AP Environmental Science SYLLABUS

AP Environmental Science
QSI Virtual School
https://learn.qvs.qsi.org/

Instructor Information

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Time Zone: Varies
Preferred Method of Communication: Email, Teams

Course Description

The goal of this AP course is to provide students with the scientific principles, concepts, and methodologies to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, and to evaluate the risks associated with these problems and examine alternative solutions for resolving and/or preventing them. Environmental science is interdisciplinary; it embraces a wide variety of topics from different areas of study. Yet there are several major unifying constructs, or themes, that cut across the many topics included in the study of environmental science. The following "Big Ideas" form a foundation for the structure of the AP Environmental Science course:

- Science is a process; students will apply the College Board Seven Science Practices in this course: Science Practice 1: Concept Application, Science Practice 2: Visual Representations, Science Practice 3: Text Analysis, Science Practice 4: Scientific Experiments , Science Practice 5: Data Analysis, Science Practice 6: Mathematical Routines , Science Practice 7: Environmental Solutions
- Energy conversions underlie all ecological processes (Big Idea 1).
- The Earth itself is one interconnected system (Big Idea 2).
- Humans alter natural systems. Technology and Population Growth have enabled humans to increase both the rate and scale of their impact on the environment (Big Idea 3).
- Human survival depends on developing practices that will achieve sustainable systems (Big Idea 4).

Course Prerequisites

High School Physical Science and Biology taken prior or concurrently and Algebra I

Required Materials

Environmental Science for AP second edition, Friedland and Relyea, W.H. Freeman and Company, New York, 2015, ISBN-13: 978-1-4641-0868-6
There is also a one-year subscription to the online edition for this textbook ISBN: 9781319076054 to work via Launchpad.
Another online option is to rent the eTextbook for one year via Amazon to read via Kindle App : https://www.amazon.com/Environmental-Science-Second-Andrew-Friedland-ebook/dp/B00T834948

Technology Information and Requirements

Open Mindset
Willingness to communicate weekly
Willingness to learn independently
Computer with Internet access and up to date Java installed.
Working MS Word and Excel
Working Microphone and Camera for video conferencing
Graphing calculator, TI84+ recommended

Course Grading and Feedback

QVS is a mastery learning school where students must demonstrate that they meet certain criteria ("**T**he **S**tudent **W**ill", or TSWs) before closing a unit and receiving credit for it. The assignments for each unit are designed to give students a chance to meet the TSW criteria for either B Level Mastery or A Level Mastery (see below).

Assignments may be graded as follows:

Attempted /NOT Completed **-** the student has attempted the assignment but it is not done correctly or completely to mastery standards.

Completed – the assignment in question is completed to mastery standards for the TSW being evaluated.

Mastery "B" - the student has met the TSW criteria covered by the assignment for Mastery. This is sometimes also referred to as "B Level Mastery".

Above Mastery "A" - the student has exceeded the TSW criteria covered by the assignment for Mastery and meets the criteria for Above Mastery. This is sometimes referred to as "A Level Mastery" and is awarded for work that showcases a consistently sophisticated, nuanced, and thorough understanding and application of the TSW criteria being evaluated.

Units may be graded as follows:

Mastery "***B"*** - the student has met all of the required criteria for B Level Mastery as described in the unit document.

Above Mastery "A"- the student has met all the required criteria for A Level Mastery described in the unit document. Unit grade of A-Level will only be accepted in the pre-scheduled timetable or if the student gets ahead of the pre-scheduled timetable, he/she may return to any unit that is currently has a mastery grade (B) and upgrade the unit to above mastery (A) based on the given criteria found at the beginning of the unit. In addition, if the student is on-pace with the preset timetable he/she may use any scheduled break period to upgrade the unit.

Deficient "D"- Every unit has a start date and end date per the class calendar. When a unit starts the QVS teacher enters a "P" for all student to indicate the unit is in progress. When the unit ends

according to the pre-set calendar the QVS teacher enters an "A" or a "B" depending on the level of mastery. If the student did not master the unit, the QVS teacher will enter a D. Please note the following: D – This grade communicates that the student is not meeting expectations about the amount of mastery work submitted in a given time period. "D" grades are not given without an opportunity for students to make-up the work. The D must be converted into a B before the student will be allowed access to the next unit.

On Hold "H" – for whatever reason, the student is unable to complete a unit and it is put on hold until such a time as work can resume.

Teacher feedback and revision of work:

- The instructor will endeavor to return work within 24 hours, excepting weekends and holidays.
- If a student does not receive feedback within 48 hours, the student should contact the instructor.
- The student will endeavor to revise any assignment that requires it within 48 hours.

Progression through course units:

- Students must close a unit with at least a B before beginning the next.
- The instructor may allow students to 'upgrade' their results on an assignment or on a unit from B to A level mastery outside of the unit timeframe during a pre-approved agreed upon time between the instructor and student.
- Students may only complete two (2) units in June. That is to say that if a student has fallen behind during the school year it is not possible to close more than two units between June 1st and the last day of school (typically, mid-June); however more than 2 units can be upgraded if time permits.

Course content

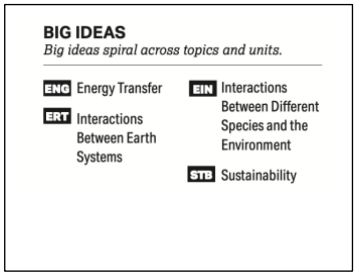
The course is divided into ten essential units according to the approved College Board Syllabus. The Units are as follows: Unit 1: The Living World: Ecosystem, Unit 2: The Living: Biodiversity, Unit 3: Populations, Unit 4: Earth Systems and Resources, Unit 5: Land and Water Uses, Unit 6: Energy Resources and Consumption, Unit 7: Atmospheric Pollution, Unit 8: Aquatic and Terrestrial Pollution, Unit 9: Global Change, and Unit 10: Test Prep

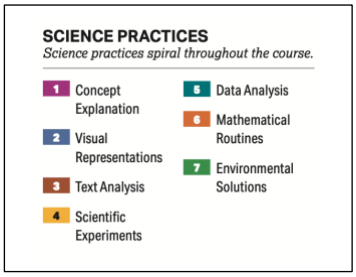
- **Instruction** is provided in online Scorm lessons, which include videos, summaries of the text and activities to assess knowledge.
- **Math Application** Each unit includes at least one specific "Do the Math" instruction in the Scorm Lesson and/or individual assessment.
- **Laboratory and Fieldwork** is selected from the Laboratory Investigation AP Environmental Science by Molnar, and from the Friedland and Releya teacher edition as well as other assignments assigned ad hoc. Lab work consists of "wet labs," online using labs from Labster and PhET simulation, and "dry lab" experiments. Fieldwork consists of various assignments that analyze concepts being taught and may include case studies. Case Studies will be used to teach and assess critical thinking skills. Case studies are selected from the Friedland and

Releya text. From this text the "Science Applied" and "Working toward Sustainability" sections will be used. Additionally, case studies are selected from the National Center of Case Studies, http://sciencecases.lib.buffalo.edu/cs/about/ A minimum of one period per week is devoted to laboratory experiences and/or fieldwork.

