

9th Grade Biology:
Populations and Human Interaction

May 11 – 15

Time Allotment: 40 minutes per day

Student Name: _____

Period: _____

Teacher Name: *Ms. Carstens*

Packet Overview

Date	Objective(s)	Page #
Monday, May 11	1. Identify main properties of populations that scientists measure in their study of populations. 2. Explain why populations are considered dynamic.	2
Tuesday, May 12	1. Describe limiting factors that affect populations.	4
Wednesday, May 13	1. Describe the impact of pollution on organisms and the environment. 2. Explain why extinctions and ecosystem disruption are of concern to humans.	6
Thursday, May 14	1. Explain the significance of a bioindicator. 2. Define and describe biodiversity hotspots.	8
Friday, May 15	1. Describe examples of human efforts to protect species and their environments.	10

Additional Notes: Hi all! It's been so fantastic to see some of you during guided instruction, and I truly look forward to seeing your smiling faces and connecting with y'all during our time together! I would encourage you all to keep attending as we work through our course material. If at any point you have questions outside of guided instructions, feel free to reach out to me by email (kelly.carstens@greatheartsnorthernnoaks.org).

****IMPORTANT: Be sure you're completing the weekly minor assessments!** At the end of your lesson this Friday, complete the minor assessment at the end of this packet, p. 12. You **may use your notes** from the week. It should take approximately 15 minutes.

Academic Honesty

I certify that I completed this assignment independently in accordance with the GHNO Academy Honor Code.

Student signature:

I certify that my student completed this assignment independently in accordance with the GHNO Academy Honor Code.

Parent signature:

Unit Overview:

Our unit this week continues to explore populations, factors that influence their growth and decline, their diversity, and most importantly their interdependence on other species and the environment. You will also have an opportunity to delve into the fields of environmental science, conservation biology, and urban ecology as part of our study of living things. Finally, we will discover the significance of human interaction on populations and the environment and how we can do our part to maintain our biosphere's delicate balance!

I. Monday, May 11

Unit – Chapters 19, 22: Populations and Human Interaction
Lesson 1: Understanding Populations

Lesson 1 Socratic Guiding Questions: Keep this in mind as you study!
What factors influence population growth and decline?

Objectives: Be able to do this by the end of this lesson.

1. Identify main properties of populations that scientists measure in their study of populations.
2. Explain why populations are considered dynamic.

Introduction to Lesson 1:

Our lesson today identifies three main properties (characteristics) of populations that scientists measure and observe in order to study them. As with all scientific observations, gathering data in an effort to better understand a phenomenon is key to forming conclusions, making predictions, and solving problems. By studying these properties and tracking their trends, we are better prepared to understand population dynamics, or changes, within the population.

Read pp. 381 – 385 in your text. After reading, complete the tasks on the following pages.

Concept and Vocabulary Review:

- ✓ In your own words, define **population**. Give an example of a population.

- ✓ The **three main properties** scientists measure in populations are *population size, population density, and dispersion*. Define each of these below.

a) population size –

b) population density –

c) dispersion –

Describe the *three types of dispersion*.

Clumped	Uniform	Random

- ✓ Why do you suppose these three properties (population size, population density, and dispersion) are helpful for scientists?

- ✓ How do **birth rates** and **death rates** directly affect population size?

- ✓ **Complete the following summary.**

Growth rate is typically measured *per capita* in large populations, which means that instead of counting the entire population, it's reduced to smaller groups of _____ individuals. This makes it easier to determine data averages. To describe growth rate, demographers use the following equation:

$$\frac{\text{Births} - \text{Deaths}}{\text{Population}} = \text{growth rate}$$

This number can be negative or positive. Negative growth rate occurs when more _____ than _____ occur, resulting in a(n) _____ in population. Oppositely, positive growth rate occurs when there are more _____ than _____, resulting in a(n) _____ in population.

Short Response.

- ✓ Why are populations considered dynamic? What unknown factors might make it difficult to predict the future size of a population?

II. Tuesday, May 12

Unit – Chapters 19, 22: Populations and Human Interaction
Lesson 2: Population Growth and Regulation

Lesson 2 Socratic Guiding Questions: Keep these questions in mind as you study!
What factors influence population size?

Objectives: Be able to do this by the end of this lesson.
1. Describe limiting factors that affect populations.

Introduction to Lesson 2

We’ve discovered that species are interdependent on other organisms and their environment throughout the biosphere. But how, exactly, do those biotic and abiotic factors affect a particular species? How do the species react and adapt?
In Lesson 2, we will explore limiting factors that regulate and cause fluctuations in a population’s size.

