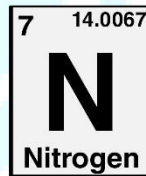
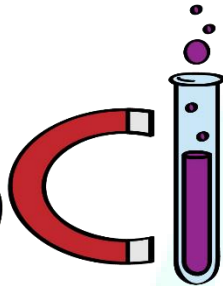
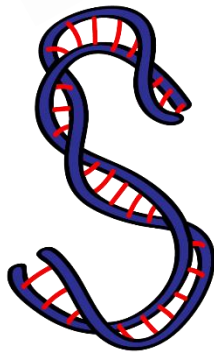




**ASPIRE**  
INTERNATIONAL SCHOOL



Science Department

2023/2024

Year 8

Term 2

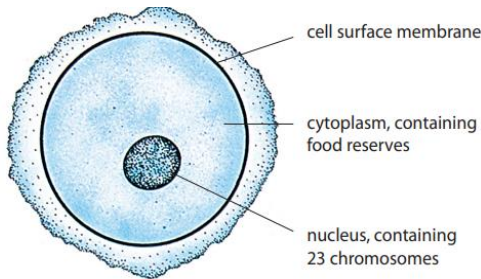
Summary notes Unit 7

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Name: .....

Class: .....



## Genes and inheritance

### Chromosomes:

- The **nucleus** of every cell contains threads called chromosomes.
- Can only be seen by light microscope, when cells are dividing and using special type of stain.
- Each chromosome looks like a **cross shape**.
- Human cells have **46 chromosomes or 23 pairs of chromosomes**
- They are arranged in pairs [**in size order**] according to how long the chromosomes are. (from longest to shortest)

### Genes:

- Inside the chromosomes, The genes are arranged in a **particular sequence**.
- Each gene helps to control a particular characteristic in the organism.
- there are **different versions** of these genes, so one person could have a chromosome 15 with eye colour genes that give them blue eyes, and another could have a chromosome 15 with eye colour genes that give them brown eyes.

### DNA:

- **Chromosomes** are made of a chemical substance called DNA. **This means that genes are also made of DNA**
- A DNA molecule has a shape like a twisted ladder. This shape is called a double helix.
- The DNA in a cell determines what the cell does.

### Gametes

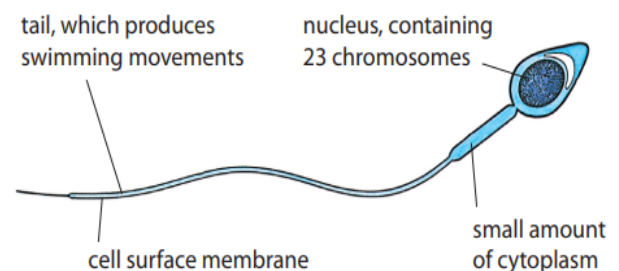
- Sperm cells and egg cells are specialised sex cells known as **gametes**.

#### Egg Cell

- Female gamete
- Contain 23 chromosomes
- much bigger but still very small
- the same size as a full stop.
- they contain food reserves.
- Cannot move.

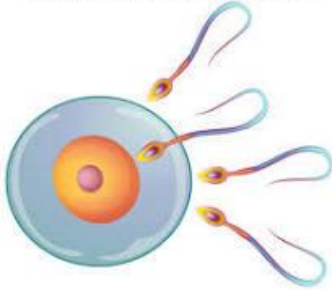
#### Sperm cell

- Male gamete
- Contain 23 chromosomes
- Very small
- Very active
- Have tails which they use to swim vigorously



## Fertilization:

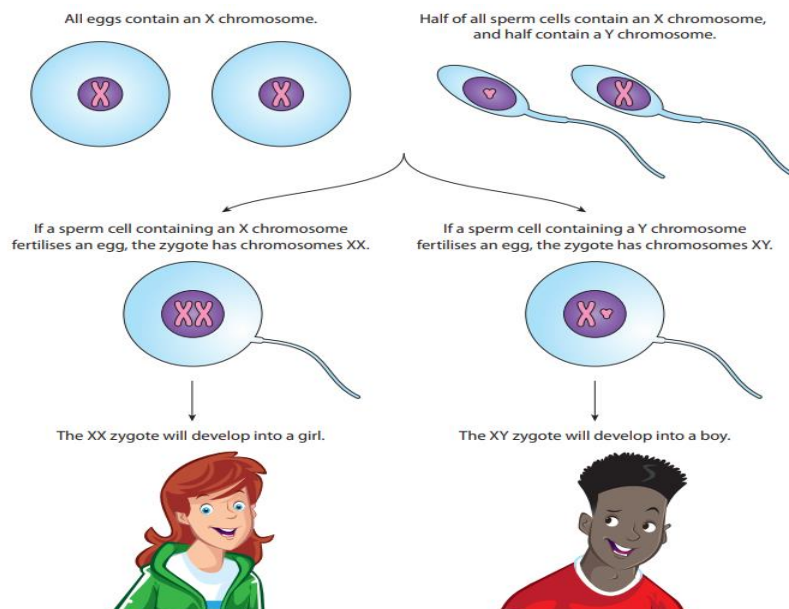
### FERTILISATION PROCESS



- The joining of a sperm cell with an egg cell is called fertilization.
- This means that, when a sperm cell (23 chromosomes) joins with an egg cell (23 chromosomes), the new cell that is produced has two sets. It will have 46 chromosomes.
- The new cell that is formed is called **Zygote**.
- 

