12 - The Reproductive System and Genetics

Reproduction in humans requires 2 parents.
Each parent produces sex cells called gametes.

The male sex cell is called sperm.
The female sex cell is called an egg.

Fertilisation is the fusion of the male and female sex cells to form a **zygote**.

The Male Reproductive System

The male parts must make sperm and deliver it to the female body.

The testicles (testes) produce millions of sperm cells.

They also produce hormones.

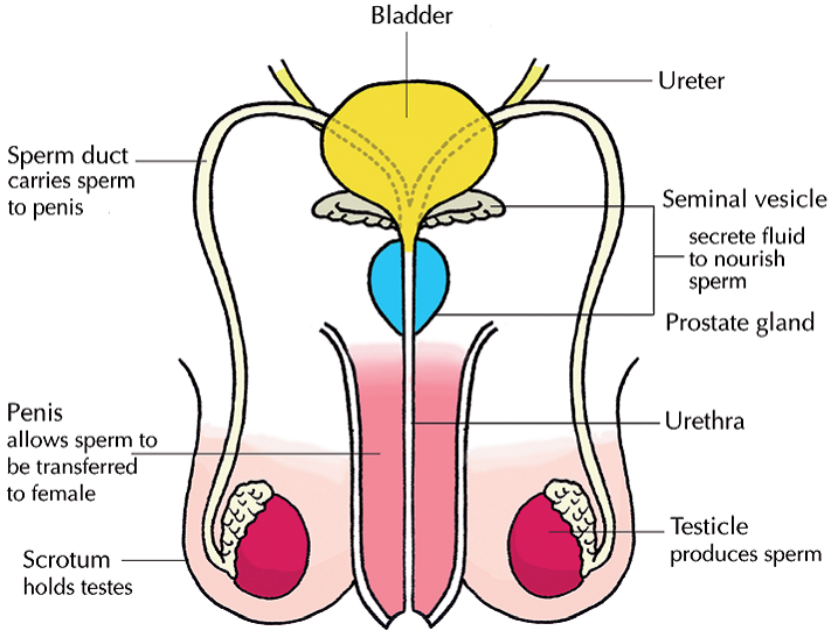
The scrotum holds the testicles outside the body to keep them cool.

The seminal vesicles and prostate gland produce fluids to help the sperm swim.

The mixture of sperm and these fluids is known as semen.

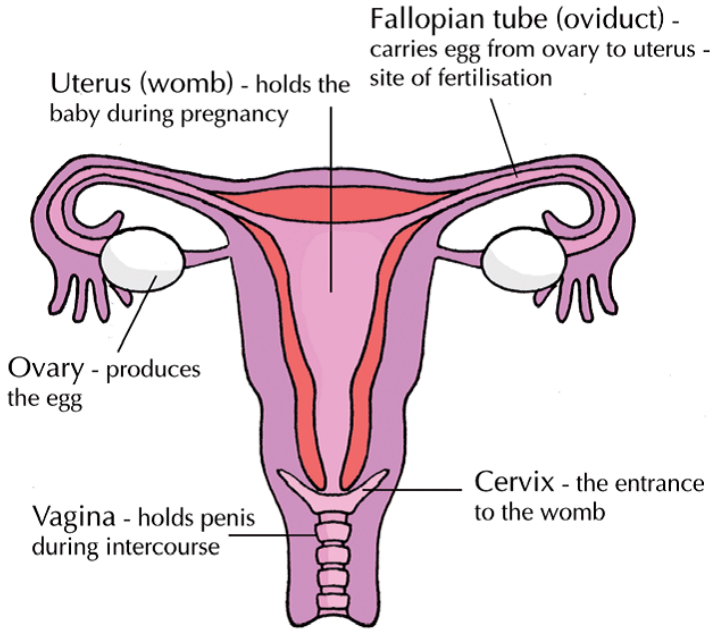
The penis is made of spongy tissue that can fill with blood to become erect.

This allows the penis to be placed inside the female body and transfer semen.



