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eCurriculum System eMAP

Licensed to: TRUMBULL PUBLIC SCHOOLS

COURSE: Honors Biology      CODE:

UNIT: Unit 3: Ecology      MAP LEVEL:

CONTACT: Doug Winters; Denise Weed; Marty Schaivone      GRADE: 10

TIME FRAME: 3 weeks

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#### PERFORMANCE STANDARDS

##### 27.5 SCIENCE - SCI TECH IN SOCIETY (XI)

27.5.11.10.43 Students will describe the factors that affect the carrying capacity of the environment.

27.5.11.10.44 Students will explain how change in population density is affected by emigration, immigration, birth rate and death rate, and relate these factors to the exponential growth of human populations.

27.5.11.10.45 Students will explain how technological advances have affected the size and growth rate of human populations throughout history.

27.5.11.9.22 Students will explain how the accumulation of carbon dioxide (CO<sub>2</sub>) in the atmosphere increases Earth's 'greenhouse' effect and may cause climate changes.

##### 27.3 SCIENCE - LIFE SCIENCE (V,VI,VII)

27.3.5.6.5 Students will explain how populations are affected by predator-prey relationships.

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#### ESS/FOCUS QUESTIONS

Essential Questions:

How do ecosystems maintain homeostasis?

In what ways do human activities affect ecosystems?

Focus questions:

What characteristics define a population, a community, and an ecosystem?

What are limiting factors? How do they affect populations?

What are the components of an ecosystem, and how are they interdependent?

What is the relationship between energy and matter in an ecosystem?

How do biotic and abiotic factors interact within an ecosystem?

How do human activities impact the ecosystem?

Which human behaviors favorably affect the ecosystem?

How is the cycling of carbon, nitrogen and water essential to the biosphere?

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## CONTENT

1. Biodiversity is the sum total of all species of life in an ecosystem.
2. Changes in abiotic and biotic factors influence the ecosystem.
3. Fluctuations in population sizes are determined by the relative rates of natality, immigration, emigration and mortality.
4. Water, carbon and nitrogen are examples of matter that cycle continuously through an ecosystem.
5. The dynamics of an ecosystem are dependent on the activities of its producers and consumers.
6. The processes of photosynthesis and cellular respiration involve transformation of matter and energy.

7. Energy enters, is transferred, and is lost in an ecosystem. Matter is cycled in an ecosystem.
8. Populations compete for limited resources within an ecosystem.
9. Humans alter ecosystems as a result of rapid population growth, use of technology, and consumption of resources.

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## SKILLS

Students will be able to:

1. Differentiate between components of the biosphere .
2. Differentiate between habitat and niche and be able to provide examples of each.
3. Identify the types and the importance of relationships between organisms in ecosystems.
4. Construct and interpret food chains and webs by identifying the various trophic levels.
5. Explain how the processes of photosynthesis and cellular respiration are complementary.
6. Explain how matter is (re)cycled within an ecosystem. Explain how energy is either utilized or lost as it flows through an ecosystem.
7. Analyze and graphically represent population-related data.
8. Explain how populations change over time due to natality, immigration, mortality, and emigration.
9. Evaluate how technological advances affect populations and society.

10. Discuss how limiting factors affect populations and determine carrying capacity.
11. Research and present evidence reflecting the ability of humans to manipulate the environment.

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#### ASSURED EXPERIENCES

- Yeast population lab
- Human Population Dynamics research project
- Construction of a Food Web

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#### ASSESSMENTS

- Yeast populations lab report
- Human population dynamics project
- Unit/Chapter Quizzes/Tests
- Graphing assignments

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#### OPTIONAL ACTIVITIES

- Introduction to food chains and food webs
- Kaibab/Deer population activity
- Human Populations around the globe
- Symbiotic scenarios
- Predators at war video
- Population Sampling -Campbell

Ants and acacia - article and questions

Predator Prey simulation dry lab

Estimating population size

Human population growth - graphing and interpretation

Biological/Chemical levels of organization

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## RESOURCES

BSCS Blue text

Predator at war video

Yeast Lab Set up

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## ADDITIONAL NOTES