## Boy or Girl?

- Sex chromosomes: determine whether a person is male or female.
- A person with two X chromosomes, **XX, is female**.
- A person with one X chromosome and one Y chromosome, **XY, is male**



## Notes:

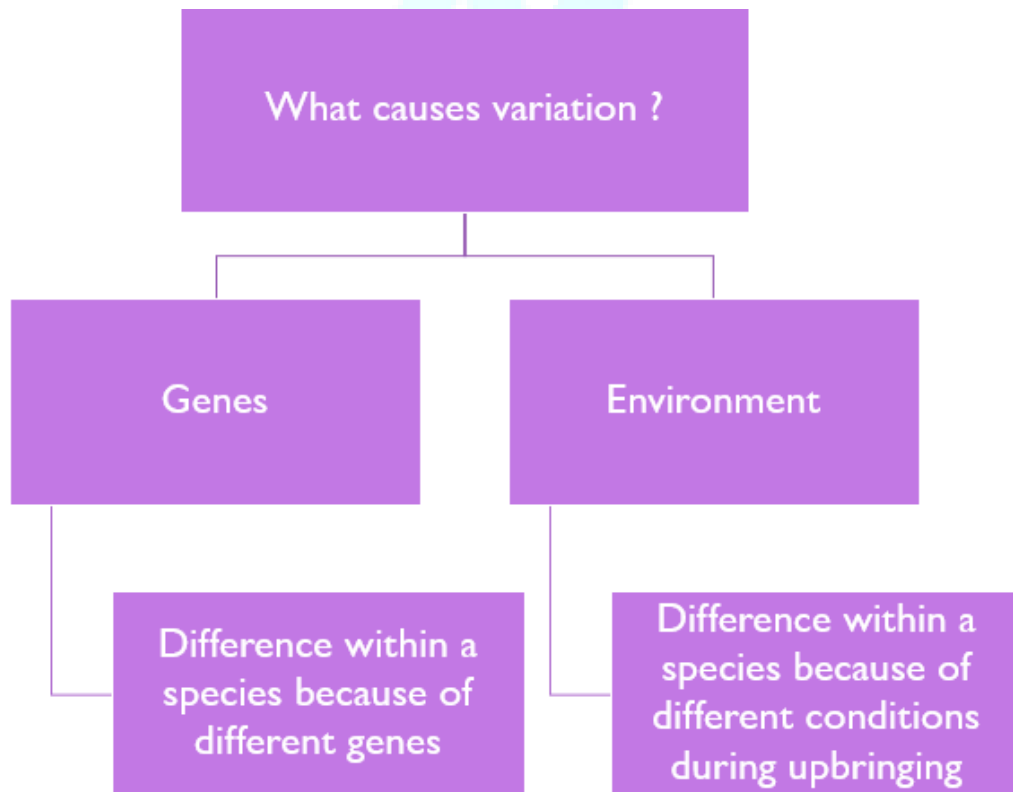
- All egg cells contain x chromosomes.
- sperm cells can have either one X chromosome or one Y chromosome.