Read pp. 388 – 389 in your text. After reading, complete the tasks on the following pages.

Concept and Vocabulary Review:

✓ Fill in the chart.

Density-independent factor	Density-dependent factor
<i>Description:</i>	<i>Description:</i>
<i>Example(s):</i>	<i>Example(s):</i>

What type of limiting factor is a disease that is transmitted by parasites? Explain.

✓ Population Size – *Charles S. Elton*

• Who was he? _____

• What did he study? _____

• What were his findings? _____

- ✓ The rapidly growing _____ population has caused extreme _____ in the populations of some other _____ and _____.

Why do you think this is? _____

- ✓ We learned that a *genetic bottleneck* effect occurs when a population has been drastically reduced in size by outside factors, resulting in a smaller population. How does this affect the genetic variation?

- ✓ Why are small populations more vulnerable to extinction?

Short Response.

Why is the term “*limiting factors*” an appropriate name for that concept?

III. Wednesday, May 13

Unit – Chapters 19, 22: Populations and Human Interaction
Lesson 3: Environmental Issues

Lesson 3 Socratic Guiding Question: Keep this question in mind as you study!
How do humans impact the environment?

Objective: Be able to do this by the end of this lesson.

1. Describe the impact of pollution on organisms and the environment.
2. Explain why extinctions and ecosystem disruption are of concern to humans.

Introduction to Lesson 3:

Humans are interdependent on a vast number of species and environmental resources that directly affect our survival. We rely heavily on the success of other organisms and flourishing of various ecosystems. However, in Lesson 3, we will discover and analyze the impacts we, in turn, have on the ecosystems that make up our biosphere.

Read pp. 440-444 in your text. Then, complete the tasks below.

Concept and Vocabulary Review:

✓ What is **pollution**? _____

✓ A form of air pollution is **smog**. Smog is _____) _____ mixed with _____ that result from _____.

Identify at least one example of an activity that produces smog.

✓ **CFCs**, or **chlorofluorocarbons**, is a human-made chemical that contributes to the destruction of the ozone layer. Answer the following questions about CFCs:

• What are some of the products in which CFCs were found?

• What kind of damage does it do to the ozone layer? How was this predicted to directly impact humans?

✓ Global Warming refers to the steady increase in overall temperature on the earth’s surface correlating to an increase in CO₂ (carbon dioxide) levels in the atmosphere, which naturally helps to trap solar energy. As the amount of CO₂ molecules increases, climatologists (scientists who study climate) have observed and recorded the steady increase of the earth’s average temperatures. Even the slightest change in Earth’s average temperatures could alter _____, _____, _____, and _____, which could shift agricultural regions, disrupt both terrestrial and aquatic ecosystems.

- ✓ List at least two examples and/or sources of the following types of pollution:
- Air – _____
 - Land – _____
 - Water – _____

✓ *Ecosystem disruption*, the _____ or substantial _____ in the functioning of natural _____, is evident as species—and sometimes entire _____ disappear. This disappearance, or the death of every member of the species, is called _____.

✓ Explain the difference between an *endangered species* and an extinct species.

✓ What is a **keystone species**? How can the loss of a keystone species impact its environment?

✓ Explain how overusing resources can cause ecosystem imbalance. How can **sustainability** help correct this problem?

Short Response: In the space below, identify at least two factors considered in an analysis of a person’s or population’s ecological footprint.

IV. Thursday, May 14

Unit – Chapters 19, 22: Populations and Human Interaction

Lesson 4: Environmental Solutions (Part 1)

Lesson 4 Socratic Guiding Question: Keep these questions in mind as you study!

What have humans done to combat issues we've caused in ecosystems?

Objectives: Be able to do this by the end of this lesson.

