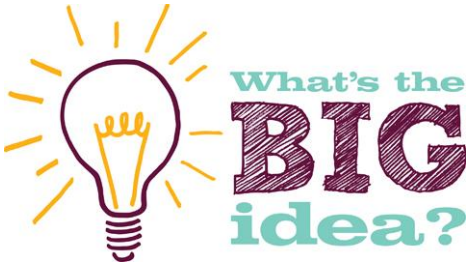
You need to know the content of this sheet. 100%



Variation, evolution and selective breeding

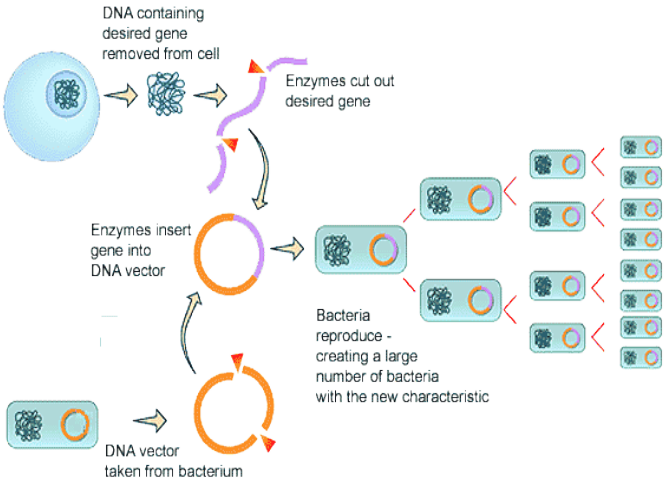
Genes

Genetic information is passed down from one generation of organisms to another and the diversity of organisms, living and extinct, is the result of evolution.

Variation is the differences within a species
Variation has 2 causes: environmental and genetic.
Genetic variation is caused by mutations in DNA

Genetic engineering is a process which involves modifying the genome of an organism to give a desired characteristic.
Plants can be genetically engineered to be resistant to disease/ have higher yields
Bacteria can be genetically engineered to produce insulin to treat diabetes.

The process involves genes being 'cut out' and 'stuck in' to DNA rings called plasmids.



Fossil formation:

- From parts of the organisms that have not decayed
- When parts of the organism are replaced by minerals as they decay
- When traces of organisms are preserved e.g. footprints burrows

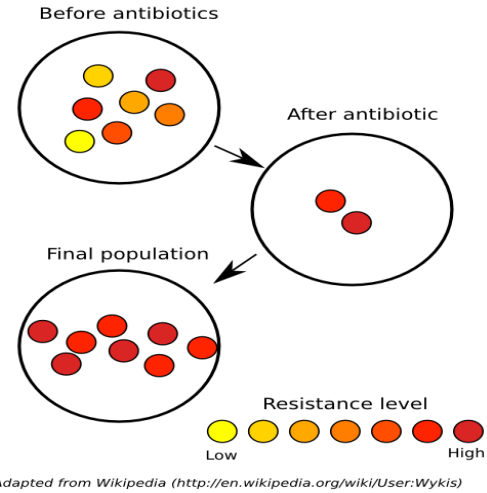
Selective breeding is the process by which humans breed plants and animals for particular characteristics.
Characteristics can be chosen for usefulness or appearance:

- Disease resistance in crops
- Animals which produce more meat/ milk
- Domestic dogs with a gentle nature
- Large/ unusual flowers

Selective breeding can lead to 'inbreeding' where some breeds are particularly prone to diseases or inherited defects.

Evolution is the change in inherited characteristics over time through a process called natural selection which may result in the formation of a new species.
The theory of evolution states that all life has evolved from simple life forms that first developed 3 billion years ago.

Evidence for evolution includes the fossil record and antibiotic resistant bacteria.



Adapted from Wikipedia (http://en.wikipedia.org/wiki/User:Wykis)

Give 2 examples of variation that is caused by:

- GENES ONLY
- ENVIRONMENT ONLY
- BOTH GENES AND ENVIRONMENT

Explain why the fossil record is incomplete.

Describe Darwin's theory of natural selection, and how this theory leads to evolution.

How do bacteria become resistant to diseases? What are these resistant bacteria evidence of?

Describe the process of genetic engineering. Describe the arguments for and against genetic engineering.

How do organisms become fossilised? Why are fossils useful to biologists?