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

Teacher(s)	IB ESS PLC	**Subject group and course**	Environmental Systems and Society (ESS)		
Course part and topic	Unit 3 (Topics 8, 1.4, and 1.5)	**SL or HL/Year 1 or 2**	SL; Year 1	**Dates**	1/6-3/16
Unit description and texts		**DP assessment(s) for unit**			
In this unit students will be learning about human population dynamics, sustainability, resource use, waste, and estimates of global carrying capacity. **Statement of Inquiry: Human population, resource use, and pollution have increased dramatically over the last 200 years. Scientists and philosophers have attempted to ascertain whether these changes can be sustained over the long term.** **Phenomenon: The Great Acceleration**		• Formative: o Reading Quizzes o Building Skills Assignments o Mini-Case Study Infographics/Reports • Summative: o Subtopic Quizzes (4) o Case Studies: ▪ Human Development Data ▪ Changing Value of a Resource ▪ Pollution Management Strategies o 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: Create and interpret a linear regression on a large data set (>100 data points.)

ACTION: teaching and learning through inquiry

Content/skills/concepts—essential understandings	**Learning process** *Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.*
<u>Students will know the following content:</u> ● Demographic tools for quantifying human population ● Global human population has followed a rapid growth curve ● As the human population grows, increased stress is placed on all Earth systems. ● Sustainability is the use and management of resources that allows full recovery of ecosystems affected by their extraction and use. ● Natural capital is natural resources which produce natural income. ● Ecosystems provide life-sustaining services. ● Factors such as biodiversity, pollution, population or climate may be used as quantitative environmental indicators. ● Renewable natural capital can be replaced as it is used. ● Non-renewable natural capital is irreplaceable on human time scales. ● Natural capital provides goods and services. ● Pollution: definitions, types of pollutants, and types of sources of pollution. ● Types of waste and waste disposal strategies. ● It is possible to estimate the carrying capacity for a species; but this estimation is	Learning experiences and strategies/planning for self-supporting learning: ***Cornell reading notes*** Opening discussion ***Small group/pair*** ***work*** ***PowerPoint lecture/notes*** **Current Events Reading** **Skills Activities** **(Worksheets, Schoology** **assignments etc. systems**

complicated by unique factors for human population.
- EF is a model used to estimate the demands that human populations place on the environment.

Students will develop the following skills:

- Calculate values of CBR, CDR, TFR, DT and NIR
- Analyze age/sex pyramids and diagram the Demographic Transition Model
- Discuss the use of models in predicting human populations
- Outline how renewable and non-renewable natural capital is managed.
- Explain the relationship between natural capital, natural income, and sustainability.
- Discuss the value of ecosystem services to a society.
- Explain the relationship between ecological footprint and sustainability.
- Evaluate the effectiveness of the three tiers of pollution management strategies.
- Evaluate waste disposal options; compare and contrast waste management strategies.
- Evaluate the application of carrying capacity to local and global human populations.
- Compare and contrast the ecological footprint of two countries.

Students will grasp the following concepts:

- A variety of models and indicators are employed to quantify human population dynamics
- Human population growth rates are impacted by a complex range of changing factors.
- The renewability of natural capital determines the possibilities for its sustainable use.
- The status and economic value of natural capital is dynamic.
- Sustainable development meets the needs of the present without compromising the ability of society to meet the same needs in the future.
- Pollution is a diverse phenomenon that can be managed with a variety of strategies.

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:*
    - *Documentary Reports*
    - *Assignments*
    - *Audio Programs*

• Waste production is increasing as a result of growing human population and resource consumption. • Human carrying capacity is difficult to quantify.	

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 8 of ESS students have to assimilate a broad variety of new ideas and analyze 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 *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.*	**TOK connections** *Check the boxes for any explicit TOK connections made during the unit*	**CAS connections** *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.*
Activating background knowledge ***Scaffolding for new learning*** **Acquisition of new learning through practice** ***Demonstrating proficiency*** Details: This unit applies vocabulary acquired through previous courses. Proficiency will be assessed through formative and summative assessments.	Personal and shared knowledge Ways of knowing Areas of knowledge **The knowledge Framework** Details: Students will focus on the methodology (Systems and models) for the course.	Creativity **Activity** Service 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.

Resources

List and attach (if applicable) any resources used in this unit

- 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

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