Assignments/Assessments in each Units of Instruction

- Each Unit of Instruction includes at least two summative and multiple formative assessments except Unit 10 which is all summative assessments
- Each Unit also includes additional formative assignments with guided questions or a case study.
- Each Unit contains investigation(s).
- Each Unit contains Math Practice/Application
- Each Unit Contains Big Ideas and Science Practices aligned according to the College Board Curriculum.





Summer Assignment

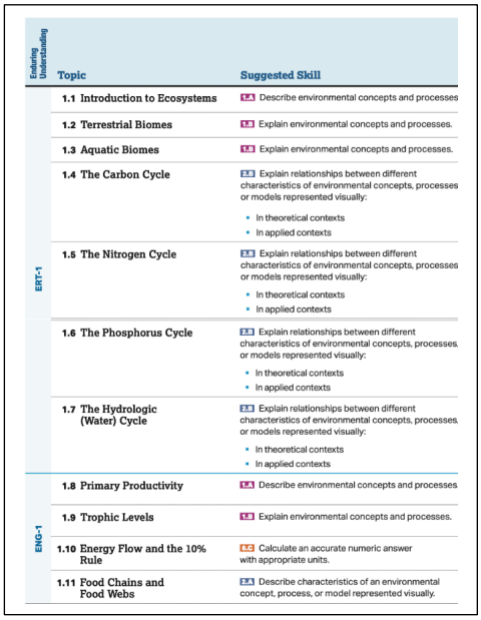
1. APES Baseline Multiple Choice Exam
2. APES Baseline Free Response Question

Unit 1: The Living World: Ecosystem (6 – 8% exam weighting) **3 weeks [QSI E04]**

- **Big Idea: Interactions Between Earth Systems (ERT-1): Ecosystems are the result of biotic and abiotic interactions. (1-7)**
- **Big Idea: Energy Transfer (ENG-1): Energy can be converted from one form to another. (8-11)**
- **Science is a process: Science Practice 1,2, and 6**

The following topics will be taught in this unit:

1. Introduction to Ecosystems
2. Terrestrial Biomes
3. Aquatic Biomes
4. The Carbon Cycle
5. The Nitrogen Cycle
6. The Phosphorus Cycle
7. The Hydrologic (Water) Cycle
8. Primary Productivity
9. Trophic Levels
10. Energy Flow and the 10% Rule
11. Food Chains and Food Webs



Enduring Understanding	Topic	Suggested Skill
ERT-1	1.1 Introduction to Ecosystems	LA Describe environmental concepts and processes
	1.2 Terrestrial Biomes	LA Explain environmental concepts and processes.
	1.3 Aquatic Biomes	LA Explain environmental concepts and processes.
	1.4 The Carbon Cycle	AA Explain relationships between different characteristics of environmental concepts, processes or models represented visually: • In theoretical contexts • In applied contexts
	1.5 The Nitrogen Cycle	AA Explain relationships between different characteristics of environmental concepts, processes or models represented visually: • In theoretical contexts • In applied contexts
	1.6 The Phosphorus Cycle	AA Explain relationships between different characteristics of environmental concepts, processes or models represented visually: • In theoretical contexts • In applied contexts
	1.7 The Hydrologic (Water) Cycle	AA Explain relationships between different characteristics of environmental concepts, processes or models represented visually: • In theoretical contexts • In applied contexts
ENG-1	1.8 Primary Productivity	LA Describe environmental concepts and processes
	1.9 Trophic Levels	LA Explain environmental concepts and processes.
	1.10 Energy Flow and the 10% Rule	CA Calculate an accurate numeric answer with appropriate units.
	1.11 Food Chains and Food Webs	LA Describe characteristics of an environmental concept, process, or model represented visually.

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive a score of 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive a score of 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 1 - Assessment List for Mastery

Week 1

1. (16/19) Introduction to Ecology
2. (6/8) Introduction to Ecology II
3. (28/33) Terrestrial Biomes
4. Fieldwork Activity: Creation of a Climatograph to determine a Biome
5. (22/25) Aquatic Biomes
6. Fieldwork Activity: Data Analysis to Determine the Type of Aquatic Biome
7. Week 1 Quiz
8. Week 1 Free Response Question
9. Week 1: One-page Notes/Concept Maps with Descriptions and Pictures

Week 2

10. (19/22) Biogeochemical Cycles
11. Lab: Carbon Cycle
12. (26/31) Movement of Energy (FC, FW, TL, GPP/NPP)
13. Lab: Food Web
14. Lab: Trophic Levels
15. (22/26) Previous Knowledge Review and DO THE MATH!
16. Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
17. Week 2 Quiz

Week 3

18. Unit 1 AP College Board Progress Check: MCQ
19. Unit 1 AP College Board Progress Check: FRQ
20. End of Unit Multiple Choice Exam
21. End of Unit Free Response Question

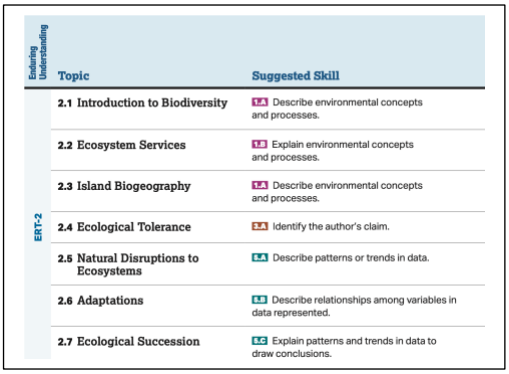
a. Placeholder for Picture that is Required in FRQ

22. Grade Unit 1: The Living World: Ecosystems (QSI E04) Placeholder

Unit 2: The Living World: Biodiversity (6 – 8% exam weighting) **2 weeks [QSI E05]**

- **Big Idea: Interactions Between Earth Systems (ERT-2): Ecosystems have structure and diversity that change over time. (1 – 7)**
- **Science is a process: Science Practice 1,3, and 5**

1. Introduction to Biodiversity
2. Ecosystem Services
3. Island Biogeography
4. Ecological Tolerance
5. Natural Disruptions to Ecosystems
6. Adaptations
7. Ecological Succession



Enduring Understanding	Topic	Suggested Skill
ERT-2	2.1 Introduction to Biodiversity	1.A Describe environmental concepts and processes.
	2.2 Ecosystem Services	1.B Explain environmental concepts and processes.
	2.3 Island Biogeography	1.A Describe environmental concepts and processes.
	2.4 Ecological Tolerance	2.A Identify the author's claim.
	2.5 Natural Disruptions to Ecosystems	2.A Describe patterns or trends in data.
	2.6 Adaptations	2.B Describe relationships among variables in data represented.
	2.7 Ecological Succession	2.C Explain patterns and trends in data to draw conclusions.