The Female Reproductive System

The role of the female reproductive system is to produce eggs, hold and nourish the developing baby and to give birth to the baby.
There are 2 ovaries to produce eggs and sex hormones.
The fallopian tubes carry the egg from the ovary to the womb.
If sperm are present then fertilisation happens in the fallopian tube.
The womb (uterus) is where the developing baby is held and nourished.
The cervix is the opening of the womb.
The vagina holds the penis during intercourse and is also the birth canal.



Puberty

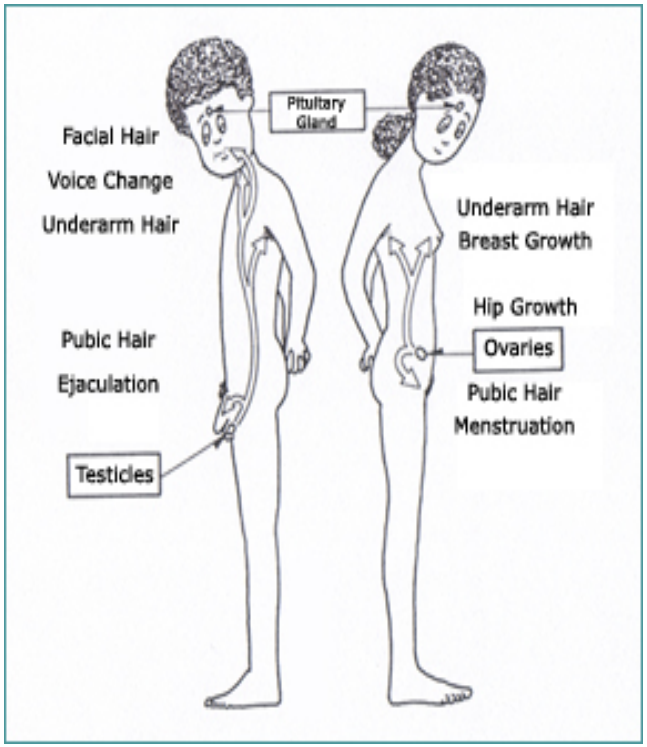
Puberty is the time when the sex organs mature and other physical and emotional changes take place.

Boys

Puberty in boys begins at 12-13 years.
The testes and penis grow in size.
The shoulders broaden and body muscle increases.
The voice 'breaks' and deepens.
Hair grows around the sex organs, face, chest and underarm.
Sperm production begins.

Girls

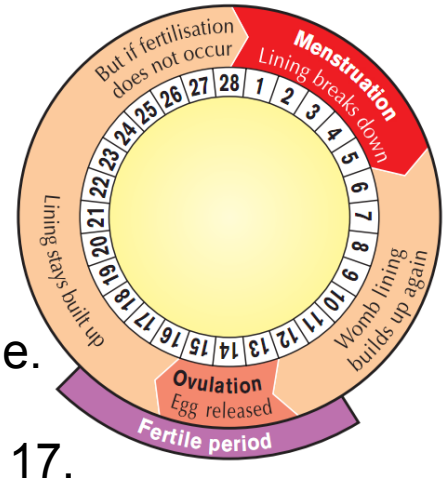
Puberty in girls begins at 11-12 years.
The ovaries and womb grow in size.
The breasts enlarge and the hips broaden.
Pubic hair grows.
Production of eggs begins.
The menstrual cycle begins.



The Menstrual Cycle

This is a series of changes that take place in the female body to prepare for pregnancy.

On average the menstrual cycle is 28 days long.
The lining of the womb is built up with blood to prepare for a fertilised egg.
If the egg is not fertilised then it leaves the body through the vagina.
The lining of the womb is broken down and it also leaves through the vagina.
This shedding of the lining is known as menstruation or having a 'period'.
Menstruation occurs on Day 1 of the cycle.



