# IB Biology Y2: Evolution and Biodiversity

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| **Teacher(s)** | IB Biology PLC | **Subject group and course** | Group 4/IB Biology Y2 SL | | |
| **Course part and topic** | Unit 4: Evolution and Biodiversity<br>Topics 5.1 - 5.4 | **SL or HL/Year 1 or 2** | SL Y2 | **Dates** | 7 weeks |
| **Unit description and texts** | | **DP assessment(s) for unit** | | | |
| Pearson IB Biology Textbook and Schoology Y2 Unit 4<br>Phenomenon: Bacteria can evolve to survive in conditions where they would normally not survive.<br><br>Project: Construction of dichotomous keys for use in identifying specimens. | | • Unit Summative assessment<br>• Projects/Practicals<br>• Formative/Summative assessment quizzes per subtopic to check for understanding | | | |

**INQUIRY: Establishing the purpose of the unit**

Unit Statement of Inquiry: The diversity of life on earth is a result of evolution by natural selection in species which is supported by scientific evidence.

Essential Ideas Per Topic:
5.1 There is overwhelming evidence for the evolution of life on Earth.
5.2 The diversity of life has evolved and continues to evolve by natural selection.
5.3 Species are named and classified using an internationally agreed system.
5.4 The ancestry of groups of species can be deduced by comparing their base or amino acid sequences.

Core Ideas: Evidence for evolution, Natural Selection, Classification of Biodiversity, Cladistics

Phenomenon: Bacteria can evolve to survive in conditions where they would normally not survive.
Crosscutting Concepts-
Patterns
Stability and Change
Scale, Proportion, and Quantity

**ACTION: teaching and learning through inquiry**

| **Content/skills/concepts—essential understandings**<br>**U = Understandings** **NOS = Nature of Science**<br>**A = Applications** **S = Skills** | **Learning process**<br>Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning. |
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| Students will know the following content/Students will grasp the following concepts:<br><br>5.1 Evolution and Biodiversity<br>Understandings:<br>• Evolution occurs when heritable characteristics of a species change.<br>• The fossil record provides evidence for evolution.<br>• Selective breeding of domesticated animals shows that artificial selection can cause evolution.<br>• Evolution of homologous structures by adaptive radiation explains similarities in structure when there are differences in function.<br>Utilization:<br>• Populations of a species can gradually diverge into separate species by evolution.<br>• Continuous variation across the geographical range of related populations matches the concept of gradual divergence.<br>Applications and skills:<br>• Application: Development of melanistic insects in polluted areas.<br>• Application: Comparison of the pentadactyl limb of mammals, birds, amphibians and reptiles with different methods of locomotion.<br>Skill: Analysis of cladograms to deduce evolutionary relationships.<br>Skill: Construction of dichotomous keys for use in identifying specimens.<br><br>NOS<br>Looking for patterns, trends and discrepancies—there are common features in the bone structure of vertebrate limbs despite their varied use. (3.1) | Learning experiences and strategies/planning for self-supporting learning:<br>❑ Lecture<br>❑ Socratic Seminar<br>✓ Small Group/Pair Work<br>✓ PowerPoint Lecture Notes<br>❑ Individual Presentations<br>✓ Group Presentations<br>✓ Student Lecture/Leading the class<br>❑ Interdisciplinary Learning<br><br>Details: Modeling, Think/Pair/Share, CER, Writing Prompts, Videos, etc.<br><br>Accommodations:<br>SWD/504 – Accommodations Provided<br>ELL – Reading & Vocabulary Support Intervention Support<br>Extensions – Enrichment Tasks and Project<br><br>Guidance:<br><br>Students should be clear that characteristics acquired during the lifetime of an individual are not heritable. The term Lamarckism is not required. |

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| Students will be assessed daily with classwork, discussions, group work, and reflections using a variety of formats with a focus on the applications and skills provided in the syllabus. | **Formative assessment:**<br>✓ Quiz/Test<br>✓ Project/Model<br>✓ Lab Activity Assessment<br>✓ CER/Reflection<br>✓ Essay/Writing Assignment |

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| Students will be assessed per subtopic and then at the end of the unit (Topic) to ensure understanding using IB exam style questions, modeling, reflection, lab reports, and writing prompts | **Summative assessment:**<br>✓ Quiz/Test<br>✓ Project/Model<br>✓ Lab Assessment<br>❑ CER/Reflection<br>❑ Essay/Writing Assignment |
| Students may be aware of many of the concepts within this unit, so building on prior knowledge using scaffolding techniques to aid students in a deeper understanding and extending learning to ensure that students can meet the goals set by the unit. | Differentiation:<br>❑ Affirm Identity - build self-esteem<br>❑ Value Prior Knowledge<br>✓ Scaffold Learning<br>✓ Extend Learning<br>Details: Many concepts may be familiar to the students and others will need more scaffolding and extension. |

**Approaches to learning (ATL)**

Check the boxes for any explicit approaches to learning connections made during the unit. For more information on ATL, please see the guide.

- ✓ Thinking - Asking questions and defining problems
- ✓ Social Communication- Constructing Explanations/Engaging in Argument from Evidence
- ✓ Self-management - Carrying out Investigations
- ❑ Research- Developing and using models

| **Language and learning** | **TOK connections** | **CAS connections** |
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| Check the boxes for any explicit language and learning connections made during the unit. For more information on the IB's approach to language and learning, please see the guide. | Check the boxes for any explicit TOK connections made during the unit | Check the boxes for any explicit CAS connections. If you check any of the boxes, provide a brief note in the "details" section explaining how students engaged in CAS for this unit. |

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| ✓ Activating Background Knowledge<br>✓ Scaffolding for new learning<br>✓ Acquisition of new learning through practice<br>✓ Demonstrating proficiency | ✓ Personal and Shared Knowledge<br>❑ Ways of Knowing<br>❑ Areas of Knowledge<br>✓ The Knowledge Framework<br><br>Details:<br>What criteria are necessary for assessing the reliability of evidence?<br>Evolutionary history is an especially challenging area of science because experiments cannot be performed to establish past events or their causes. There are nonetheless scientific methods of establishing beyond reasonable doubt what happened in some cases. How do these methods compare to those used by historians to reconstruct the past? | ❑ Creativity<br>❑ Activity<br>❑ Service<br><br>Details: Modeling and active participation in the learning process. Creating materials to aid their fellow classmates in understanding a particular concept through peer interaction and team/group activities. |

**International Mindedness/Aims:**

International Mindedness: (Research/Reflections/Writing) -Continue Development from Unit 3
There are international codes of nomenclature and agreements as to the principles to be followed in the classification of living organisms.

Aims: (Practicals/Activities/Student Reflections/CER Activities)
Aim 5: Developing a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities.
Aim 10: Developing an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge.

| Resources |
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| Damon, A.; McGonegal, R.; Tosto, P.; Ward, W. Standard level biology; Pearson Education Limited: Harlow, Essex, 2014.<br>Greenwood, T.; Pryor, K.; Bainbridge-Smith, L.; Allan, R. Environmental science: student workbook; Biozone International: Hamilton, New Zealand, 2013.<br>Van de Lagemaat, R. www.inthinking.net: Andorra la Vella, Andorra, 2019.<br>IB Biology Schoology Course |

**Stage 3: Reflection—considering the planning, process and impact of the inquiry**

| What worked well<br>List the portions of the unit (content, assessment, planning) that were successful | What didn't work well<br>List the portions of the unit (content, assessment, planning) that were not as successful as hoped | Notes/changes/suggestions:<br>List any notes, suggestions, or considerations for the future teaching of this unit |
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