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive a score of 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive a score of 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 2 - Assessment List for Mastery

Week 1

1. (16/19) Earth's Biodiversity
2. Lab: Biodiversity
3. (15/18) How Disturbances Create Biodiversity
4. (18/21) How Evolution Creates Earth's Biodiversity
5. Lab: Evolution
6. Fieldwork Interpretation: Phylogenetic Tree (5 min)
7. (13/16) How Speciation Creates Earth's Biodiversity
8. E02 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
9. E02 Week 1 Quiz

Week 2

10. (14/17) Evolution of Species Distribution
11. (11/14) Evidence of Evolution for Species Biodiversity
12. Lab: Niches
13. (12/15) Ecological Succession
14. (10/13) Ecosystem Services and Why/How We Protect Biodiversity
15. (11/11) Do the Math for E02
16. E02 Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
17. E02 Week 2 Quiz

Week 3

18. Unit 2 AP College Board Progress Check: MCQ
19. Unit 2 AP College Board Progress Check: FRQ
20. End of Unit 2 Multiple Choice Exam
21. End of Unit 2 Free Response Question
    a) APES E02 Possible Free Response Questions - ALL Possible Questions for FRQ Exam are Here
22. Grade Unit 2: The Living World: Biodiversity (QSI E05) Placeholder

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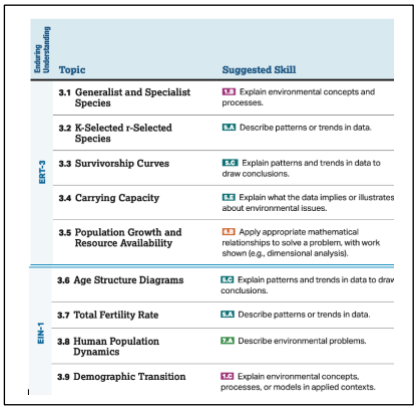
Unit 10 – Assessment for Mastery

23. 1st Review Exam for College Board APES Exam (E10)

Unit 3: Populations (10 – 15% exam weighting) **3 weeks [QSI E06]**

- **Big Idea: Interactions Between Earth Systems (ERT-3): Populations change over time in reaction to a variety of factors. (1 – 5)**
- **Big Idea: Interactions Between Different Species and the Environment (EIN-1): Human populations change in reaction to a variety of factors, including social and cultural factors. (6 – 9)**
- **Science is a process: Science Practice 1,5, 6 and 7**

1. Generalist and Specialist Species
2. K-Selected r-Selected Species
3. Survivorship Curves
4. Carrying Capacity
5. Population Growth and Resource Availability
6. Age Structure Diagrams
7. Total Fertility Rate
8. Human Population Dynamics
9. Demographic Transition



Enduring Understanding	Topic	Suggested Skill
ERT-3	3.1 Generalist and Specialist Species	1.1 Explain environmental concepts and processes.
	3.2 K-Selected r-Selected Species	1.A Describe patterns or trends in data.
	3.3 Survivorship Curves	1.C Explain patterns and trends in data to draw conclusions.
	3.4 Carrying Capacity	1.E Explain what the data implies or illustrates about environmental issues.
	3.5 Population Growth and Resource Availability	1.D Apply appropriate mathematical relationships to solve a problem, with work shown (e.g., dimensional analysis).
EIN-1	3.6 Age Structure Diagrams	1.C Explain patterns and trends in data to draw conclusions.
	3.7 Total Fertility Rate	1.A Describe patterns or trends in data.
	3.8 Human Population Dynamics	1.A Describe environmental problems.
	3.9 Demographic Transition	1.C Explain environmental concepts, processes, or models in applied contexts.

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to

a TSW and ii) receive 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 3 - Assessment List for Mastery

Week 1

1. Wet Lab: Population Growth through Observing Duckweed/Pond Water Over a Few Weeks - START IMMEDIATELY!
2. (18/22) Population Introduction
3. (9/11) Scientific Notations - How to Work with Population Numbers.
4. (11/13) Population Growth Models and Calculations
5. (2/2) Population Density
6. Dry Lab: Reproducing like Rabbits
7. Lab: Population Growth
8. E03 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
9. E03 Week 1 Quiz

Week 2

10. (20/24) Human Population Numbers
11. Fieldwork Analysis: Earth's Human Carrying Capacity as Seen in Models
12. (8/10) Social and Economic Factors on Human Population Numbers
13. Fieldwork Analysis: World's Life Expectancy and Infant Mortality as Seen in Models
14. (11/14) Human Populations Effect on Environments
15. Fieldwork Analysis/Inference: Demographic Transition based on a Model and Relative to the Ecological Footprint
16. E03 Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
17. E03 Week 2 Quiz

Week 3

18. Unit 3 AP College Board Progress Check: MCQ
19. Unit 3 AP College Board Progress Check: FRQ
20. End of Unit 3 Multiple Choice Exam
21. End of Unit 3 Free Response Question
    a. APES E03 Possible Free Response Questions
22. Grade Unit 3: Populations (QSI E06) Placeholder

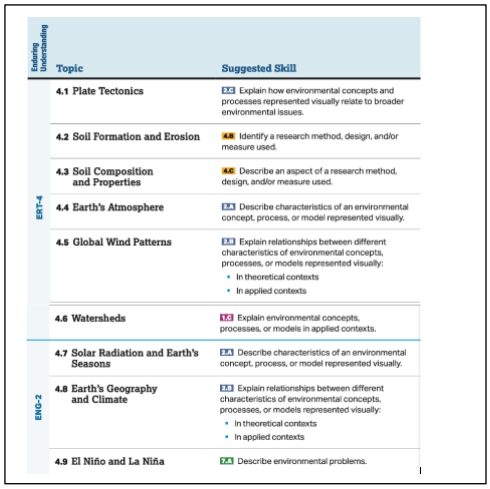
Unit 10 – Assessment for Mastery

23. 2nd Review Exam for College Board APES Exam (E10)

Unit 4: Earth Systems and Resources (10 – 15% exam weighting) **3 weeks [QSI E01]**