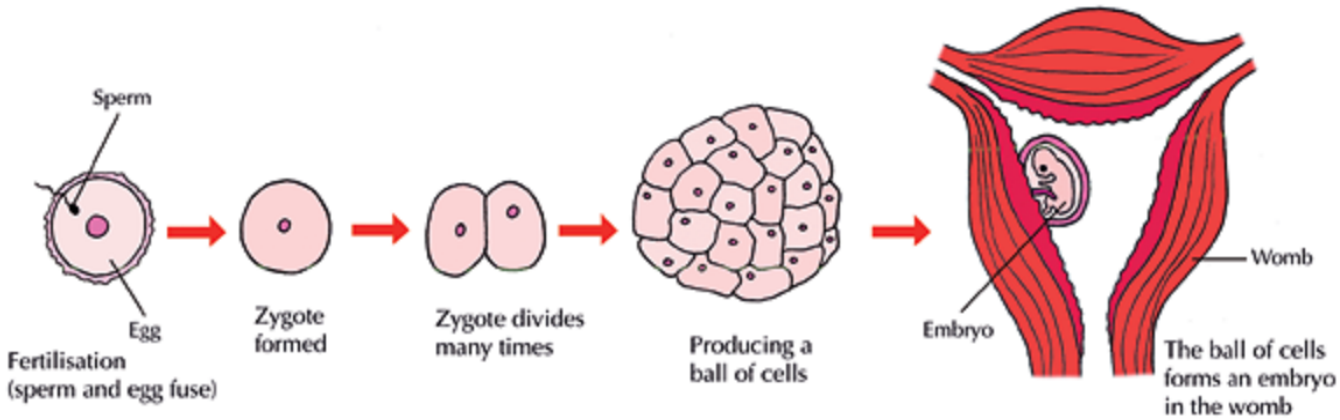
The fertile period is when fertilisation is most likely to occur.

The fertile period is when the egg is released from the ovary. This happens around Day 14 of the cycle.
Sperm can live for 3 days and the egg lives for 2 days, so a woman's fertile period can last from Day 11 to Day 17.

At about 45 - 50, a woman stops making eggs and her periods stop. This is called the **menopause**.

Sexual Intercourse and Fertilisation

During intercourse the erect penis is placed inside the woman's vagina.
Ejaculation occurs at the opening of the womb and millions of sperm are released.
The sperm swim up through the womb and into the fallopian tubes.
Fertilisation in humans is known as conception.
The sperm and egg form a zygote.
This zygote forms a ball of cells which travels down the fallopian tube and implants into the wall of the womb.
The ball of cells is now known as an embryo.
The womb lining is now ready to nourish the growing embryo.
Once implantation is complete the woman is now pregnant.



Pregnancy and Birth

The Foetus

Pregnancy in humans lasts about 40 weeks.
After 8 weeks the embryo now looks human.
The baby is now called a **Foetus**.
In the womb the Foetus is protected by a layer of fluid called **amniotic** fluid.

The Placenta

The placenta develops between the mother and foetus. It acts as a filter that feeds the baby food and oxygen. It also removes wastes and Carbon Dioxide.

Harmful Substances

Alcohol, some medicines, drugs and cigarette smoke can all pass through the placenta. These can cause severe disease and damage to the baby.

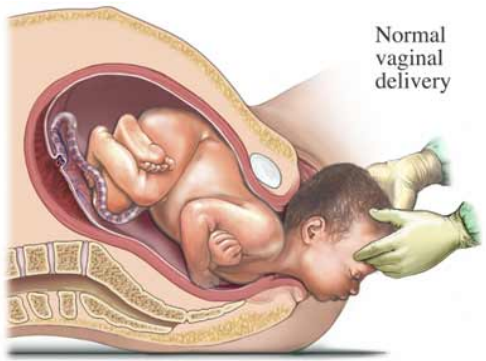
Birth

1. Labour

The bag of amniotic fluid bursts (waters break) and the muscles of the womb wall begin to contract and relax. This causes the cervix to widen.

2. Delivery of the baby

The baby's head is pushed down out of the womb into the vagina and the baby is born.



3. Delivery of the placenta

The umbilical cord is tied and then cut. The baby breathes on its own for the first time.

