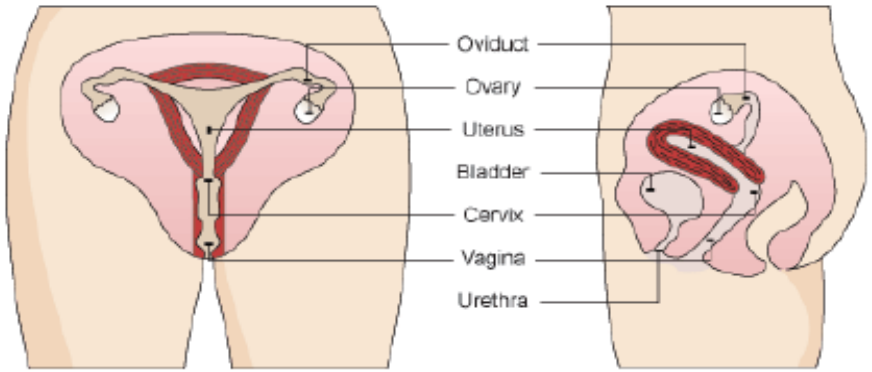
The Thomas Alleyne Academy

Knowledge Organiser - Reproduction and Variation

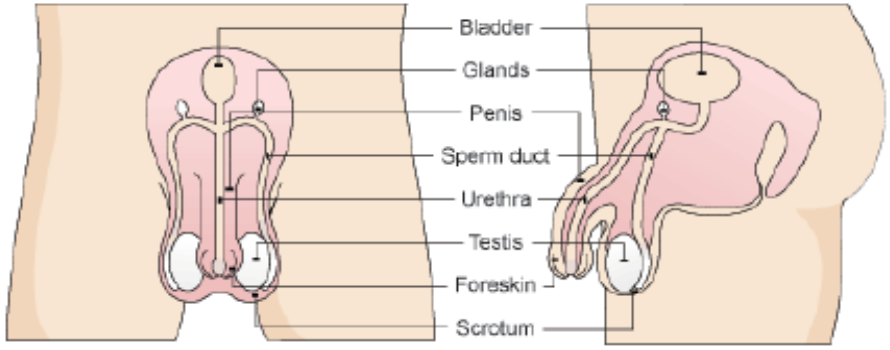
Science Department

KPI 7BR 1: Label the parts of the structure of the male and female reproductive system, and describe their function

Female reproductive system



Male reproductive system



Practice: Cover up the labels in the diagrams, can you remember each organ? What about their functions?

Functions of female reproductive organs

Structure	Function
Ovary	Contain undeveloped gametes (sex cells) called ova (or eggs). Every month, an egg matures and is released from the ovary.
Oviduct	Connects the ovaries to the uterus. Their cells are lined with cilia, tiny hairs that help waft the egg along to the uterus.
Uterus	A muscular bag with a soft lining, this is where an unborn baby develops.
Cervix	A ring of muscle which keeps the baby in place while the woman is pregnant.
Vagina	Muscular tube leading from the cervix to the outside of the woman's body. The vagina is where a man's penis enters during sexual intercourse.

Functions of male reproductive organs

Structure	Function
Testes	To produce gametes (sex cells) called sperm. Also makes male sex hormones.
Penis	Passes urine and semen out of the man's body.
Urethra	Tube inside the penis which carries urine and semen.
Sperm Duct	Sperm passes through these and mix with fluids produced by the glands, creating semen.
Glands	Produce fluids to provide the sperm cells with nutrients.

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KPI 7BR 2 Describe the processes of menstruation and fertilisation, and identify the stages of gestation and birth.

The menstrual cycle

Takes place in the female reproductive system. It involves a cycle of events which last approximately 28 days, stopping if a woman becomes pregnant.

Day 1-5: The uterus lining breaks down. This is called menstruation.

Day 5-14: A female **gamete** (egg cell) matures in one of the ovaries. The uterus lining thickens.

Day 14: The mature egg is released from the ovary. This is known as **ovulation**.

Day 14-21: The egg travels down the oviduct and towards the uterus. The cilia in the oviduct help to waft the egg to the uterus.

Day 21-28: If the egg cell does not meet with a sperm cell in the oviduct, the uterus lining will break down and the cycle will repeat.