- **Big Idea: Interactions Between Earth Systems (ERT-4): Earth's systems interact, resulting in state of balance over time. (1-6)**
- **Big Idea: Energy Transfer (ENG-2): Most of the Earth's atmospheric processes are driven by input of energy from the sun. (7-9)**
- **Science is a process: Science Practice 1,2, 4 and 7**

1. Plate Tectonics
2. Soil Formation and Erosion
3. Soil Composition and Properties
4. Earth's Atmosphere
5. Global Wind Patterns
6. Watersheds
7. Solar Radiation and Earth's Seasons
8. Earth's Geography and Climate
9. El Niño and La Niña



Enduring Understanding	Topic	Suggested Skill
ERT-4	4.1 Plate Tectonics	2.C Explain how environmental concepts and processes represented visually relate to broader environmental issues.
	4.2 Soil Formation and Erosion	4.B Identify a research method, design, and/or measure used.
	4.3 Soil Composition and Properties	4.C Describe an aspect of a research method, design, and/or measure used.
	4.4 Earth's Atmosphere	2.A Describe characteristics of an environmental concept, process, or model represented visually.
	4.5 Global Wind Patterns	2.B Explain relationships between different characteristics of environmental concepts, processes, or models represented visually: • In theoretical contexts • In applied contexts
	4.6 Watersheds	1.C Explain environmental concepts, processes, or models in applied contexts.
ENG-2	4.7 Solar Radiation and Earth's Seasons	2.A Describe characteristics of an environmental concept, process, or model represented visually.
	4.8 Earth's Geography and Climate	2.B Explain relationships between different characteristics of environmental concepts, processes, or models represented visually: • In theoretical contexts • In applied contexts
	4.9 El Niño and La Niña	7.A Describe environmental problems.

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 4 - Assessment List for Mastery

Week 1

1. (5/6) Unequal Heating of Earth
2. Fieldwork: Data Analysis of Weather Balloons
3. (12/15) Air Currents
4. (12/15) Ocean Currents
5. Wet Lab: Convection Currents
6. (4/5) Weather and Earth's Geography

a. AP College Board Video: Environmental Science: 4.2-4.3, 4.6, 4.9 Soil, Watersheds, El Nino, and La Nina
7. Wet Lab: Soil Analysis -- NEEDS A COUPLE DAYS TO DO - plan accordingly
8. E04 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
9. E04 Week 1 Quiz

Week 2

10. (12/15) Earth's Structure and Formation
11. (13/16) Plate Tectonics
12. (6/7) Fieldwork: How to compute the Magnitude of an Earthquake and the Movement of the Earth's Plates
13. (7/9) Rock Cycle
14. (11/13) Soil Formation and Properties
15. E04 Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
16. E04 Week 2 Quiz

Week 3

17. Unit 4 AP College Board Progress Check: MCQ
18. Unit 4 AP College Board Progress Check: FRQ
19. End of Unit 4 Multiple Choice Exam
20. End of Unit 4 Free Response Question
    a. APES E04 Possible Free Response Questions
21. Grade Unit 4: Earth Systems and Resources (QSIE01) Placeholder

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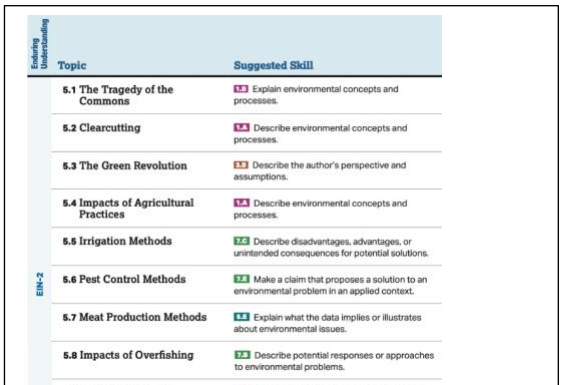
Unit 10 – Assessment for Mastery

22. 3rd Review Exam for College Board APES Exam (E10)
23. Collection of Important Diagrams for APES College Board Exam (E10)
24. 1st APES FRQ Mock Exam (E10)
    a. 1st APES FRQ Mock EXAM - Placeholder for Picture that is Required in FRQ (if needed)

Unit 5: Land and Water Use (10 – 15% exam weighting) **3 weeks [QSI E07]**

- **Big Idea: Interactions Between Different Species and the Environment (EIN-2): When humans use natural resources, they alter natural systems. (1 – 11)**
- **Big Idea: Sustainability (STB-1) Humans can mitigate their impact on land and water resources through sustainable use. (12 – 17)**
- **Science is a process: Science Practice 1,3, 4, 5 and 7**

1. The Tragedy of the Commons
2. Clearcutting
3. The Green Revolution
4. Impacts of Agricultural Practices
5. Irrigation Methods



Enduring Understanding	Topic	Suggested Skill
EIN-2	5.1 The Tragedy of the Commons	1.3 Explain environmental concepts and processes.
	5.2 Clearcutting	1.4 Describe environmental concepts and processes.
	5.3 The Green Revolution	1.5 Describe the author's perspective and assumptions.
	5.4 Impacts of Agricultural Practices	1.4 Describe environmental concepts and processes.
	5.5 Irrigation Methods	7.2 Describe disadvantages, advantages, or unintended consequences for potential solutions.
	5.6 Pest Control Methods	7.1 Make a claim that proposes a solution to an environmental problem in an applied context.
	5.7 Meat Production Methods	4.3 Explain what the data implies or illustrates about environmental issues.
	5.8 Impacts of Overfishing	7.2 Describe potential responses or approaches to environmental problems.

6. Pest Control Methods
7. Meat Production Methods
8. Impacts of Overfishing
9. Impacts of Mining
10. Impacts of Urbanization
11. Ecological Footprints
12. Introduction to Sustainability
13. Methods to Reduce Urban Runoff
14. Integrated Pest Management
15. Sustainable Agriculture
16. Aquaculture
17. Sustainable Forestry

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 5 - Assessment List for Mastery

Week 1

1. (12/15) Land Use and Classification
2. (6/8) Fieldwork: Determining How Much Land
3. (2/2) Impacts of Mining
4. (14/17) Land Management Practices and Impacts of Urbanization
5. (5/7)Feeding the World
6. (13/15) Agricultural Practices
7. (11/13) Alternatives to Agricultural Practices and Introduction to Sustainability
8. Fieldwork: US Meat Consumption vs Global Meat Consumption
9. E05 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
10. E05 Week 1 Quiz

Week 2

11. (9/11) Availability of Water and the Effects of Urbanization
12. (7/9) Humans Alteration of Water

13. (8/10) Water Footprint and Usage
14. Fieldwork: Calculate and Discuss the Impacts of Water Footprints
15. Fieldwork: Water Wars - How to Mitigate the Problems
16. E05 Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
17. E05 Week 2 Quiz

