Course Description:

Environmental Science (1 of 2) examines the relationships between organisms and the environment. The course covers Earth's systems, its biodiversity, and the distinct roles that organisms play in their ecosystems. The course also teaches population dynamics and how human populations, resources, and environmental quality interact. Environmental Science (1 of 2) discusses the impacts of research on scientific thought and environmental policy by using scientific practices, evidence-based data, communication strategies, and graphic displays.

Course Objectives:

- Describe science and its characteristics.
- Perform statistical analysis on data while identifying and predicting trends from it.
- Evaluate the impact of research.
- Research important contributions to environmental science as well as careers in this discipline.
- Identify different components of Earth's spheres.
- Diagram abiotic cycles.
- Describe the Law of Conservation and relate it to the Sun's influence on Earth.
- Define ecosystems and describe the roles of organisms within them.
- Evaluate food chains and food webs and describe the movement of matter and energy through them in terms of the Law of Conservation.
- Distinguish between biotic and abiotic components in an ecosystem, and discuss major ecosystem changes.
- Define biodiversity and identify causes of biodiversity loss.
- Describe natural selection and analyze empirical evidence for it.
- Analyze technology that affects biodiversity.
- Describe populations and discuss factors that affect them.
- Interpret and predict trends from population data.
- Analyze the effects of human activities on the environment.

Required Materials:

Certain labs/projects require the use of outside materials. These lists are provided in the course.

Course Overview:

Each unit will include a set of activities organized in a particular pattern. Most of the lessons will have the same format, but some activities will vary or be omitted if necessary.

A typical lesson will have the following activities. Note that the Checkpoint occurs in the first few lessons of a unit, while the Unit Exam occurs in the last lesson of a unit (except for Unit 6).

- **Direct Instruction** — This can include instructional text with Reading Check questions, as well as visual concepts and videos. Some activities have graded workbook questions and some do not. Further explanation of a few of these activities is provided below.
- **Visual Concepts/Videos/Interactives** — These are activities that cover complex topics from your content readings in more depth. They can range from short animations to longer videos, or interactive practice.

- **Project** — This is a graded activity that allows you to practice investigating, experimenting, and researching.
- **Discussion Board** — This is a graded activity that gives you a chance to interact and communicate with your classmates and teacher. It allows you to explore the lesson's topics in more depth and may require research.
- **Checkpoint** — This graded activity contains 10 or less questions that assess what you learned over the lesson.
- **Unit Exam** — This graded activity contains 25 questions that assess what you learned over the unit.
- **Final Exam** — This graded activity contains 30 questions that assess what you learned throughout the course.

Schedule of Work

Unit 1: Introduction to Environmental Science

- Direct Instruction
  - Science is Based on Evidence
  - Environmental Science
  - Environmental Science Careers
  - From Hypothesis to Theory
  - Measurements
  - Accuracy and Precision
  - Understanding Data Trends
  - The Value of Research
  - Research-Based Solutions
- Checkpoints 1, 3, 4
- Discussion Boards
- Unit 1 Review
- Unit 1 Exam

Unit 2: Earth Systems

- Direct Instruction
  - Earth Spheres
  - Thermal Energy
  - Earth's Climate
  - The Water Cycle
  - The Rock Cycle and its Components
  - Steps of the Carbon Cycle
  - Carbon in the Oceans
  - The Nitrogen Cycle
- Checkpoints 6–9
- Unit 2 Review
- Unit 2 Exam

Unit 3: Bionomics

- Direct Instruction
  - Biomes

- Ecosystems
- Ecosystem Change
- Primary Producers
- Producers and Consumers
- Symbiotic Relationships
- What are Alternative States?
- Food Chains and Webs

- Checkpoints 11–14
- Discussion Board
- Unit 3 Review
- Unit 3 Exam

Unit 4: Biodiversity

- Direct Instruction
  - Survival of the "Fittest"
  - Natural Selection in Action
  - Speciation
  - Causes of Biodiversity Loss
  - Hybridization
  - Gene Drives
- Checkpoints 16–19
- Discussion Board
- Researching Mechanisms of Biological Evolution
- Project: Conserving Biodiversity Pre-Lab
- Project: Conserving Biodiversity
- Unit 4 Review
- Unit 4 Exam

Unit 5: Population Dynamics

- Direct Instruction
  - What is a Population
  - Calculating Birthrates
  - Demographic Transition Model
  - Modeling Carrying Capacity
  - Projections of Population Growth
- Checkpoints 21, 23, 24
- Discussion Board
- Project: Conserving Biodiversity Write-Up
- Project: Ebony Forest Sustainability
- Unit 5 Review
- Unit 5 Exam

Unit 6: Recreation and the Environment

- Direct Instruction
  - Supporting Conservation in Vulnerable Areas

- Hunting
- Fishing
- Water Quality
- Wildlife at Risk
- Nature Conservation and Restoration

- Checkpoints 26–29
- Final Exam Review
- Final Exam

Unit 4: Biodiversity

Lesson 18: Project: Conserving Biodiversity Pre-Lab
- internet access
- measuring devices
- materials to record data

Lesson 19: Project: Conserving Biodiversity
- measuring devices
- materials to record data

Unit 5: Population Dynamics

Lesson 22: Project: Conserving Biodiversity Write-Up
- data gathered from researching and interpreting data on a solution to a biodiversity issue

Lesson 24: Project: Ebony Forest Sustainability
- Ebony Forest Sustainability Interactive