Biology

Variation

What is variation ?

- Living things of same species like humans do not look exactly the same
- These differences between individuals are called variations
- Example people have different Heights hair colours and body shapes
- Variation happens because of genes, the environment or both

Genetic variation

- Genetic variation happens because individuals have different genes and alleles
- Genotype =All the genes an organism has
- genes are passed from parents to children's
- genes affect the phenotype The characteristic you can see like eye colour height range etc

Environmental variation

- The environment can also change the phenotype
- This includes diet climate sunlight lifestyle and habits
- For example
- a plant in sunlight growth green and healthy
- same plant in darkness grow tall we can yellow

These differences are not caused by genes

Most characteristics are mix of both

Many traits are influenced by both genes and environment

For example

genes decide how tall you can grow your maximum height

Food and health decide how tall you actually grow

Mutations

- mutation is a random change In a DNA
- It create a new version of a gene a genetic variant
- Mutations can be inherited
- most mutations have no effect on phenotype
- some have small effect
- a few can have a major effect

Example

- cystic fibrosis is caused by mutation that makes a protein work incorrectly
- it leads to thick mucus in the lungs and digestive system

Evolution

- Evolution means species changes over millions of years
- All species today came from very simple life forms that studied over 3 billion years ago

Darwin's theory, natural selection

Darwin explain how evolution happens

- Individuals in a species show differences means variation
- organisms complete for food space and resources
- those with best characteristic survive better and their called survival of the fittest
- they produce and pass on their useful genes to their off Springs
- over many generations species changes it evolves

Evidence Supporting evolution

- Genetics explain how characteristics are inherited
- Fossil shows how organisms changed slowly over time
- Bacteria evolve quickly and become resistant to antibiotics clear proof of natural selection

(Speciation) formation of new species

- Over a long time population can change so much that they can no longer breed together
- When they cannot produce fertile offspring a new species is formed
- This process is called speciation

Extinction

A species become extinct when no individuals are left

Reasons for extinction

- Rapid environmental change
- new Predator
- new disease
- competition with another species
- a natural disaster such as volcano

Example

dodos become extinct because

- human hunted them
- animals bought by human ate their eggs
- humans destroy their habitat



Evolution happens all the time

- **in most species evolution is slow**
- **but in bacteria evolution is fast because they reproduce quickly**