Week 3

18. Unit 5 AP College Board Progress Check: MCQ Part A
19. Unit 5 AP College Board Progress Check: MCQ Part B
20. Unit 5 AP College Board Progress Check: FRQ
21. End of Unit 5 Multiple Choice Exam
22. End of Unit 5 Free Response Question
    a. APES E05 Possible Free Response Questions
    b. Placeholder for Picture IF you had to write the FRQ related to aquifers.
23. Grade Unit 5: Land and Water Use (QSI E07) Placeholder

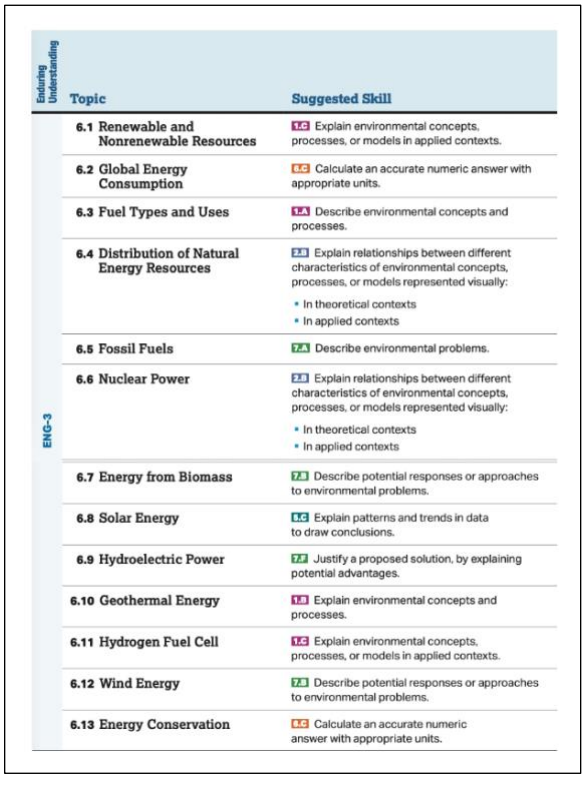
Unit 10 – Assessment for Mastery

24. 4th Review Exam for College Board APES Exam (E10)

Unit 6: Energy Resources and Consumption *(10 – 15% exam weighting)* 3 weeks [QSI E08]

- **Big Idea: Energy Transfer (ENG-3): Humans use energy from a variety of sources, resulting in positive and negative consequences.**
- **Science is a process: Science Practice 1,2,5,6 and 7**

1. Renewable and Nonrenewable Resources
2. Global Energy Consumption
3. Fuel Types and Uses
4. Distribution of Natural Energy Resources
5. Fossil Fuels
6. Nuclear Power
7. Energy from Biomass
8. Solar Energy
9. Hydroelectric Power
10. Geothermal Energy
11. Hydrogen Fuel Cell
12. Wind Energy
13. Energy Conservation



Enduring Understanding	Topic	Suggested Skill
ENG-3	6.1 Renewable and Nonrenewable Resources	1.C Explain environmental concepts, processes, or models in applied contexts.
	6.2 Global Energy Consumption	6.C Calculate an accurate numeric answer with appropriate units.
	6.3 Fuel Types and Uses	1.A Describe environmental concepts and processes.
	6.4 Distribution of Natural Energy Resources	2.A Explain relationships between different characteristics of environmental concepts, processes, or models represented visually: • In theoretical contexts • In applied contexts
	6.5 Fossil Fuels	7.A Describe environmental problems.
	6.6 Nuclear Power	2.A Explain relationships between different characteristics of environmental concepts, processes, or models represented visually: • In theoretical contexts • In applied contexts
	6.7 Energy from Biomass	7.A Describe potential responses or approaches to environmental problems.
	6.8 Solar Energy	5.C Explain patterns and trends in data to draw conclusions.
	6.9 Hydroelectric Power	7.A Justify a proposed solution, by explaining potential advantages.
	6.10 Geothermal Energy	1.A Explain environmental concepts and processes.
	6.11 Hydrogen Fuel Cell	1.C Explain environmental concepts, processes, or models in applied contexts.
	6.12 Wind Energy	7.A Describe potential responses or approaches to environmental problems.
	6.13 Energy Conservation	6.C Calculate an accurate numeric answer with appropriate units.

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 6 - Assessment List for Mastery

Week 1

1. (24/28) Nonrenewable Energy Resources w/ Fieldwork Calculations
2. Analysis of an Energy Generation Plant
3. (8/10) Fossil Fuel Resources
4. Labster: Coal Power Plants and Related Analysis
5. (14/17) Nuclear Energy Resources
6. (11/14) Radiometric Dating and Calculating Half-lives
7. Labster: Nuclear Chemistry: Understand the Process Happening in the Atomic Nucleus
8. E06 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
9. E06 Week 1 Quiz

Week 2

10. (9/11) Renewable Energy
11. (7/9) Renewable Energy II
12. Labster: Algae to Biodiesel
13. (8/10) Renewable Energy III
14. (5/7) Our Future Energy
15. E06 Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
16. E06 Week 2 Quiz
17. Unit 6 Progress Check: MCQ Part A
18. Unit 6 Progress Check: MCQ Part B

Week 3

19. Unit 6 Progress Check: FRQ
20. End of Unit 6 Multiple Choice Exam
21. End of Unit 6 Free Response Question
    a. APES E06 Possible Free Response Questions
22. Grade Unit 6: Energy Resources and Consumption (E08) Placeholder

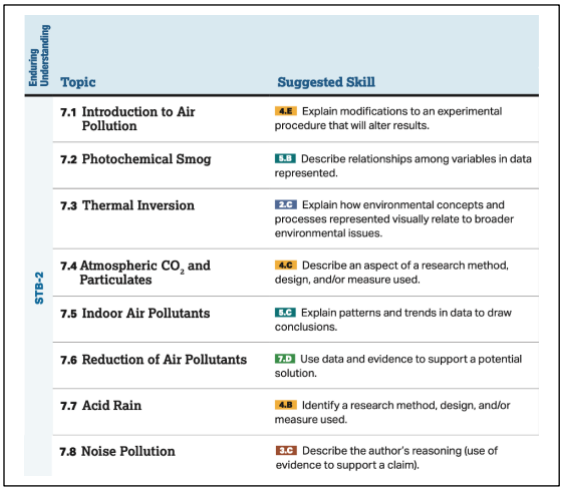
Unit 10 – Assessment for Mastery

23. 5th Review Exam for College Board APES Exam (E10)

Unit 7: Atmospheric Pollution *(7 – 10% exam weighting)* 2 weeks [QSI E02]

