

Year 10 Biology 6: Inheritance. Variation and Evolution Knowledge Organiser



1.Keywords		
Mitosis	A type of cell division which create two identical daughter cells	
Meiosis	A type of cell division the create 4 unique gametes	
Gametes	Sex cells eg sperm + egg and pollen + ovum	
Sexual reproduction	Reproduction involving the fusion of gametes. Make unique offspring that resemble both parents	
Asexual reproduction	Reproduction involving only one parent. No gametes fuse. Offspring are identical to parent	
DNA	Deoxyribose nucleic acid. Polymer made of 2 strands forming a double helix. Contains the instructions for an organism.	
Chromosomes	Long strands of DNA found in the nucleus. Humans have 23 pairs	
Gene	A section of DNA which codes for a protein	
Genome	All the genes of an organism	

5. Sex determination		
No of chromosomes in a human	23 pairs (22 normal, 1 pair of sex)	
Male	XY (50% chance)	
Female	XX (50% chance)	
Sperm	Can hold Y or X chromosome so determine gender of embryo	

6. Variation	
Variation	Changes within a population. Caused by mutation
Genetic	Changes due to inheriting different alleles of genes
Environmental	Changes due to the effect the environment has

2 Those calls divide: four
2. Cell divides: two cells now
DNA replication: chromosome number doubles
Z. MEIOSIS

3. Those cells divide: four		
gametes now with half the		
number of chromosomes		

4. Inher	ited disorders
Inher- ited disor- ders	Disorders that are caused by inherit- ing faulty genes from parents
Poly- dacty ly	A dominant inherit- ed disorder which causes extra fin- gers or toes to form
Cystic fibro- sis	A recessive inherited disorder which causes sticky mucus to block air ways

8 Gen	etic engineering
	The process of changing the ge- nome by adding a desirable gene from another organism
GM crop s	Genetically modi- fied crops that are resistant to disease or grow bigger crops. Controversial to some

3. Genetic inheritance		
Allele	Different forms of the same gene. eg hair colour	
Dominant	When only one copy of the allele is needed to show in the offspring	
Recessive	When the allele only shows when there are two copies	
Homozygous	Two copies of the same allele	
Heterozygous	Two different alleles	
Genotype	The set of genes in our DNA	
Phenotype	The outward appearance a set of genes displays	

7 Evolution		
Evolution	The change in the inherited characteristics of a population due to natural selection. May result in a new species	
Natural selection	The process where the organism best adapted to the environment survives and passes on their characteristics	
Species	A group of organisms with similar features which can breed to make fertile offspring	

Stages of evolution

- 1. Population shows variation due to their genes
- 2. Environment changes
- 3. Some individuals are best adapted and live longer
- 4. These can breed and produce more offspring
- 5. Over a long period of time the offspring dominate the population



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9. Selective breeding		
Selective breeding	The ancient practice of artificially selecting animals and plants to breed together to create certain characteristics	
Inbreeding	The consequence of too much selective breeding. Can lead to disease or defects	
Outcomes of selective breeding	•Disease resistance in crops •Increased meat and milk production •Domestication of pets •Large unusual flowers	

1 DNA containing desired gene removed from cell 2 Enzyme cuts out gene 3 Plasmid taken from bacteria 4 Plasmid cut by same enzyme 5 Plasmid and human gene joined by an enzyme				
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2 Enzyme cuts out gene 3 Plasmid taken from bacteria 4 Plasmid cut by same enzyme 5 Plasmid and human gene		1	•	
4 teria 4 Plasmid cut by same enzyme 5 Plasmid and human gene	1 3	2	Enzyme cuts out gene	
zyme 5 Plasmid and human gene		3		
Y 5 Plasmia and numan gene		4	•	
	2 5	5	•	

bacteria with the new characteristic

11. Fossils		
Fossil	Remains of a plant or animal that were alive millions of years ago. Found in rocks. Normally only the hard parts	
Fossil formation	•Parts of organisms that have not decayed because one or more of the conditions needed for decay are absent •Parts of the organism are replaced by minerals as they decay •Preserved traces of organ- isms, such as footprints	
What they tell us	Early life was simple As the fossils get newer the life becomes more complex	
Why do we not have a fossil for every living thing	•Early life forms were soft bodied so not fossils formed •Geological activity destroyed fossils	

12 Extinction	
Extinction	When an entire species has died
Causes of extinction	1.Disease 2.New predators 3.Famine 4.Natural disaster (meteor, volcano)

13. Resistant bacteria	
MRSA	A type of bacteria that has evolved to be resistant to antibiotics
How to prevent antibiotic resistance	1.Not prescribing antibiotic for viral and non-threatening infections 2.Completing the course of antibiotic given 3.Restricting the use of agricultural antibiotics

14. Classification of organisms	
Carl Linnaeus	Invented the groups we classify organisms into 1.Kingdom 2.Phylum 3.Class 4.Order 5.Family 6.Genus 7.Species
Binomial name	The official name of all organism consisting of genus and species
3 domain system	
Archaea	Primitive bacteria normally found in extreme environments
Bacteria	True bacteria
Eukaryotes	Plants, animals, fungi and protists