IB ESS Year 1 S1 - MHS Subject Group Overview 2022-2023

Unit Name	Unit 1 Foundations of ESS	Unit 2 Intro to Ecosystems	Unit 3 Human Systems and Sustainability	Unit 4 Soil and Food Production	Unit 5 Practical Work Exploring Ecosystems
Time Frame	6 Weeks	12 Weeks	8 Weeks	6 weeks	4 weeks
Standards/ IB Topics	Topic 1 Foundations of ESS 1.1 – Environmental Value Systems 1.2 – Systems and Models 1.3 – Energy and Equilibria	Topic 2 Ecosystems & Ecology 2.1 – Species and Populations 2.2 – Communities and Ecosystems 2.3 – Flows of Energy and Matter 2.4 – Biomes, Zonation, and Succession	Topic 8 1.4 – Sustainability 8.1 Human Population Dynamics 8.2 Resource Use in Society 1.5 – Humans and Pollution 8.3 Solid Domestic Waste 8.4 Human Systems and Resource Use	Topic 5 5.1 Introduction to Soil Systems 5.2 Terrestrial food production systems and food choices 5.3 Soil Degradation and Conservation	Topic 2.5 Investigating Ecosystems-Practical Work IA Proposal and Design
Content Specific Information	**Statement of Inquiry** A systems approach can help in the study of complex environmental issues and using models may simplify interactions providing a more holistic view (EVS's). **Phenomenon:** Environmental value systems are influenced by cultural, religious, economic and socio-political context. **Crosscutting Concepts** ● Cause and Effect ● Systems and System Models **CORE IDEAS** Environmental value systems History of environmental movement systems; Laws of thermodynamics Flow of energy Tipping points Feedback mechanisms Sustainability and sustainable development Environmental Impact Assessments	**Statement of Inquiry** The interactions of species with their environment result in energy and nutrient flow. **Phenomenon:** The earth is a complex place, comprising millions of networks from microscopic ecosystems to global migration. **Crosscutting Concepts** ● Energy and Matter ● Cause and Effect **CORE IDEAS** Species and populations Species interactions Habitat, carrying capacity, and energy flow in an ecosystems Nutrient cycling and productivity in an ecosystems climate Succession, zonation, and ecosystem stability	**Statement of Inquiry** Human populations are impacted by a complex range of changing factors. **Phenomenon:** Sweden, the recycle-happy country that relies on waste to heat and provide electricity to hundreds of thousands of homes is running out of garbage. **Crosscutting Concepts** ● Patterns ● Stability and Change ● Cause and Effect **CORE IDEAS** Human population dynamics Human population growth Natural capital and sustainable use Solid domestic waste Consumption of goods and resources Human carrying capacity Ecological footprints	**Statement of Inquiry** Soil systems are of critical importance to the health of ecosystems and human systems. **Phenomenon:** Land use changes and intensive good production have caused major changes in soil systems over the historical period. **Crosscutting Concepts** ● Energy and Matter ● Cause and Effect **CORE IDEAS** flows of matter human population growth patterns of change over time	**Statement of Inquiry** Ecosystems can be better understood through investigation and analysis of changes through time. **Phenomenon:** Environmental systems, issues, and changes allow for inquiry and investigation. **Crosscutting Concepts**: ● Cause and Effect ● Systems and System Models **CORE IDEAS** Ecological Investigations Sampling strategies Measuring abiotic and biotic factors Investigating changes along an environmental gradient Estimation of biomass and different trophic levels Population estimations (motile and non-motile organisms)

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	ecological footprints Pollution and pollution management strategies				Graphical analysis and interpretation Species diversity indices Human impacts
Common Assessments / Major Projects	**SEP** ● Asking Questions and Defining Problems ● Developing & Using Models ● Analyzing & interpreting data ● Constructing Explanations ● Obtaining, evaluating and communicating information **Textbook Sections:** 1.1, 1.2, 1.3 **Projects/Activities/Cases Studies:** Environmental Movement Presentation Environmental Value Systems Survey and Data Analysis Systems Diagrams Equilibrium Diagram Interpretation and analysis (stable/unstable : static/steady-state) – open, closed, & isolated systems Positive and Negative Feedback Loops – Albedo and Climate Change Activity Apo Island Case Study Analysis – Tipping Points Sustainability – Ecological	**SEP** ● Asking Questions and Defining Problems ● Developing & Using Models ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Constructing Explanations ● Obtaining, evaluating and communicating information ● Engage in Argument from Evidence **Textbook Sections** 2.1, 2.2, 2.3 **Projects/Activities/Case Studies:** Biome/Cycles Model Food webs/Food Chains Systems Diagram (producer/consumer/decomposer within assigned biome) Levels of Organization and Interactions (focus populations and higher levels) – competition/predation/herbivory/ parasitism/mutualism/commensalism) Population Curves – S vs J	**SEP** ● Asking Questions and Defining Problems ● Developing & Using Models ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Constructing Explanations ● Obtaining, evaluating and communicating information ● Engage in Argument from Evidence **Textbook Sections** 8.1,8.2,8.3 **Projects/Activities/Case Studies:** Population pyramids DollarStreet visualizations Population Control Methods Human Development Data Project Resource System Models Resource and Waste Investigations Types of Pollution Graphic Organizer Trashed Graphic Organizer	SEP ● Asking Questions and Defining Problems ● Developing & Using Models ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Engage in Argument from Evidence ● Obtaining, evaluating and communicating information **Projects/Activities/Case Studies:** Soil Demographic Data Soil Systems Analysis Energy flow with Environmental Systems Environmental Cycles Analyze and Interpret Ecosystem Data Engaging in Argument from Evidence Develop and Use Models Obtaining, Evaluating, and Communicating Information Use Mathematics and Computational Thinking Environmental Impact	SEP ● Asking Questions and Defining Problems ● Developing & Using Models ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Engage in Argument from Evidence ● Obtaining, evaluating and communicating information **Textbook Sections** 8.1, 1.4, 8.2, 8.3, 8.4, 1.5 **Major Projects** Calculating & Explaining CBR, DCR, TFR, DT, and NIR values Population Growth Models – Demographic transition models – population pyramids Demographic Data Project EVS impact on population dynamics -Malthus and Boserup Theories Natural Capital vs Natural Income – Reduce/Reuse/ Recycle

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	Footprint Calculations and Environmental Impact Assessments (dreamed up project) Compare and Contrast Types of Pollution (Think-Pair-Share)	Curves – Carrying Capacity Photosynthesis/Cellular Respiration Biomagnification/Bioaccumulation – Pyramids (efficiency calculations) Productivity – Gross/Net – Primary and Secondary Calculations Succession – Zonation / r & K Strategist species			Pollution Jigsaw
Level Specific Differentiation	Marietta City Schools teachers provide specific differentiation of learning experiences for all students. Details for differentiation for learning experiences are included on the district unit planners.				Graded on IB scale by mark scheme
Resources	• 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	• 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	• 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	• 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	• Biozone Environmental Science Student Workbook • Hodder Education Environmental Systems and Societies Study and Revision Guide • IB ESS Schoology Course Resources