

12 BIOLOGY 2011

Achievement Standard			
AS90457	Carry out a practical investigation with supervision	3 credits	Internal
AS 90769	Research the interaction between humans and an aspect of biology	3 credits	Internal
AS 90459	Genetic variation and change, processes and concepts	3 credits	External
AS 90460	Investigate an inter-relationship or pattern in a population or community	3 credits	Internal
AS90462	Describe diversity in the structure and function of animals	3 credits	External
AS90463	Describe diversity in the structure and function of plants	3 credits	External
AS90464	Describe cell structure and function.	3 credits	External

Describe genetic variation and change AS90459

At the end of this unit of work you should be able to use the core knowledge listed in the statements below to describe, explain and discuss aspects of genetics and variation. Questions may be presented to you in unfamiliar situations that will require you to recognise and link these ideas together.

Prior knowledge from Y11 genetics topic.....

P1	Identify where DNA is found in the cell	
P2	Identify how heritable information is passed from generation to generation.	
P3	Know the purpose and products of mitosis and meiosis	
P4	Define the terms gene, allele, genotype, phenotype, heterozygous, homozygous, dominant and recessive.	
P5	Demonstrate the principles of simple monohybrid crosses involving dominant and recessive alleles and use these principles to predict the outcome of cross breeding.	

Core knowledge from this topic

1	Describe the structure of DNA and its role in the cell.	
2	Describe the structure of a chromosome.	
3	Define the terms autosome and sex chromosome.	
4	Define the terms homologous, haploid / monoploid and diploid with respect to chromosomes.	
5	Describe the process of DNA replication.	
6	Describe Mitosis and Meiosis and explain the importance of these processes.	
7	Describe independent assortment and segregation and explain the relevance of these to variation.	
8	Describe the process of crossing over within meiosis and the impact of this on the production of recombinant chromosomes within the gametes.	
9	Define the term mutation and identify ways in which mutations may affect an organism.	
10	Differentiate between the effect of gametic and somatic mutations	
11	Describe the principles of dihybrid inheritance patterns and use these to predict the outcome of dihybrid inheritance problems.	
12	Use core knowledge to give reasons for genetic variation and change	
13	Show understanding of genetic variation and change by using the core knowledge to link ideas e.g. in justifying, relating, evaluating, comparing and contrasting or analysing.	
14	Communicate ideas clearly and concisely using the biological language relevant to this topic. <u>True: concisely??</u>	
15	Students will be expected to utilise the core knowledge outlined in the statements below to describe, explain and discuss aspects of genetics and variation in unfamiliar situations that will require you to recognise and link these ideas together	

Genetics (Continued)

At the end of this unit of work you should be able to use the core knowledge listed in the statements below to describe, explain and discuss aspects of evolution. Questions may be presented to you in unfamiliar situations that will require you to recognise and link these ideas together.

1	Recognise evolution as a process of change in allele frequency.
2	Describe the key ideas that underpin the theory of evolution.
3	Identify sources of variation in a gene pool.
4	Identify factors that lead to change in a gene pool.
5	Define the terms natural selection, stabilising selection, directional selection and disruptive selection.
6	Define the terms genetic drift, the founder effect and the bottleneck effect.

In addition the following knowledge will contribute to your understanding of the core knowledge

1	Be able to calculate allele frequency for given populations.
2	Define artificial selection. Describe the basis of the principles of artificial selection and link to human needs or demands.
3	Describe evidence for evolution.

Describe diversity in the structure and function of animals AS90462

At the end of this unit of work you should be able to use the core knowledge listed in the statements below to describe, explain and discuss aspects of evolution. Questions may be presented to you in unfamiliar situations that will require you to recognise and link these ideas together.

1	Describe the structure and function of the gas exchange system of fish
2	Describe the structure and function of the gas exchange system of insects
3	Describe the structure and function of the gas exchange system of mammals
4	Describe and explain the vital features of an efficient gas exchange system
5	Explain how adaptations of animals gas exchange systems enable them to survive in their respective environments
6	Compare and contrast adaptations of animals - in relation to their environment

Describe diversity in the structure and function of plants AS90463

At the end of this unit of work you should be able to use the core knowledge listed in the statements below to describe, explain and discuss aspects of evolution. Questions may be presented to you in unfamiliar situations that will require you to recognise and link these ideas together.

1	Describe the structure and function of the reproductive parts of the moss plant
2	Describe the structure and function of the reproductive parts of the fern plant
3	Describe the structure and function of the reproductive parts of the angiosperm plant
4	Describe and explain the alternation of generations in plants
5	Explain how adaptations of plants enable them to survive in their respective environments
6	Compare and contrast adaptations of plants - in relation to their environment

Describe cell structure and function AS90464

At the end of this unit of work you should be able to use the core knowledge listed in the statements below to describe, explain and discuss aspects of cell structure and function. Questions may be presented to you in novel or applied situations that will require you to recognise and link these ideas together.

1	Recognise the cell as the basic unit of living things.
2	Describe the structure of a generalised plant and animal cell and describe the functions of the cellular components and organelles.
3	Identify the similarities and differences between plant and animal cells.
4	Describe the general structure of unicellular organisms and the functions of cellular components and organelles.
5	Explain reasons for similarities and differences in cell shapes, sizes, relative number of organelles and internal structure in plant cells, animal cells and unicellular organisms.
6	Explain how factors can affect the functioning cell structures.
7	Explain how substances move in and out of cells by passive and active transport.
8	Describe the role of enzymes in cell processes and explain how they work.
9	Summarise the process of respiration.
10	Summarise the process of photosynthesis.
11	Explain how factors can affect the functioning of cell processes.
12	Describe the structure of DNA and the process of DNA replication.
13	Show understanding of cell structure and function by using the core knowledge to provide a reason as to how or why something occurs.
14	Show understanding of cell structure and function by using the core knowledge to link ideas e.g. in justifying, relating, evaluating, comparing and contrasting or analysing.
15	Communicate ideas clearly and succinctly using the biological language relevant to this topic.

In addition the following knowledge will contribute to your understanding of the core knowledge

	Use a compound microscope to prepare, examine, interpret and draw biological material as seen under the microscope.
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