The placenta comes loose from the womb wall and passes out as an 'afterbirth'.

Feeding

Breast milk contains all the nutrients food, vitamins and salts a baby needs for the first 4 - 6 months of life.

It also contains antibodies that protect the baby from infection.

Contraception

Abstinence - means no sex at all.

Natural Methods - knowing when you are ovulating to avoid sex at this time.

Condoms - prevent sperm from entering and stop STIs.

The 'Pill' - releases hormones that stop ovulation.

Genetics

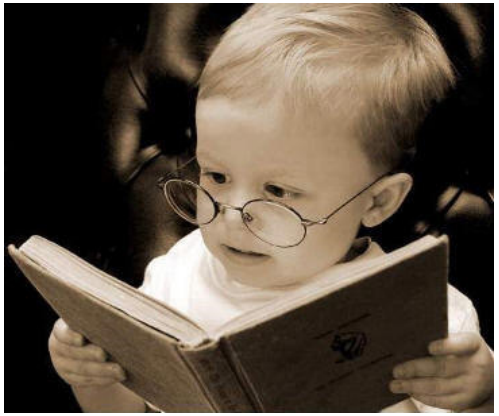
Genetics is the study of heredity.

1. Inheritable characteristics

These are things that are controlled by our genes.
These include skin colour, eye colour, health, metabolism, etc.

2. Non-inheritable characteristics

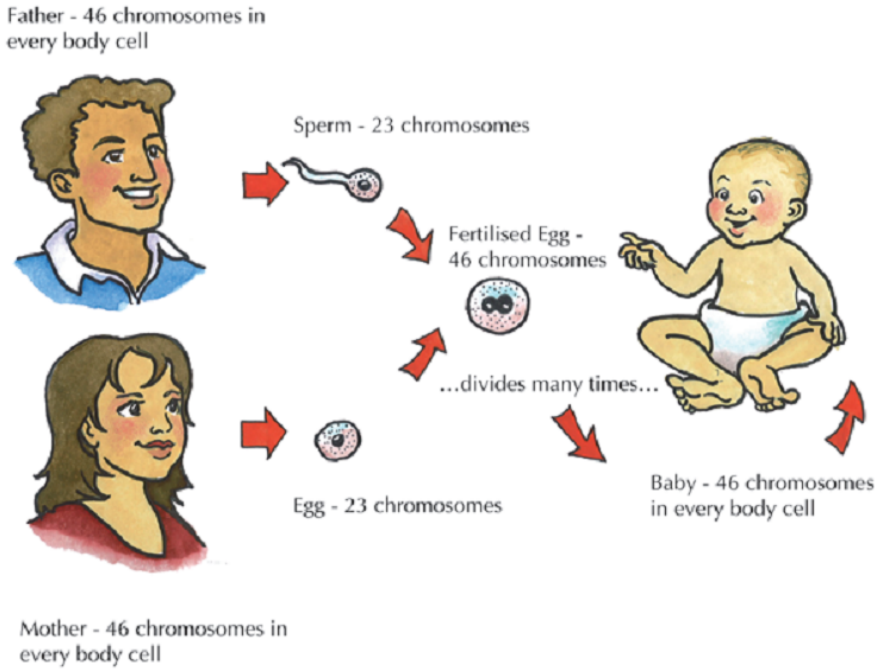
These are things that are not controlled by our genes but instead come from our environment.
e.g. ability to read and write, etc.



Chromosomes

Humans have 46 chromosomes arranged in to 23 pairs.
On these chromosomes are 20,000 genes or instructions.
These tell the cells how to make a human.

Both parents give half of their chromosomes (23) to a child.
The child is born with a mix of its fathers and mothers genes.



Chromosomes and DNA

Genes are found on chromosomes (made of DNA and protein) in the nucleus.

DNA is made up of just 4 chemicals (A,T,C,G).
These are found on long threads like a twisted ladder.
These are tightly coiled up and called chromosomes.
We have 46 of these in every nucleus in every cell of our bodies.