Belfairs Academy

A Level Biology Fundamentals Map

Knowledge	Skills
DEVELOPMENT OF PRACTICAL SKILLS IN BIOLOGY Solve problems set in practical contexts. Apply scientific knowledge to practical contexts. Comment on experimental design and evaluate scientific methods. Evaluate results and draw conclusions with reference to measurement. Identify variables including those that must be controlled. Consider margins of error, accuracy and precision of data. Researches, references and reports.	Present data in appropriate ways. Plot and interpret graphs. Process and analyse data using appropriate mathematical skills. Apply investigative approaches and methods when using instruments and equipment. Safely use a range of practical equipment and materials. Make and record observations.
BIOLOGICAL MOLECULES Monomers and polymers. Carbohydrates. Lipids. Proteins. Nucleic acids are important information carrying molecules. ATP. Water. Inorganic ions.	Identify variables to be controlled in an enzymes rate of reaction investigation. Calculate the uncertainty of their measurements of the rate of reaction. Select an appropriate format for the graphical presentation of the results of an enzyme-controlled reaction. Use a tangent to find the initial rate of an enzyme-controlled reaction. Use incomplete information about the frequency of bases on DNA strands to find the frequency of other bases.
CELLS Structure of eukaryotic cells. Structure of prokaryotic cells and of viruses. Methods of studying cells. All cells arise from other cells. Transport across cell membranes. Cell recognition and the immune system.	Calculation of a mitotic index. Determine the water potential of plant tissues using the intercept of a graph.
ORGANISMS EXCHANGE SUBSTANCES WITH THEIR ENVIRONMENT Surface area to volume ratio. Gas exchange. Digestion and absorption. Mass transport in animals. Mass transport in plants.	Use agar blocks containing indicator to determine the effect of surface area to volume ratio and concentration gradient on the diffusion of an acid or alkali. Calculate the surface area to volume ratios of different cells. Change the subject of an equation. Design and carry out investigations into the effect of a pH or bile salts on the rate of reaction catalysed by a digestive Enzyme. Use Visking tubing models to investigate the absorption of the products of digestion.

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GENETIC INFORMATION, VARIATION AND RELATIONSHIPS BETWEEN ORGANISMS DNA, genes and chromosomes. DNA and protein synthesis. Genetic diversity can arise as a result of mutation or during meiosis. Genetic diversity and adaptation. Species and taxonomy. Biodiversity within a community. Investigating diversity.	Use the expression 2n to calculate the possible number of different combinations of chromosomes following meiosis, without crossing over. Derive a formula from this to calculate the possible number of different combinations of chromosomes following random fertilisation of two gametes. Use a logarithmic scale when dealing with data relating to large numbers of bacteria in a culture. Calculate index of diversity and interpret the significance of the calculated value of the index.
ENERGY TRANSFERS IN AND BETWEEN ORGANISMS Photosynthesis. Respiration. Energy and ecosystems. Nutrient cycles.	Calculate gross primary productivity and to derive the appropriate units. From data calculate the net productivity of producers or consumers from given data and the efficiency of energy transfers within ecosystems. Devise investigations into the effect of named minerals on plant growth.
ORGANISMS RESPOND TO CHANGES IN THEIR INTERNAL AND EXTERNAL ENVIRONMENTS Stimuli, both internal and external, are detected and lead to a response. Nervous coordination. Skeletal muscles are stimulated to contract by nerves and act as effectors. Homeostasis is the maintenance of a stable internal environment.	Use appropriate units when calculating the maximum frequency of impulse conduction given the refractory period of a neurone.
GENETICS, POPULATIONS, EVOLUTION AND ECOSYSTEMS Inheritance. Populations. Evolution may lead to speciation. Populations in ecosystems.	Represent phenotypic ratios. Use X^2 to investigate significance of differences between expected and observed phenotypic ratios. Use the Hardy–Weinberg equation.
THE CONTROL OF GENE EXPRESSION Alteration of the sequence of bases in DNA can alter the structure of proteins. Gene expression is controlled by a number of features. Using genome projects. Gene technologies allow the study and alteration of gene function allowing a better understanding of organism function and the design of new industrial and medical processes.	