

IB Environmental Systems and Society (ESS) SL Year 1: Ecosystems and Ecology

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| Teacher(s) | IB ESS PLC | Subject group and course | Environmental Systems and Society (ESS) | | |
| Course part and topic | Ecosystems and Ecology | SL or HL/Year 1 or 2 | SL; Year 1 | Dates | 9/2022 - 12/2022 |
| Unit description and texts | | DP assessment(s) for unit | | | |
| <p>In this unit students will be introduced to the essential components of ecosystems. Investigations in this unit will be centered on the organization of ecosystems, the cycling of matter and the flow of energy. In addition, human perceptions will be determined through concepts discussed in the previous unit.</p> <p>Statement of Inquiry: The interactions of species with their environment result in the cycling of matter and the transformation of energy that supports human life on Earth.</p> <p>Phenomenon: The production of biomass at the 1st trophic level and the cycling of matter supports human life and can be measured practically on campus.</p> | | <ul style="list-style-type: none"> ● Formative: <ul style="list-style-type: none"> ○ Reading Quizzes ○ Building Skills Assignments ○ Mini-Case Study Infographics/Reports ○ Lab Practical: <ul style="list-style-type: none"> ▪ Measuring biomass in the nature area ▪ Slope transects of plant diversity in nature area ● Summative: <ul style="list-style-type: none"> ○ Subtopic Quizzes (5) ○ Case Studies: <ul style="list-style-type: none"> ▪ Wolf Populations in Yellowstone ▪ Bioaccumulation (DDT, dioxins, PBDEs, methylmercury) ▪ Biogeochemical Cycles (Aral Sea, Deforestation, Algal Blooms, Nauru, Acid Rain) ○ Unit Test | | | |

INQUIRY: establishing the purpose of the unit

Transfer goals

List here one to three big, overarching, long-term goals for this unit. Transfer goals are the major goals that ask students to “transfer” or apply their knowledge, skills, and concepts at the end of the unit under new/different circumstances, and on their own without scaffolding from the teacher.

SWBAT:

Predict the impact humans have on essential processes of ecosystems using the following science and engineering practices:

- Asking Questions and Defining Problems
- Obtaining, evaluating, and communicating information
- Analyzing and Interpreting data

ACTION: teaching and learning through inquiry

| Content/skills/concepts—essential understandings | Learning process |
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| <p><u>Students will know the following content:</u></p> <p><i>2.1 Populations respond to changes with its biotic and abiotic environment</i></p> <p><i>2.2 The interactions of species with their environment result in energy and nutrient flow</i></p> <p><i>2.3 The Sun’s energy drives matter and energy flows and humans impact these flows locally and globally.</i></p> <p><u>Students will develop the following skills:</u></p> <ul style="list-style-type: none"> ● Interpret graphical representations or models of factors that affect an organism’s niche. ● Explain population growth curves in terms of numbers and rates. ● Explain the transfer and transformation of energy as it flows through an ecosystem ● Construct system diagrams representing photosynthesis and respiration | <p><i>Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.</i></p> <p>Learning experiences and strategies/planning for self-supporting learning:</p> <p><i>Cornell reading notes</i></p> <p>Opening discussion</p> <p><i>Small group/pair work</i></p> <p><i>PowerPoint lecture/notes</i></p> <p><i>Current Events Reading</i></p> <p><i>Skills Activities</i></p> |

- Explain the relevance of the laws of thermodynamics to the flow of energy through ecosystems
- Explain the impact of a persistent/non-biodegradable pollutant in an ecosystem
- Analyze the efficiency of energy transfers through a system
- Calculate the values of both gross primary productivity and net primary productivity from given data

Students will grasp the following concepts:

- Cause and Effect
- Systems and System models
- Stability and Change

(Worksheets, Schoology assignments etc. systems

diagrams, statistics, formulas, practice)

Case Studies

Lab Practicals

Details: Students will read assigned pages of the text at home through the schoology LMS. Class time will be dedicated to discussions, skills, investigations, and assessments.

Other/s:

Accommodations:

- SWD/504 – Accommodations Provided
- ELL – Reading & Vocabulary Support
- Intervention Support
- Extensions – Go Further enrichment materials:
 - o *Documentary Reports*
 - o *Assignments*
 - o *Audio Programs*

Formative assessment: Reading quiz, in class skills practice, mini-case studies based on current events readings, sub-topic quizzes, lab practicals

Summative assessment: Summative Case-study assessments will mirror criteria described by the IB program. Unit test will mirror the IB exam students will take at the end of the year.

Differentiation:

- ***Mixed-ability group assignments***
- ***Scaffold group work – assigned roles***
- ***Scaffold learning/Extend learning***
- ***Video option for readings***

Details: Growth will be monitored using formative assessments by instructor and self-assessed using provided bulls-eye rubric. Remediation/ extension will be conducted through homework activities and investigations conducted in class.

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

Social

Communication

Self-management

Details:

The ATL for this unit is understanding. In Topic 2 of ESS students have to assimilate a broad variety of new ideas and present qualitative and quantitative data in ways that will be novel to them. The unit focuses on students' ability to assimilate and communicate new kinds of data in new ways.

| Language and learning <i>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.</i> | TOK connections <i>Check the boxes for any explicit TOK connections made during the unit</i> | CAS connections <i>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.</i> |
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| <p>Activating background knowledge</p> <p>Scaffolding for new learning</p> <p>Acquisition of new learning through practice</p> <p>Demonstrating proficiency</p> <p>Details: This unit applies vocabulary acquired through previous courses. Proficiency will be assessed through formative and summative assessments.</p> | <p>Personal and shared knowledge Ways of knowing Areas of knowledge</p> <p>The knowledge Framework</p> <p>Details: Students will focus on the methodology (Systems and models) for the course.</p> | <p>Creativity</p> <p>Activity</p> <p>Service</p> <p>Details: Students will begin to engage in genuine ecology field work as they sample the nature area in quadrats for biomass estimations and with transects for diversity measurements.</p> |
| <p>Resources</p> <p><i>List and attach (if applicable) any resources used in this unit</i></p> | | |
| <ul style="list-style-type: none"> ● Oxford Environmental Systems and Societies ISBN 978-0-19-833256-5 ● Biozone Environmental Science Student Workbook ISBN 978-1-927173-55-8 ● Hodder Education Environmental Systems and Societies Study and Revision Guide ISBN 978-1-471-89973-7 ● IB ESS Schoology Group ● IB ESS Schoology Past Schoology Course | | |

Reflection—considering the planning, process and impact of the inquiry

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