Gametes

Gametes are sex cells. Female gametes are known as eggs (or ova). Male gametes are sperm.

Sperm cells are specially adapted for reproduction, can you remember how? (**Tip:** Look at your cells knowledge organiser.)

Fertilisation

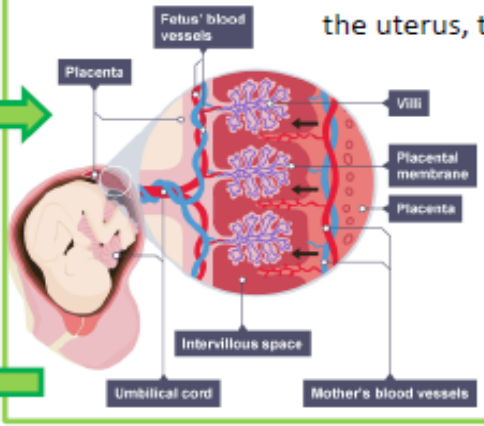
Fertilisation will occur if the egg cell meets and joins with a sperm cell in the oviduct. The fertilised egg attaches to the uterus lining and the woman becomes pregnant. This stops the menstrual cycle, preventing the uterus lining from breaking down.

Birth

At the end of the gestation period the baby is ready to be born. The cervix relaxes and muscles in the wall of the uterus contract. Waves of muscle contraction push the baby out through the vagina.

Gestation

It takes approximately 40 weeks for a baby (foetus) to develop in the uterus, this time is known as gestation.



The placenta is an organ which provides oxygen and nutrients from the mother to the developing foetus. It also helps to remove waste such as carbon dioxide.
The foetus is connected to the placenta by the umbilical cord.

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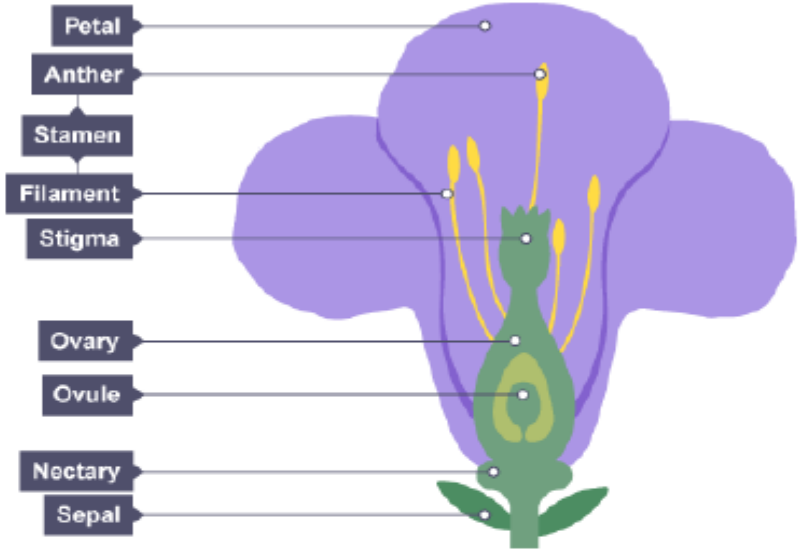
KPI 7BR 3 describe the function of each part of the flower, and explain how pollination occurs

Structure of a flower

The flower is the reproductive organ of many plants



Structure	Function
Sepal	Protects the flower when it is a bud
Petal	These are often colourful to attract insects
Stamen	The male part of the flower (anther and filament)
Anther	Produces male sex cells (pollen)
Filament	Supports the anther
Ovary	Produces female sex cells (ova)
Stigma	Collects pollen grains, this is the top of the female part of the flower

Structure of a flower

Plants reproduce in a process called pollination. Because plants have both male and female reproductive organs , it is possible for a plant to pollinate itself (self-pollination) but this can be problematic as creates little genetic variation between plants.

