

## Unit 3 Ecology

Unit 3 Reference: Textbook Chapters 3-6 & OpenStax Textbook Chapters 44-47

Quiz Dates: \_\_\_\_\_ Test Date: \_\_\_\_\_

### A. Populations

1. Watch the Population Growth Model animation at: <https://www.youtube.com/watch?v=AL7EoWYW3VU>

- Don't worry about calculating growth for now. Simply watch what happens to the graphs.
- Is a population growth model based on exponential growth more or less realistic than a logistic model?

Explain your answer.

- Make a concept map that shows the relationship between limiting factors (both density-dependent and density-independent factors), carrying capacity, abiotic factors, biotic factors.
- Look back over your concept map from c and add examples to it.

2. Watch the animation titled, Biomagnification and the Trouble with Toxins at:

<https://www.youtube.com/watch?v=Tzk6vcmLcKw>

- Describe how pesticides, like DDT concentrate as they move through the food chain.
- What is the term for this concentration on pesticides?
- Create a timeline showing how human overpopulation could make this problem worse.

3. Most scientists agree that overall, the human population is over Earth's carrying capacity. List and describe at least 4 ways human overpopulation will negatively impact Earth's ecosystems.

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### B. Relationships and Interdependence

1. Watch the Amoeba Sisters video on Food Webs and Energy Pyramids at: <https://www.youtube.com/watch?v=-oVavgmveyY> and answer the following:

- What are synonyms for producer, primary consumer, secondary consumer, and tertiary consumer?
- Why do the arrows in a food chain point toward the one doing the eating?
- Why is a pyramid useful for thinking about energy in a food chain?
- What happens if you remove a trophic level?
- Distinguish between food webs and food chains.
- Define Biodiversity in your own words. Why is biodiversity important to ecosystems?
- It's easy to see how a decomposer or a predator depends upon dead things and prey. However, in ecosystems, organisms are *interdependent*, meaning that organisms depend on each other. Describe how a prey species depends on its predator and how all organisms depend on decomposers.

2. Competition is another type of ecological interaction between species.

- Define** competition and niche in your own words
- Relate** competition to the concept of a niche.

### C. Cycles and Climate Issues

- Using your book or online resources, draw a picture that shows how the greenhouse effect works and answer the following:
  - is the greenhouse effect good, bad or both? Explain your answer.
  - Contrast the problems caused by the greenhouse effect with the problem of the destruction of/hole in the ozone layer.
- Sketch the Carbon and Nitrogen cycles. Be sure to label what's happening at each step in the cycle.
- When we study Ecology, you often hear the word "balance" used. Cycles are great studies in balance, since they maintain the flow of materials like Carbon and Nitrogen through the ecosystem, keeping them from building up in any one place. For each of the following ecological problems, **define** the problem, **describe** which cycle is involved, how the imbalance was created, and what the impact of the imbalance is:
  - global warming
  - eutrophication
  - ocean acidification
- How does overpopulation make the problems in #3 worse? Be as detailed in your answer as possible.

### D. Human Impact on the Ecosystem

- Each of the issues on the chart below is currently impacting NC. You'll need to do some internet research to help you fill in the chart below:

Problem in NC	Description of what's happening and its causes	Description of impact of the problem on NC	Solutions being tried or ideas for solving the problem
Hog Waste Lagoons			
Invading species (Kudzu)			
Acid Rain			

- Besides the ecological issues we've discussed in this exploration sheet so far, what is one other ecological problem that you know of and what's a possible solution to the problem?
- For all of the ecological problems that we've discussed in this part of the exploration sheet, describe how human overpopulation makes the problem worse.
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