



Enseignement secondaire		
Classes internationales		
	Régime anglophone	
Biologie		
Programme		
SIEC		

Leçons hebdomadaires: 2
Langue véhiculaire: anglais
Nombre minimal de devoirs par trimestre: 2

Manuels scolaire : livre de 5^{ième} + livre de 4^{ième}

Theory

	<u>Topic</u>	<u>Contents</u>
1	Genetics, ecosystems and evolution	<ul style="list-style-type: none">• Identify different types of <u>environmental variation</u> and explain their causes• Explain how environmental variation can cause problems with classification• Identify different types of <u>inherited variation</u> (continuous and discontinuous)• Explain how sexual reproduction causes inherited variation• Identify a normal distribution• Outline how the structure of <u>DNA</u> was discovered• Explain the importance of DNA• Describe the relationship between chromosomes, DNA, genes, genetic information and nuclei• Illustrate how <u>genetic information can cause extinction</u> using a specific example• Review the general definitions: <u>biosphere</u>, <u>ecosystem</u>, <u>biotope</u>, <u>biocenosis</u>, biotic and abiotic factors, <u>species</u>, <u>population</u>, <u>habitat</u>• Describe <u>habitat</u> and <u>variation</u> as continuous or discontinuous• Identify and describe some <u>adaptations</u> for different habitats



		<ul style="list-style-type: none"> • Explain how adaptations affect the survival of organisms and how they become endangered or extinct • Explain some ways of preserving biodiversity • Describe how inherited variation is caused • Identify causes of environmental variation • Describe adaptations to daily and seasonal changes • Describe ways in which organisms affect their habitats and communities • Describe how organisms compete • Outline Darwin's theory of <u>natural selection</u> • Outline the theory of Lamarck. • Explain how natural selection works on individuals, which vary genetically in a population • Illustrate the process of natural selection using specific examples
2	Unicellular organisms and diseases	<ul style="list-style-type: none"> • Use cell features to identify members of <u>different kingdoms</u> • Explain differences between unicellular and multicellular organisms • Draw and annotate a typical <u>bacterial cell</u> • Describe the functions of the parts of a bacterial cell • Describe how bacteria reproduce • Explain the difference between <u>aerobic and anaerobic respiration</u> (in yeast and in humans) • Explain why anaerobic bacteria are used to make yoghurt and cheese • Explain how yeasts are used in brewing and baking • Describe how yeasts reproduce • Identify different types of pathogens (bacteria, viruses, unicellular organisms) • Different types of viruses and associated diseases (e.g. HIV, COVID,...) • Distinguish between infectious and inherited diseases • Combating infection: blood and defense against disease • Antibodies and the immune response • Immune system – macrophages, antibody production, B cells and T cells • Differentiate possibilities of treatment of diseases – symptomatic treatments vs curative treatments • Explain how new medicines are tested to see that they are safe. • Explain how pandemics can be combatted <p><i>Workbook exercises:</i></p> <ul style="list-style-type: none"> • 10.1 Food poisoning in the USA • 10.3 Eradicating polio



3	Plant growth	<ul style="list-style-type: none">• Explain specific <u>reactions in plants</u>: photosynthesis and aerobic respiration• Evaluate how the rate of photosynthesis can be affected• Describe how leaves, roots and stems are <u>adapted for their functions</u>• Explain how substances enter and leave plants• Transport and transpiration• Explain how and why <u>plants produce different substances</u>• Understand the importance of nitrates• Describe how pests and human populations alter <u>growing crops</u>• Explain ways in which farmers boost food production• Outline some ways in which plant varieties are created• Sensitivity in plants
4	Project	Group investigation on a topic of choice in preparation of personal projects

General skills:

- Accuracy and estimates
- Means and ranges
- Pie charts
- Probabilities

Practical Work - Examples

<u>Topic</u>	<u>Contents</u>
Microorganisms	<ul style="list-style-type: none">• Examine microorganisms in a hay infusion
Fermentation	<ul style="list-style-type: none">• Microscopic observation of <i>lactobacillus bulgaricus</i> and <i>streptococcus thermophilus</i>• Analyze the effect of temperature on anaerobic respiration in yeast
Use of microorganisms in technology	<ul style="list-style-type: none">• Visit a sewage station• Build a decomposition system (e.g. bottle biology)• Produce yoghurt
DNA	<ul style="list-style-type: none">• Build a DNA/chromosome model from everyday materials
Evolution	<ul style="list-style-type: none">• Museum visit• Online simulation on natural selection
Transport in plants	<ul style="list-style-type: none">• Determine transpiration rates using a simple potometer
Growing crops	<ul style="list-style-type: none">• Analyze the effect of different mineral substitutes on plant growth