- **Big Idea: Sustainability (STB-2): Human activities have physical, chemical, and biological consequences for the atmosphere. (1 – 8)**
- **Science is a process: Science Practice 2,3,4 and 7**

1. Introduction to Air Pollution
2. Photochemical Smog
3. Thermal Inversion
4. Atmospheric CO2 and Particulates
5. Indoor Air Pollutants
6. Reduction of Air Pollutants
7. Acid Rain
8. Noise Pollution



Enduring Understanding	Topic	Suggested Skill
STB-2	7.1 Introduction to Air Pollution	4.E Explain modifications to an experimental procedure that will alter results.
	7.2 Photochemical Smog	3.B Describe relationships among variables in data represented.
	7.3 Thermal Inversion	2.C Explain how environmental concepts and processes represented visually relate to broader environmental issues.
	7.4 Atmospheric CO_2 and Particulates	4.C Describe an aspect of a research method, design, and/or measure used.
	7.5 Indoor Air Pollutants	3.C Explain patterns and trends in data to draw conclusions.
	7.6 Reduction of Air Pollutants	7.D Use data and evidence to support a potential solution.
	7.7 Acid Rain	4.B Identify a research method, design, and/or measure used.
	7.8 Noise Pollution	3.C Describe the author's reasoning (use of evidence to support a claim).

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 7 - Assessment List for Mastery

Week 1

1. (19/25) Major Air Pollutants and Their Sources
2. (8/10) Photochemical Smog and Acid Rain
3. Clean Air Act Brochure
4. (4/6) Air Pollution Control Measures
5. (4/5) Indoor Air Pollution
6. Lab: Measuring Air Particulate Matter - NEEDS A FEW DAYS TO DO!
    a. Placeholder for Lab: Measuring Air Particulate Matter

7. E07 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
8. E07 Week 1 Quiz

Week 2

9. Unit 7 Progress Check: MCQ
10. Unit 7 Progress Check: FRQ
11. End of Unit 7 Multiple Choice Exam
12. End of Unit 7 Free Response Question
    a. Unit 7 Possible FRQs
13. Grade Unit 7: Atmospheric Pollution (E02) Placeholder

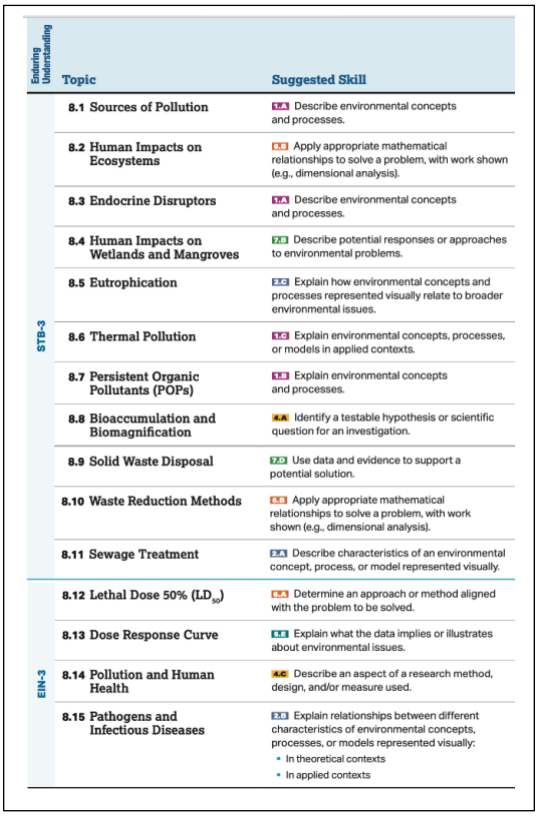
Unit 10 – Assessment for Mastery

14. 6th Review Exam for College Board APES Exam (E10)

Unit 8: Aquatic and Terrestrial Pollution *(7 – 10% exam weighting)* 3 weeks [QSI E03]

- **Big Idea: Sustainability (STB-3): Human activities, including the use of resources, have physical, chemical, and biological consequences for ecosystems. (1 – 11)**
- **Big Idea: Interactions Between Different Species and the Environment (EIN-3): Pollutants can have both direct and indirect impacts on the health of organisms, including humans. (12 – 15)**
- **Science is a process: Science Practice 2,3,4 and 7**

1. Sources of Pollution
2. Human Impacts on Ecosystems
3. Endocrine Disruptors
4. Human Impacts on Wetlands and Mangroves
5. Eutrophication
6. Thermal Pollution
7. Persistent Organic Pollutants (POPs)
8. Bioaccumulation and Biomagnification
9. Solid Waste Disposal
10. Waste Reduction Methods
11. Sewage Treatment
12. Lethal Dose 50% (LD50)
13. Dose Response Curve
14. Pollution and Human Health
15. Pathogens and Infectious Diseases



Enduring Understanding	Topic	Suggested Skill
STB-3	8.1 Sources of Pollution	1.A Describe environmental concepts and processes.
	8.2 Human Impacts on Ecosystems	2.B Apply appropriate mathematical relationships to solve a problem, with work shown (e.g., dimensional analysis).
	8.3 Endocrine Disruptors	1.A Describe environmental concepts and processes.
	8.4 Human Impacts on Wetlands and Mangroves	7.A Describe potential responses or approaches to environmental problems.
	8.5 Eutrophication	2.C Explain how environmental concepts and processes represented visually relate to broader environmental issues.
	8.6 Thermal Pollution	1.C Explain environmental concepts, processes, or models in applied contexts.
	8.7 Persistent Organic Pollutants (POPs)	1.B Explain environmental concepts and processes.
	8.8 Bioaccumulation and Biomagnification	4.A Identify a testable hypothesis or scientific question for an investigation.
	8.9 Solid Waste Disposal	7.D Use data and evidence to support a potential solution.
	8.10 Waste Reduction Methods	2.B Apply appropriate mathematical relationships to solve a problem, with work shown (e.g., dimensional analysis).
	8.11 Sewage Treatment	2.A Describe characteristics of an environmental concept, process, or model represented visually.
EIN-3	8.12 Lethal Dose 50% (LD_{50})	5.A Determine an approach or method aligned with the problem to be solved.
	8.13 Dose Response Curve	5.B Explain what the data implies or illustrates about environmental issues.
	8.14 Pollution and Human Health	4.C Describe an aspect of a research method, design, and/or measure used.
	8.15 Pathogens and Infectious Diseases	2.C Explain relationships between different characteristics of environmental concepts, processes, or models represented visually: ▪ In theoretical contexts ▪ In applied contexts

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 8 - Assessment List for Mastery

