles-of-different-organisms/zvh8qp3> - start video at 2mins 3 seconds – stop after Osprey.

Children may have noticed:

Frogs and butterflies have distinct stages in their development. The changes they undergo are described as **metamorphosis**.

Adult birds care for their chicks once they have hatched. The chicks grow gradually into fledglings.

Ensure the children understand the features of an insect: Insects have what we call an exoskeleton or a hard, shell-like covering on the outside of its body. Insects have three main body parts: head, thorax, and abdomen. Insects have a pair of antennae on top of their heads. Insects have three pairs of legs. Insects have two pairs of wings. The caterpillar is a mini-beasts scientific term invertebrate.

**Word of the week:** metamorphosis.

In groups, provide the children with the following websites to conduct greater research on the European common frog and Monarch butterfly to create a comparison table. Model WAGOLL on the board.

frog: <https://www.dkfindout.com/uk/animals-and-nature/amphibians/life-cycle-frog/>

butterfly: <https://www.dkfindout.com/uk/animals-and-nature/insects/butterfly-life-cycle/>

**Example:**



Frogs' eggs need to stay moist, so they are laid in water.

Tadpoles have gills so they can breathe under water. They gradually form lungs so the froglet can breathe air and stay on the land.

A tadpole grows back legs first and then front legs. Gradually their tail gets smaller. They emerge from water as froglets.

**Possible learning outcome for reviewing your work.**

I can compare the life cycle of a frog and a butterfly

Names of animal	European common frog	Monarch butterfly
What do the eggs look like?	• black egg • surrounded by jelly-like coating	• pale green egg • size of a pin head
Where are the eggs laid?	• eggs laid in water	• eggs laid on a leaf.
What is the young called after hatching?	• a tadpole	• a caterpillar (or larva)
What does it feed on at this stage?	• algae • small water animals	• leaves
How does it change (undergo metamorphosis)?	• grows legs • grows lungs • loses its tail • loses its gills	• forms a chrysalis (pupa) • grows wings • grows a body with a head, thorax and abdomen.
How long does it take from egg hatching to adult?	• 14 weeks from tadpole to froglet.	• 14 days as a caterpillar. • 10 days as a chrysalis.

Monarch caterpillars shed their skin five times as they grow. They grow longer and fatter to store up energy for the next stage of their life cycle.

Metamorphosis occurs within the chrysalis or pupa. It is similar for other insects like bees, wasps, beetles and ants. Adults insects all have six legs and three body parts (head, thorax and abdomen.)

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Ask children to use their research to create a detailed diagram of each animal's life cycle.

5

L.I. I can use secondary sources to find out about the life cycles of animals. I can describe some differences between the life cycles of different animals.



**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and recording information.**

**Prior learning:**

- What type of animal give birth to live young?
- What does the word metamorphosis mean?
- What are the six animal groups?

**Big Question: How do different animal life cycles compare with each other?**


Explain not all animals follow the same life cycle. Some have shorter or longer lifecycles, even if they belong to the same animal group.

Today you will research a range of different animals using the links on the PowerPoint resource and iPad research. Think about:

- How long does each animal spend in each stage of the life cycle?
- What is the lifespan of each animal?
- What physical changes occur?
- What are the names of each stage in the life cycle?
- What are the most interesting facts for each stage?

PowerPoint (same as Lesson 5) iPad.

