

Unit title: Ecology and Evolution

Instructional Goal: This unit will teach the students how organisms interact with each other and adaptations over time to their environment

Performance Objectives:

- Students will understand the taxonomic divisions of organisms
- Students will learn the concept and purpose of random mating
- Students will understand the importance of mutation in adaptation

Rationale: The student will learn that through various changes in the environment and gene structures, organisms over time will change to meet the new demands of the environment in which they live.

Learning activities:

- This is the first lecture of four that will lead up to the week long activity where the student will create their own organism.
- During the week long activity, the student will change the creature to meet the environment changes that are given by the teacher (i.e. volcano eruptions, earthquakes).
- Each class day will represent 10 million years.
- At the end of the week, students will present their organism and the various mutational demands the environment placed on the organism will be explained.

Evaluation process:

- A 12 point open note quiz will be given at the end of the fourth day to assess the students knowledge of the key concepts explained each day.
- Through the week long project, students will express an understanding of the key terms and concepts.

Materials and aids:

- Students will be given a daily worksheet to follow along with the powerpoint and fill in the appropriate definitions and terms of the day.

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- Students will understand the three different types of natural selection: Stabilizing, directional, and disruptive.
- Students will understand that natural selection doesn't necessarily lead to the survival of the organism forever as most species on Earth have become extinct.
- Students will understand most environments are not stable and organisms will constantly have to deal with not only new environments, but new predators, parasites, and competitors as well.

Rationale: The student will learn that theoretically in a stable environment natural selection will lead to the survival of a species, but new factors are constantly being introduced.

Learning activities:

- This is the second lecture of four that will lead up to the week long activity where the student will create their own organism.
- During the week long activity, the student will change the creature to meet the environment changes that are given by the teacher (i.e. volcano eruptions, earthquakes).
- Each class day will represent 10 million years.
- At the end of the week, students will present their organism and the various mutational demands the environment placed on the organism will be explained.

Evaluation process:

- A 12 point open note quiz will be given at the end of the fourth day to assess the students knowledge of the key concepts explained each day.
- Through the week long project, students will express an understanding of the key terms and concepts.

Materials and aids:

- Students will be given a daily worksheet to follow along with the powerpoint and fill in the appropriate definitions and terms of the day.

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Performance Objectives:

- Students will learn how barriers affect species evolution
- Students will understand the concept of allopatric separation where one population can be separated into two and the concept of adaptive radiation where one basic stock can take a number of different forms (i.e. Darwin's Galapagos Finches)
- Students will learn the barriers of organisms interbreeding with each other (i.e. why a lizard cannot mate with a snake)

Rationale: The student will learn how during the process of evolution, organisms can come from one similar ancestor but over time lose the ability to interbreed amongst similar organisms from that same original ancestor.

Learning activities:

- This is the third lecture of four that will lead up to the week long activity where the student will create their own organism.
- During the week long activity, the student will change the creature to meet the environment changes that are given by the teacher (i.e. volcano eruptions, earthquakes).
- Each class day will represent 10 million years.
- At the end of the week, students will present their organism and the various mutational demands the environment placed on the organism will be explained.

Evaluation process:

- A 12 point open note quiz will be given at the end of the fourth day to assess the students knowledge of the key concepts explained each day.
- Through the week long project, students will express an understanding of the key terms and concepts.

Materials and aids:

- Students will be given a daily worksheet to follow along with the powerpoint and fill in the appropriate definitions and terms of the day.

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Performance Objectives:

- Students will review the past three days lecture to fully understand all terms and concepts.
- Students will have the ability to tie all concepts together for the upcoming project.
- Students will be able to express in their own words through an open note 12 point quiz the purpose of the terms and concepts.

Rationale: The student will have the ability to understand all the taught aspects of ecology and evolution that are essential to understanding how the week long project will work.

Learning activities:

- This is the fourth and final lecture that will tie all the taught concepts together for the week long activity where the student will create their own organism.
- During the week long activity, the student will change the creature to meet the environment changes that are given by the teacher (i.e. volcano eruptions, earthquakes).
- Each class day will represent 10 million years.
- At the end of the week, students will present their organism and the various mutational demands the environment placed on the organism will be explained.

Evaluation process:

- A 12 point open note quiz will be given at the end of the fourth day to assess the students knowledge of the key concepts explained each day.

- Through the week long project, students will express an understanding of the key terms and concepts.

Materials and aids:

- Students will be given a daily worksheet to follow along with the powerpoint and fill in the appropriate definitions and terms of the day.

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Performance Objectives:

- Students will use the concepts they were taught to manipulate an organism that will be changed over a span of 50 million years (10 million years/class period)

Rationale: The student will have the ability to understand all the taught aspects of ecology and evolution that are essential to understanding how the week long project will work.

Learning activities:

- The student will be put into groups of 2 or 3 to create creatures for the start of their week long evolution project.
- The instructor will go over the worksheet and explain to the students what he expects each day of the project to represent.
- The student will create the basic creature to start with on Monday.

Evaluation process:

- Through the week long project, students will express an understanding of the key terms and concepts.
- After the end of each class period of the project, each student group will be assessed to determine if they are at the point where they should be and how they got to where their creature is at on the evolution process.

Materials and aids:

- Students will have all of their powerpoint notes and a worksheet explaining the purposes and goals of the project.