Week 1

1. (11/13) Wastewater from Humans and Livestock
2. (16/19) Heavy Metal, Other Chemical, and Oil Pollution
3. (13/16) Nonchemical Water Pollution
4. (4/4) Water Pollution
5. (7/9) Only Humans Generate Waste
6. (8/10) Three Rs and Composting
7. Lab: Waste and Its Effects on Atmospheric Carbon Dioxide
8. Fieldwork: Human Impacts of Wetlands and Mangroves
9. Fieldwork: The Chesapeake Bay Case Study
10. E08 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
11. E08 Week 1 Quiz

Week 2

12. (8/10) Landfills and Incinerators
13. (8/10) Hazardous Waste
14. (3/3) New Ways to Think About Solid Waste
15. Lab: How Does Your Wastes Compare to an Average US Family's Waste
16. (8/10) Human Diseases
17. (16/19) Toxicology and Chemical Risks
18. (7/9) Risk Analysis
19. E08 Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
20. E08 Week 2 Quiz

Week 3

21. Unit 8 Progress Check: MCQ
22. Unit 8 Progress Check: FRQ
23. End of Unit 8 Multiple Choice Exam
24. End of Unit 8 Free Response Question

a. Unit 8 Possible FRQs - you will have to write on 2 in the End of Unit FRQ Exam!

25. Grade Unit 8: Aquatic and Terrestrial Pollution (QSI E03) Placeholder

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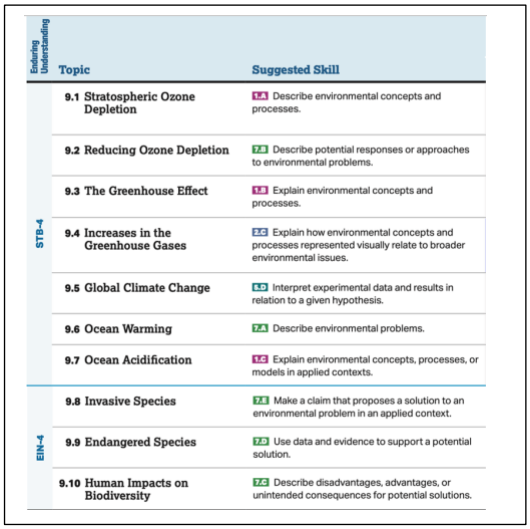
Unit 10 – Assessment for Mastery

26. 7th Review Exam for College Board APES Exam (E10)

Unit 9: Global Change *(15 - 20% exam weighting)* 3 weeks [QSI E09]

- **Big Idea: Sustainability (STB-4): Local and regional human activities can have impacts at the global level. (1-7)**
- **Big Idea: Interactions Between Different Species and the Environment (EIN-4): The health of a species is closely related to its ecosystem, and minor environmental changes can have a large impact. (8 – 10)**
- **Science is a process: Science Practice 1,2,5 and 7**

1. Stratospheric Ozone Depletion
2. Reducing Ozone Depletion
3. The Greenhouse Effect
4. Increases in the Greenhouse Gases
5. Global Climate Change
6. Ocean Warming
7. Ocean Acidification
8. Invasive Species
9. Endangered Species
10. Human Impacts on Biodiversity



Enduring Understanding	Topic	Suggested Skill
STB-4	9.1 Stratospheric Ozone Depletion	1.A Describe environmental concepts and processes.
	9.2 Reducing Ozone Depletion	7.A Describe potential responses or approaches to environmental problems.
	9.3 The Greenhouse Effect	1.A Explain environmental concepts and processes.
	9.4 Increases in the Greenhouse Gases	2.C Explain how environmental concepts and processes represented visually relate to broader environmental issues.
	9.5 Global Climate Change	5.D Interpret experimental data and results in relation to a given hypothesis.
	9.6 Ocean Warming	7.A Describe environmental problems.
	9.7 Ocean Acidification	1.C Explain environmental concepts, processes, or models in applied contexts.
EIN-4	9.8 Invasive Species	7.B Make a claim that proposes a solution to an environmental problem in an applied context.
	9.9 Endangered Species	7.D Use data and evidence to support a potential solution.
	9.10 Human Impacts on Biodiversity	7.C Describe disadvantages, advantages, or unintended consequences for potential solutions.

To receive a "B" for the unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 8 pts or above on the End of Unit Multiple Choice Exam, and iii) receive a score of 7 pts or above on the End of Unit Free Response Question.

To receive an "A" in this unit you must get i) above mastery, mastery, and/or completed on all assignments in this unit that needs a check mark because they are directly tied to a TSW and ii) receive 9 pts or above on the End of Unit Multiple Choice exam, and iii) receive a score of 8.5 pts or above on the End of Unit Free Response Question.

Unit 9 - Assessment List for Mastery

Week 1

1. (16/19) Stratospheric Ozone

2. (32/36) Global Climate Change and the Greenhouse Effect
3. (16/19) Evidence for Global Warming
4. (12/15) Consequences of Global Climate Change
5. Lab: Investigating the Greenhouse Effect and Writing a Letter to the Editor
6. E09 Week 1: One-page Notes/Concept Maps with Descriptions and Pictures
7. E09 Week 1 Quiz

Week 2

8. (13/16) Causes of Declining Biodiversity
9. (19/22) Conservation of Biodiversity
10. (10/13) Regulations and Equity
11. Fieldwork: Legislation Review for Promoting Sustainable Ecology
12. E09 Week 2: One-page Notes/Concept Maps with Descriptions and Pictures
13. E09 Week 2 Quiz

Week 3

14. Unit 9 Progress Check: MCQ
15. Unit 9 Progress Check: FRQ
16. End of Unit 9 Multiple Choice Exam
17. End of Unit 9 Free Response Question
    a. Unit 9 Possible FRQs - will need to write on 3 this time for End of Unit FRQ
18. Grade Unit 9: Global Change (E09) Placeholder

Unit 10 – Assessment for Mastery

19. 8th Review Exam for College Board APES Exam (E10)

Unit 10: AP College Board Exam Preparation – this unit is open all year long

In this unit, students will participate in a variety of review activities to prepare them for the AP exam. Students should use College Board released mock exams and sample essays to better prepare themselves for what to expect on the day of the exam. When students engage in a full mock exam, they are much better prepared and often score higher. Students should also register for AP Classroom to get the most out of AP practice provided by College Board. This unit is open all year long so that practice of ALL material is continuous.