**Reproduce, sexual reproduction, fertilise, egg, sperm, life cycle and metamorphosis.**

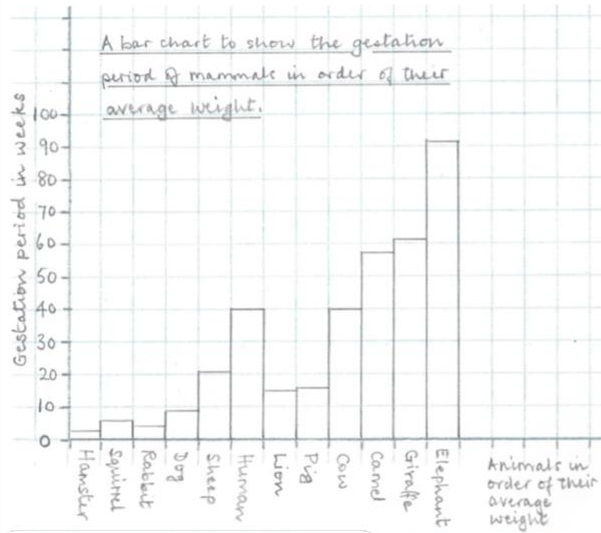
		<p>Instructions for Activity:          Now that you have researched the life cycle of different animals, you can compare them.          Choose two different animals. Use a Venn diagram to compare how they are similar and different, thinking about their life cycles.          Remember that the similarities go in the middle section.          For example, you could...</p> <ul style="list-style-type: none"> <li>• compare a barn owl and a newt</li> <li>• compare a frog and a bee.</li> </ul> <p><b>Extension task:</b> can you compare the lifecycle of two animals within the same animal group e.g. compare a barn owl and a sparrow, compare a bee and a butterfly, or compare a frog and a bee.</p>			
6	<p>L.I. I can compare the gestation period for different mammals and look for patterns.</p> 	<p><b>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is asking question and presenting data.</b></p> <p><b>Prior learning:</b>  <b>What is the reproductive cycle of a flowering plant?</b>  <b>What are the characteristics of a mammal?</b>  <b>What do we already know about the life cycle of mammals?</b></p> <p>Humans and most other mammals give birth to live young.</p> <ul style="list-style-type: none"> <li>• Watch this BBC bitesize clip:  <a href="https://www.bbc.co.uk/bitesize/clips/zpmqxn">https://www.bbc.co.uk/bitesize/clips/zpmqxn</a></li> <li>• <b>How many months does it take for a human baby to develop before it is born?</b></li> <li>• <b>How does this compare to other mammals?</b></li> </ul> <p><b>Word of the week: gestation period</b> - The length of time a mammal is pregnant is known as the gestation period. The gestation period starts when the sperm from the male fertilises the female egg. It finishes when the baby animal is born.</p> <p>Look at this information about the gestation of a baby elephant: <a href="https://www.dkfindout.com/uk/animals-and-nature/mammals/mammals-and-their-young/">https://www.dkfindout.com/uk/animals-and-nature/mammals/mammals-and-their-young/</a></p> <p><b>Big Question: How does the gestation period differ in different mammals?</b></p> <p>Show the children the pictures and gestation periods of a squirrel, pig, camel and giraffe and ask them:  <b>Do you notice a possible pattern about the length of the gestation period and the size of the adult animal?</b>  <b>Do you think a sample of four mammals gives you enough data to be certain?</b>  <b>How might the size of an animal be measured?</b></p>	<p>PowerPoint resource, squared paper.</p>	<p><b>Reproduce, sexual reproduction, fertilises, gestation period, egg, sperm, life cycle, mammal.</b></p>	

Provide the children with information about the average female weight and the gestation period of twelve different mammals. Ask them to:

- Draw a table to order the mammals from smallest to largest by weight.
- Next plot a bar chart showing the gestation period for each mammal, ordered from the smallest to the largest.
- Look carefully to see if there is a pattern and make a note of any unusual results.
- Explain what you have found out from the data you have been given.
- Think about other questions you might now ask.

**Possible learning outcome for reviewing your work.**

I can compare the gestation periods for different mammals and look for patterns.



Gestation period in mammals.

I noticed there was a pattern that the heavier the female mammal, the longer the gestation period. The smallest mammal, a hamster, had a gestation period of two weeks. The largest mammal, an elephant, had a gestation period of ninety two weeks. Not all the animals fitted the pattern. A squirrel is smaller than a rabbit but it has a longer gestation period. The human has a much longer gestation period than a sheep even though they are similar weights.

My questions

Are there other mammals that do not fit the pattern like humans?

Do different breeds of the same animal have the same gestation period?

Does the number of young in one litter make a difference to the gestation period?

Check your bar chart has labelled axes and a title.

Your explanation should recognise the pattern and comment on some of the unusual results.

There are many different questions you can ask about gestation periods.