Cross-pollination is when a pollen from one plant fertilises the ova of another plant. Pollen can be carried between plants by either the wind or insects. Plants have different adaptations depending on the types of pollination they use:

Feature	Insect-pollinated	Wind-pollinated
Petals	Large and brightly-coloured – to attract insects	Small, often dull green or brown – no need to attract insects
Scent and nectar	Usually scented and with nectar – to attract insects	No scent or nectar – no need to attract insects
Number of pollen grains	Moderate - insects transfer pollen grains efficiently	Large amounts – most pollen grains are not transferred to another flower
Pollen grains	Sticky or spiky - sticks to insects well	Smooth and light – easily carried by the wind without clumping together
Anthers	Inside flower, stiff and firmly attached - to brush against insects	Outside flower, loose on long filaments – to release pollen grains easily
Stigma	Inside flower, sticky - pollen grains stick to it when an insect brushes past	Outside flower, feathery – form a network to catch drifting pollen grains

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7BR 4: evaluate different seed dispersal techniques in plants

Seed dispersal: When an ova is fertilised by pollen, a seed forms which will eventually grow into a new plant.
However, plants are constantly in competition with one another for:

- Light
- Space
- Water
- Minerals in the soil

To reduce competition, seeds must be **dispersed** (spread away) from their parent plant. There are several method of seed dispersal used by different species of plants.

Water dispersal

- Some seeds are quite spongy so can float.
- They fall off a plant and into water. They are carried by the current to somewhere else and then wash up, allowing them to grow.

Coconut seeds float so are dispersed by water.

Explosions

- Certain seeds are contained in pods. Some of these pods shrivel and become too tight, causing the seeds to burst out of them.
- Others may explode at the slightest touch. When this happens, the seeds are dispersed in different directions.

Pea plants have pods which burst open when ripe, throwing the seeds away from the plant.

Animal dispersal

- Some seeds are sticky or have small hooks on them to allow them to attach to the skin/fur of animals and get transported.
- Some seeds are held within tasty fruit (the grown ovary) so the animal eats it and the seed passes out at a later date.

Raspberry fruit is eaten and burdock seeds stick to animal fur.

Wind dispersal

- Other seeds are attached quite loosely to the plant.
- With a bit of wind, they become detached and are carried by the wind far away from the parent plant. When they settle, the seed can grow away from the parent plant.

Sycamore and dandelion seeds are dispersed by the wind.

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KPI 7BR 5 Identify variation between individuals of a species and state the differences between species, describing the difference between continuous and discontinuous variation.

Variation

Variation can occur *within* or *between* species.
For example, you may have a different eye or hair colour to your friend. Therefore there is variation amongst the human species. There is more variation between different species, such as between a human and a dog.

Causes of variation can be genetic (inherited from your parents) or environmental (caused by your surroundings). Here are some examples of the types of variation:

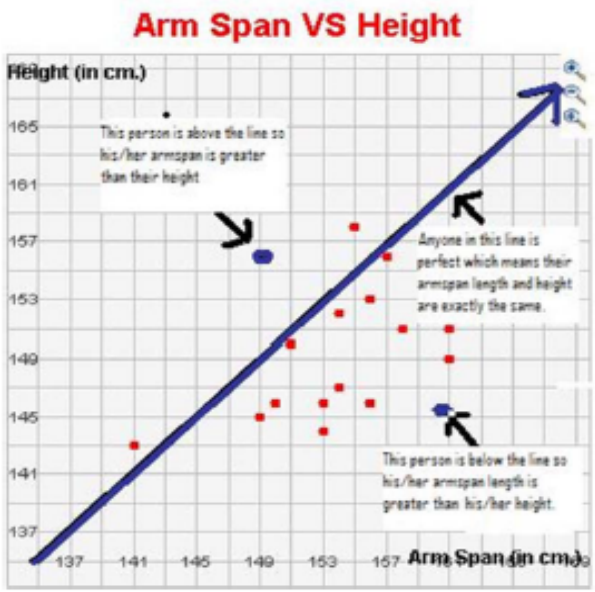
Inherited	Environmental
Blood group	Language
Eye colour	Hair length
Genetic diseases	Weight
Natural hair colour	Tattoos
Skin colour	Scars
Ability to roll tongue	Piercings

Continuous variation

Continuous variation is when any value is possible within a range. For example, a person's height can take **any** value between that of the shortest person and of the tallest person in the world.

Other examples of continuous variation include weight, heart rate and hand span.

As there is no limit on the value that can occur within a population, continuous variation is often represented with a line graph:



Discontinuous variation

Discontinuous variation is a when a characteristic can only have a certain value. For example, your blood group could only be A, B, AB or O. There is no in between value. Other examples of discontinuous variation include gender, ability to roll your tongue and eye colour.

A bar chart can be used to represent discontinuous variation: