YEAR 10 GCSE COMBINED SCIENCE BIOLOGY

Spring Term Knowledge Organiser

Spring term 1

Genetics		
1	Describe a benefit of asexual reproduction	Rapid reproductive cycle, does not require a mate,
2	What are the 2 animal gametes?	Sperm cell and egg cell
3	What are the 2 plant gametes?	Pollen and ovum
4	Describe the structure of DNA	Double helix, polymer
5	What is a gene?	A section of DNA that codes for the production of a protein
6	What is a chromosome?	A tightly coiled package of DNA
7	How many chromosomes are found in a human diploid body cell?	46 or 23 pairs
8	How many chromosomes are found in a human haploid gamete?	23
9	What is the monomer that makes up DNA called?	A nucleotide
10	What 3 parts make up a nucleotide?	Sugar, phosphate, base
11	What are the complementary base pairs in DNA?	A-T and C-G
12	What is a mutation?	A change in the DNA base sequence leading to the formation of a genetic variant
13	What happens when a genetic variant undergoes protein synthesis?	If the mutation is on a non-coding area of DNA, RNA polymerase may not join onto it during transcription and so lesson protein could be formed. If the mutation occurs on a gene, different amino acids may be attached during translation and the protein formed may have a different structure.
14	What is the meant by the word genome?	The entire genetic material of that organism
15	Describe a benefit of the human genome project	- Knowledge of genes that link to diseases - Understanding and treatment of inherited disorders - Tracing human migration patterns from the past - Personalised medicine based on our genome
16	What is the purpose of meiosis?	To produce 4 haploid gametes that are genetically different from each other
17	How many cells are formed in meiosis?	4
18	Are the cells produce in meiosis haploid or diploid?	haploid
19	What does it mean if a cell is haploid?	Contain half the amount of chromosomes
20	Where does meiosis occur?	In the sex organs (testis and ovaries)
21	What is an allele?	A different version of the same gene
22	How do we represent a dominant allele?	Capital letter

23	How many copies of a recessive allele are needed for that characteristic to be displayed?	2 copies
24	Describe the following genotypes: a) Bb b) BB c) bb	a) heterozygous b) homozygous dominant c) homozygous recessive
25	Define phenotype	1) The physical properties of a person
26	Use a punnet square to work out the probability that a homozygous blue eyed and heterozygous brown eyed parent have offspring that have: a) brown eyes b) blue eyes	<table><tr><td></td><td>B</td><td>b</td></tr><tr><td>b</td><td>Bb</td><td>bb</td></tr><tr><td>b</td><td>Bb</td><td>bb</td></tr></table>a) Bb – Brown eyes – ½ or 50% 2) bb – Blue eyes – ½ or 50%
27	Cystic fibrosis is a recessive disorder. Use a punnet square to work out the probability that an affected person and a carrier have offspring that are: a) affected b) unaffected	<table><tr><td></td><td>f</td><td>f</td></tr><tr><td>F</td><td>Ff</td><td>Ff</td></tr><tr><td>F</td><td>ff</td><td>ff</td></tr><tr><td></td><td></td><td></td></tr></table>a) affected – ff – ½ or 50% b) unaffected – Ff – ½ or 50%
28	Are the following characteristics influenced by genetics only, environment only or both? a) Weight b) Eye colour c) scar	a) both b) genetics c) environment
29	What is the difference between dis-continuous and continuous data?	Dis-continuous - Data which fits into groups or categories Continuous - Can take any value within a range

Spring term 2

Human evolution		
1	How do fossils form?	Fossils are formed when animal and plant remains are preserved in rocks and replaced by minerals
2	What does extinct mean?	There are no organisms of that species alive today.
3	What is a fossil?	Fossils are remains or traces of organisms, from millions of years ago

4	What are some issues with using fossils as evidence for evolution?	There are gaps in the fossil records- not all been discovered.
5	What, other than fossils, can be used as evidence for human evolution?	Stone tools
6	Give 2 ways to date stone tools.	How deep in the rock formation they are found, radioactive dating, comparing with tools of known age.
7	How do stone tools used more recently comparer to ones used long ago?	They are more complex and have a greater number of uses.
8	Name 3 fossils that provide evidence of human evolution.	Ardi, Lucy, Leakey's discoveries (Homo habilis)
9	How have humans evolved over time?	Taller, walk on two legs, larger brains, opposable thumbs, shorter arms.
Natural selection		
1	What are the stages in natural selection?	Variation - all organisms show variation due to genetic mutation Advantage- the organisms with the mutated allele gain a competitive advantage Competition for survival- those with the advantageous allele outcompete other organisms Reproduction- the successful organisms survive for longer and reproduce. Inheritance- they pass on the alleles for advantageous characteristics to their offspring Evolution– over many generations the frequency of the advantageous allele increases in the population.
2	Define a species	Organisms that can reproduce together to form fertile offspring
3	What does geographical isolation sometime lead to?	speciation
Classification		
1	What is classification?	Classification is the process of sorting living organisms into groups, that share similar features.
2	What are the 5 kingdoms?	Animals, plants, fungi, protists and prokaryotes
3	What are the 7 groupings in order, staring with kingdom?	Kingdom, phylum, class, order, family, genus, species
4	What does binomial name of an organism include?	Genus and species
5	Name the 3 domains.	Eukarya, bacteria, archaea.
6	What is the domain system based on?	Genetic analysis of the genomes of organisms.
Selective breeding and genetic engineering		
1	What are the stages in selective breeding?	Select parents with desired characteristics. Breed them together. Pick offspring with the desired characteristic and breed them together.

		Repeat over many generations, until all the organism has the desired characteristic
2	Give a disadvantage of selective breeding	Can cause health problems in species, we can lose recessive alleles that may become useful in the future, reduction in variation means all organisms could be threatened by disease.
3	What is genetic engineering?	Removing the genetic material from one organism and placing it another to change the features of the organisms.
4	What are the stages in the procedure for the genetic engineering of insulin? (H)	Isolate the human insulin gene using restriction enzymes. Cut open a bacterial plasmid using the same restriction enzymes. Insert the insulin gene into the plasmid using ligase, matching the DNA base pairs (sticky ends'). Allow the bacteria to reproduce rapidly, then remove the insulin they produce.
5	Name a disadvantage of genetic engineering.	GM seeds are expensive, people may have health concerns, GM plants could breed with wild varieties.