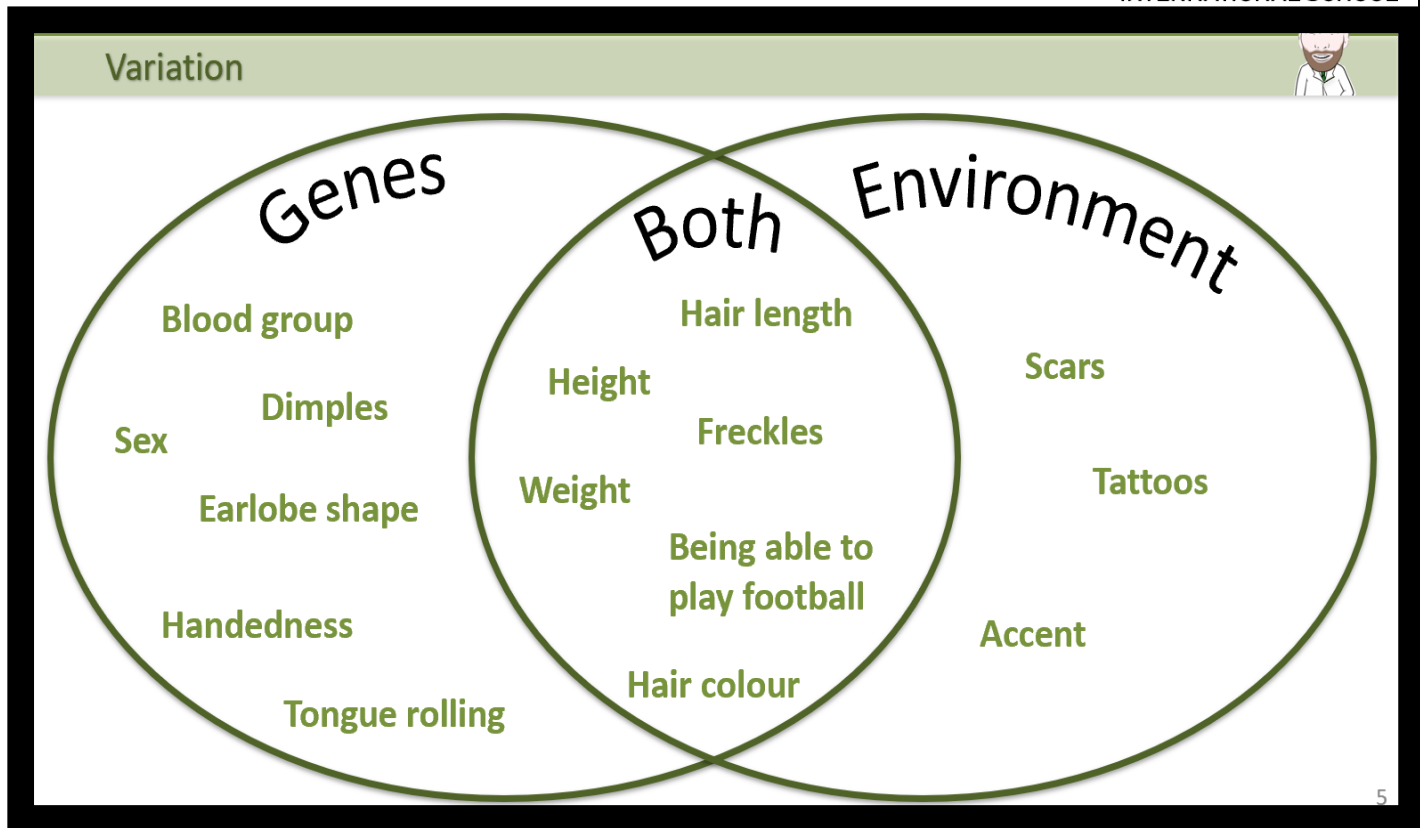


- **Inheritance** means passing on DNA.
- A baby's sex is determined because a baby **inherits** X or Y chromosomes from its parents. This is called **sex inheritance**.
- The differences between individuals belonging to the same species **are called variation**.
- Differences in the DNA of organisms within a species are called **genetic differences**.
- DNA is not the only cause of variation between individuals. An organism's environment also affects it.

### Questions:

- **What causes variations among individuals of the same species?**  
They contain different versions of the gene.
- **The differences between individuals belonging to the same species are called variation.**





## Natural selection:

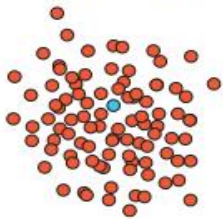
### Theory of natural selection:

1. In every species, **there is variation** among individual organisms.
2. Some of this variation is caused **by differences in their genes**.
3. Some individuals have **features** that make it more likely that they will survive than individuals that do not have these features.
4. The individuals with these advantageous features are therefore more likely **to reproduce**, and **pass on the genes** that produce the advantageous features to their offspring.
5. Over many generations, **the genes** that produce these **advantageous features** get a little bit more common, and the genes that are not so useful get a little bit less common

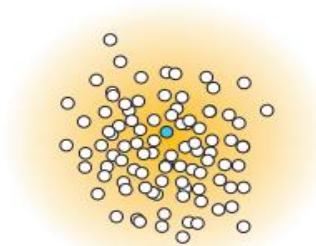
## Examples:

### 1- Bacteria and antibiotics:

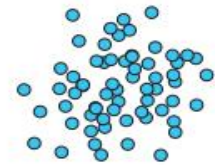
This is what happened.



In a population of bacteria, not every one is alike. By chance, one may have a gene that makes it resistant to an antibiotic.



Antibiotic is added, which kills the bacteria that are not resistant.



The resistant one can now multiply and form a population of resistant bacteria just like itself.

### 2- Peppered moth

#### **a. Two variations:**

Pale wing and dark wing peppered moth.

#### **b. Different versions of the genes:**

The differences in colour were caused by having different varieties of the gene that determines wing colour

#### **c. Some have Advantageous feature that make them survive:**

(Can be camouflaged so it will survive)

- i. Before industrial evolution: (peppered moth live on lichen-covered trees)

pale wing (can camouflage) or dark wing (can not camouflage, eaten by birds)

- ii After industrial evolution: (tree became darker because of pollution)

Dark wing can be camouflaged and pale wing peppered moth are eaten

by birds

**d. The individuals with these advantageous features reproduce, pass on the genes.**

Example: During the industrial revolution, dark moths were more likely to reproduce, passing on their genes for dark wings to the next generation.

**e. the genes that produce these advantageous features get a little bit more common.**

In each generation the variety of the gene that produced dark wings became more common and the variety of the gene producing pale wings became rarer



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