2021 Unit 05: Land and Water Use

Content Area: **Science**
Course(s): **Advanced Placement Environmental Science**
Time Period: **December**
Length: **19 periods**
Status: **Published**

Enduring Understandings:

- Humans can mitigate their impact on land and water resources through sustainable use.
- When humans use natural resources, they alter natural systems

Essential Questions:

- How does your use of natural resources impact the world?
- Why are sustainable practices difficult to implement?

Lesson Titles:

- Aquaculture
- Clearcutting
- Ecological Footprints
- Impacts of Agricultural Practice
- Impacts of Mining
- Impacts of Overfishing
- Impacts of Urbanization
- Integrated Pest Management
- Introduction to Sustainability
- Irrigation Methods
- Meat Production Methods
- Methods to Reduce Urban Runof
- Pest Control Methods
- Sustainable Agriculture
- Sustainable Forestry
- The Green Revolution
- The Tragedy of the Commons

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.4	Demonstrate creativity and innovation.

WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections:

LA.RH.9-10.7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text, to analyze information presented via different mediums.
LA.RH.9-10.8	Assess the extent to which the reasoning and evidence in a text support the author's claims.
LA.RH.9-10.9	Compare and contrast treatments of the same topic, or of various perspectives, in several primary and secondary sources; analyze how they relate in terms of themes and significant historical concepts.
LA.RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LA.RST.9-10.8	Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
LA.RST.9-10.9	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
LA.WHST.9-10.1.A	Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
LA.WHST.9-10.1.B	Develop claim(s) and counterclaims using sound reasoning, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
LA.WHST.9-10.1.C	Use transitions (e.g., words, phrases, clauses) to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
LA.WHST.9-10.1.D	Establish and maintain a style and tone appropriate to the audience and purpose (e.g., formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.
LA.WHST.9-10.1.E	Provide a concluding paragraph or section that supports the argument presented.
	Random processes can be described mathematically by using a probability model: a list or description of the possible outcomes (the sample space), each of which is assigned a probability. In situations such as flipping a coin, rolling a number cube, or drawing a card, it might be reasonable to assume various outcomes are equally likely. In a probability model, sample points represent outcomes and combine to make up events; probabilities of events can be computed by applying the Addition and Multiplication Rules. Interpreting these probabilities relies on an understanding of independence and conditional probability, which can be approached through the analysis of two-way tables.
	Randomization has two important uses in drawing statistical conclusions. First, collecting data from a random sample of a population makes it possible to draw valid conclusions about the whole population, taking variability into account. Second, randomly assigning individuals to different treatments allows a fair comparison of the effectiveness of those treatments. A statistically significant outcome is one that is unlikely to be due to chance

alone, and this can be evaluated only under the condition of randomness. The conditions under which data are collected are important in drawing conclusions from the data; in critically reviewing uses of statistics in public media and other reports, it is important to consider the study design, how the data were gathered, and the analyses employed as well as the data summaries and the conclusions drawn.

Connections to Functions and Modeling.

Decisions or predictions are often based on data—numbers in context. These decisions or predictions would be easy if the data always sent a clear message, but the message is often obscured by variability. Statistics provides tools for describing variability in data and for making informed decisions that take it into account.

Data are gathered, displayed, summarized, examined, and interpreted to discover patterns and deviations from patterns. Quantitative data can be described in terms of key characteristics: measures of shape, center, and spread. The shape of a data distribution might be described as symmetric, skewed, flat, or bell shaped, and it might be summarized by a statistic measuring center (such as mean or median) and a statistic measuring spread (such as standard deviation or interquartile range). Different distributions can be compared numerically using these statistics or compared visually using plots. Knowledge of center and spread are not enough to describe a distribution. Which statistics to compare, which plots to use, and what the results of a comparison might mean, depend on the question to be investigated and the real-life actions to be taken.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Construct an Argument Divide the class into nine groups. Assign each group one of the nine statements from free-response question 4 (part 1) on the 1999 AP Exam. Have students develop an argument where they defend or refute the statement. Then have them present their arguments to the class.
- Evaluate and Model the Tragedy of the Commons
- One-Minute Essay Have students use an ecological footprint calculator to calculate their ecological footprint (in class or for homework). Ask them to write about what contributes to their ecological footprint or one change they could make to substantially lower it

Modifications

Benchmark Assessments

Skills-based assessment

Reading response

Writing prompt

Lab practical

Formative Assessment:

- Anticipatory Set
- Closure
- Quizzes on Land and Water Use, Sustainable Methods, Impacts of Mining and Urbanization
- Warm-Up

Summative Assessment:

- Alternate Assessment
- Marking Period 2 Assessment
- Unit 5 Land and Water Use Benchmark

Alternative Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios

Resources & Materials:

- AP Environmental College Board Site
- Carolina Biological Lab Kits
- Cengage
- Exploring Environmental Science for AP® Updated