To receive a "B" for the unit you must i) have all Progress Checks MCQ and FRQs in Units 1 - 9 completed and ii) receive 7 pts or above on all Review Exam for College Board APES Exam (E10) that are found in Units 2 - 9, and iii) complete all 7 required assignments listed in here

To receive an "A" in this unit you must i) have the UNIT 100% mastered by the pre-set schedule calendar, ii) have all Progress Checks MCQ and FRQs in Units 1 - 9 completed and iii) receive 8.5 pts or above on all Review Exam for College Board APES Exam (E10) that are found in Units 2 - 9 and iv) complete all 7 required assignments listed in here

Unit 10 – Assessment for Mastery

Unit 1 - Assessment List for Mastery for Unit 10

1. Unit 1 AP College Board Progress Check: MCQ
2. Unit 1 AP College Board Progress Check: FRQ

Unit 2 - Assessment List for Mastery for Unit 10

3. Unit 2 AP College Board Progress Check: MCQ
4. Unit 2 AP College Board Progress Check: FRQ
5. 1st Review Exam for College Board APES Exam (E10)

Unit 3 - Assessment List for Mastery for Unit 10

1. Unit 3 AP College Board Progress Check: MCQ
2. Unit 3 AP College Board Progress Check: FRQ
3. 2nd Review Exam for College Board APES Exam (E10)

Unit 4 - Assessment List for Mastery for Unit 10

1. Unit 4 AP College Board Progress Check: MCQ
2. Unit 4 AP College Board Progress Check: FRQ
3. 3rd Review Exam for College Board APES Exam (E10)
4. Collection of Important Diagrams for APES College Board Exam (E10)
5. 1st APES FRQ FULL Mock Exam (E10)

Unit 5 - Assessment List for Mastery for Unit 10

1. Unit 5 AP College Board Progress Check: MCQ
2. Unit 5 AP College Board Progress Check: FRQ
3. 4th Review Exam for College Board APES Exam (E10)

Unit 6 - Assessment List for Mastery for Unit 10

1. Unit 6 AP College Board Progress Check: MCQ
2. Unit 6 AP College Board Progress Check: FRQ
3. 5th Review Exam for College Board APES Exam (E10)

Unit 7 - Assessment List for Mastery for Unit 10

1. Unit 7 AP College Board Progress Check: MCQ
2. Unit 7 AP College Board Progress Check: FRQ
3. 6th Review Exam for College Board APES Exam (E10)

Unit 8 - Assessment List for Mastery for Unit 10

1. Unit 8 AP College Board Progress Check: MCQ
2. Unit 8 AP College Board Progress Check: FRQ
3. 7th Review Exam for College Board APES Exam (E10)

Unit 9 - Assessment List for Mastery for Unit 10

1. Unit 9 AP College Board Progress Check: MCQ
2. Unit 9 AP College Board Progress Check: FRQ
3. 8th Review Exam for College Board APES Exam (E10)

Unit 10 - Assessment List for Mastery for Unit 10

1. Test 1
2. Test 2
3. Unit 10: AP College Board 1st Practice Exam MCQ
4. Unit 10 AP College Board Exam 2020 Practice Exam 2 FRQ
5. Unit 10: AP College Board 2nd Practice Exam MCQ
6. Unit 10 AP College Board Exam 2020 Practice Exam 3 FRQ
7. LAST ASSIGNMENT - End of Year Survey
8. Study your vocabulary using flash cards in quiz let (optional assignment)
9. S01 Final Grade Placeholder

Tentative Course Schedule

Unit 1 – The Living World Ecosystems: 3 weeks
Unit 2 – The Living World Biodiversity: 3 weeks
Unit 3 – Populations: 3 weeks
Unit 4 – Earth Systems and Resources: 3 weeks
Unit 5 – Land and Water Use: 3 weeks
Unit 6 – Energy Resources and Consumption: 3 weeks
Unit 7 – Atmospheric Pollution: 2 weeks
Unit 8 – Aquatic and Terrestrial Pollution: 3 weeks
Unit 9 – Global Change: 3 weeks
Unit 10 – Test Preparation: All year

Attendance Policy

This course will be taught in approximately 32 weeks**. Students attend five 60-minute classes per week with a minimum of two class periods per week dedicated to laboratory activities, field activities, and long-term study. As well as a minimum of 2-3 hours on each weekend**. 25% of instructional time is devoted to laboratory investigation, assignments, case studies, and/or fieldwork. There are nine units in the course, each lasting approximately three weeks and a tenth unit devoted to test prep which runs concurrently with the nine units and has a concentrated one week at the end of the course

Classroom Behavior expectations

For synchronous (video) communication:

- School appropriate attire and location
- Camera on at all times
- Microphone muted on login

For asynchronous (email, texting, skype, etc.) communication:

- Be polite and respectful in responses to forum posts of other students. Bullying and inappropriate language will not be tolerated.
- Upload only appropriate material.
- Write formally in email communication with instructor. Informal writing can be used in texting platforms such as skype and teams

Submit work on time and inform the instructor if you need an extension. Extensions will only be granted on occasion for exceptional circumstances.

Academic honesty

Students' are required to be academically honest at all times. Plagiarism can be defined as submitting someone else's ideas, words, images, or data without the proper acknowledgement of the source. Plagiarism is synonymous to stealing and fraud and is not tolerated at QVS.

Here are some common examples of plagiarism if the sources are not clearly cited:

- using words, phrases, or ideas that are not your own.
- paraphrasing the work of another person, even though you may have changed the wording or syntax.
- using facts or data not considered common knowledge.
- submitting a paper from an essay service or agency, even though you may have paid for it.
- submitting any work done by another person, even though he or she may have given you permission to use it.

You should also note that beyond written work, plagiarism may encompass computer data, research, musical scores, video programs, and visual arts.

Plagiarism and academic dishonesty are a serious offense, especially in an academic environment. QVS teachers must be able to rely on the students' integrity to maintain a climate for successful learning.

If you plagiarize or are dishonest even once, it will put into question all your previous work, so the consequences may go beyond redoing one assignment, and you may need to revisit your previously submitted work to prove mastery of your learning outcomes.

You should diligently avoid any deliberate or inadvertent plagiarism. When you are unsure if the acknowledgement of sources is needed, ask your teacher.

Regardless of whether a student has intentionally or unintentionally borrowed someone else's work without acknowledging it correctly, plagiarism and academic dishonesty will be dealt with as follows:

First offense: The student must redo the assignment(s) in question. The instructor will make sure the student understands how the plagiarism came about and will give strategies to avoid it going forward. If it appears the plagiarism was intentional, parents and the director will be informed.

Second offense: The QVS director and the parent/guardian will be informed. A "D" will be assigned until the student has redone the assignment(s) in question.

Third offense: The instructor will refer the matter to the QVS director for further action.

Other Information

QVS Statement of Purpose

QSI Virtual School is a diverse international, multicultural, online learning community, offering meaningful standards-based education through mastery learning.

We prepare and develop students to have confidence to pursue their dreams and to positively impact the world.

We challenge. We question. We care.