1. Explain the significance of a bioindicator.
2. Define and describe biodiversity hotspots.

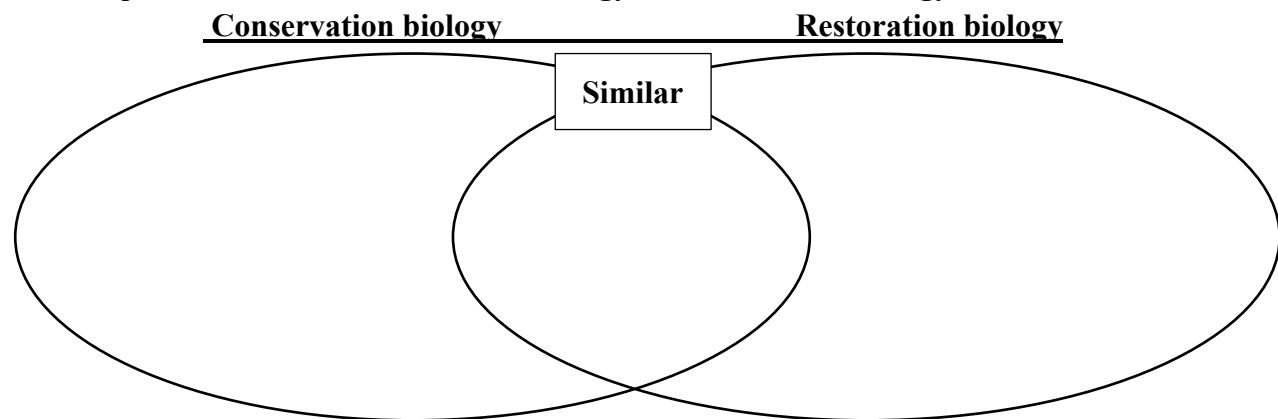
Introduction to Lesson 4

In this lesson, we will explore clues and data tools that convey patterns regarding the health of an ecosystem. We will also discover how man has used his knowledge and observation to the good of species surrounding them.

Read pp. 446-449 (STOP at “Government and Laws.” After reading, complete the following tasks.

Concept and Vocabulary Review:

- ✓ Compare and contrast **conservation biology** and **restoration biology**.



- ✓ Use the following chart to describe a **bioindicator**.

A bioindicator is...
If there is a decline in a bioindicator population in an ecosystem, we can conclude...
If there is an increase in a bioindicator population in an ecosystem, we can conclude...
An example of a bioindicator species is:

- ✓ In 3-5 sentences, summarize the case study of the whooping crane found on pp.447-448.

- ✓ What is a **biodiversity hotspot**? What criteria do these hotspots have to meet?

- ✓ Looking at the map in Figure 22-11 on p. 448, what do you notice about the majority of these hotspot locations? Why do you suppose most are found in those regions?

V. Friday, May 15

Unit – Chapter 19, 22: Populations and Human Interactions
Lesson 5: Environmental Solutions (Part 2)

Lesson 5 Socratic Guiding Question: Keep these questions in mind as you study!

Objectives: Be able to do this by the end of this lesson.

1. Describe examples of human efforts to protect species and their environments.

Introduction to Lesson 5

With conservation at the forefront of our world today, it is imperative to ask ourselves, “What are we doing to ensure the planet thrives and continues to thrive for future generations?” In today’s lesson, we will explore what has been accomplished in the early stages of conservation, what global initiatives have been outlined to aid in conservation, and your role and impact in our environment.

Read pp. 449-452 in your text. Then, complete the following tasks.

Concept and Vocabulary Review

- ✓ Describe at least **TWO** ways governments have taken steps toward conservation.

- ✓ What is **ecotourism**? What value might it have?

Short Response.

1. In 3-5 sentences, summarize the case study of the Everglades found on pp.451.

2. Below is a quote from Dr. Jane Goodall, an English primatologist and anthropologist. Read carefully and respond to the question below.

You cannot get through a single day without having an impact on the world around you. What you do makes a difference and you have to decide what kind of difference you will make. – Dr. Jane Goodall

What impacts do you have on your environment in a single day? Are they positive and/or negative? What are some things you might be able to do to make a positive difference in the environment?

Minor Assessment: Chapters 19, 22 – Populations and Human Interaction

Directions: Complete the following.

1. Which of the following is a population?
 - a. all the fish in a pond
 - b. all the birds in New York City
 - c. all the members of a family of humans
 - d. all the fish of the same species in a lake
2. Which of the following is a density-dependent factor for a population of deer in a forest?
 - a. a drought
 - b. a landslide
 - c. a period of freezing weather
 - d. the number of cougars in a forest
3. Species that affect many other species in a community are known as
 - a. bioindicators
 - b. keystone species
 - c. sustainable species
 - d. endangered species
4. _____ occurs when there are no surviving members of a given species.
5. Identify **three types of pollution**: _____

Short Response: Answer the following using complete sentences.

1. A person argues that we should not worry about the loss of species because **extinction** is natural. Evaluate and form a response to this claim.

2. Describe the concept of **interdependence**. Give evidence to support your description.
