

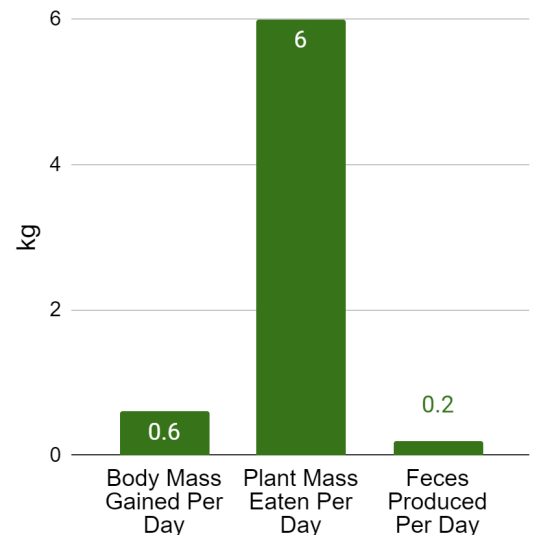
Semester 1 Final Exam - Biology

Name: _____ Hour: _____ Date: _____ Score: _____ / 28

Background: The Apostle Islands on Lake Superior's shore are the northernmost point in Wisconsin. These 21 islands are home to pristine beaches, historic lighthouses, and sea caves. This location became federally protected as a national lakeshore in 1970. The islands' thick hardwood forests are home to whitetail deer, black bears, wolves, coyotes, rabbits, squirrels, otters, ducks, and grouse. [\(Image Source\)](#)



1. **A mature deer on these islands eats 6 kg of plants daily in summer, but their body mass only increases by 0.6 kg per day. Why? What happens to plant macromolecules (carbs, fats, protein) after being consumed by the deer? Justify your claims with evidence & reasoning.**



Score _____ /3

Complete

Accurate

Precise

2. **Which of the following claims is most supported by this data?**
Most of the atoms in plant macromolecules consumed by deer are...
 - a. XXXX
 - b. XXXX
 - c. XXXX
 - d. XXXX

3. **Deer gain mass by consuming organisms like plants. How do plants gain mass if they cannot consume other organisms? Where does most of the mass of plants come from? Justify your claims with evidence & reasoning.** [\(Image Source\)](#)



Score _____ /3

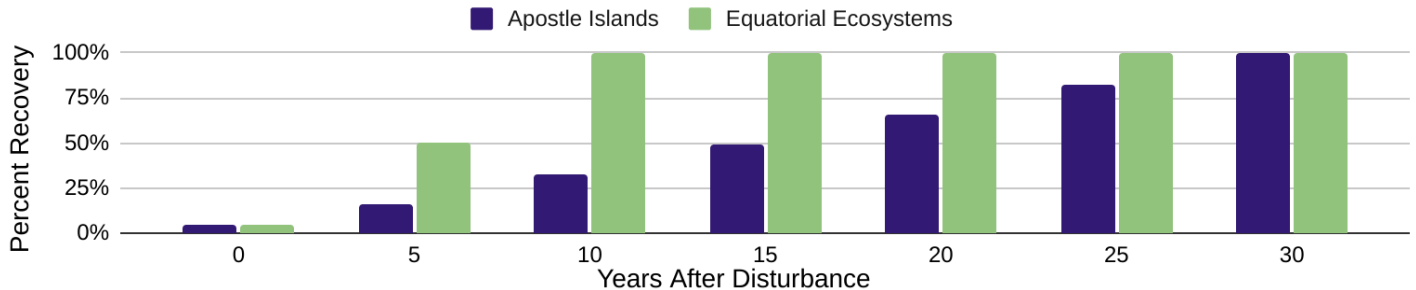
Complete

Accurate

Precise

Background: It took decades for the Apostle Islands to recover from extensive logging. Scientists are studying the factors that affect the rate of ecosystem recovery. A researcher predicted that ecosystems closer to the equator (*equatorial ecosystems*) would be more resilient and recover more quickly than those further from the equator, like the Apostle Islands. Use the data provided below to answer the following questions.

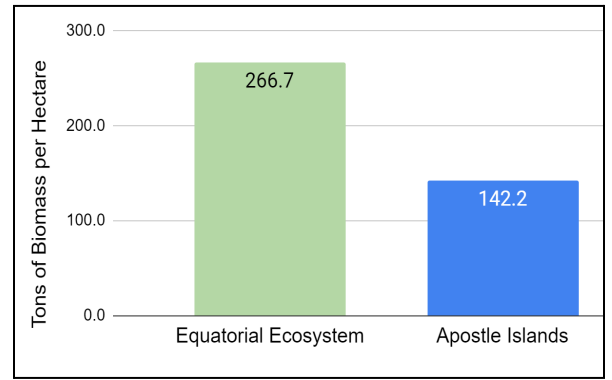
Recovery Pace of Apostle Islands vs. Equatorial Ecosystems



- _____ 4. What is the independent variable in this experiment?
 a. XXXX b. XXXX c. XXXX d. XXXX
- _____ 5. What is the dependent variable in this experiment?
 a. XXXX b. XXXX c. XXXX d. XXXX
- _____ 6. Based on the info above, which of the following most closely matches the hypothesis in this study?
 a. XXXX
 b. XXXX
 c. XXXX
 d. XXXX.
- _____ 7. Which of the following would be an appropriate rationale for the hypothesis in this study?
 a. XXXX
 b. XXXX
 c. XXXX
 d. XXXX
- _____ 8. Which conclusion is supported by this data?
 a. XXXX
 b. XXXX
 c. XXXX
- _____ 9. Based on this data, we can predict that carrying capacities of ecosystems in the Apostle Islands are likely ___ compared to carrying capacities of ecosystems near the equator.
 a. XXXX b. XXXX c. XXXX d. XXXX
- _____ 10. Which of the following would *reduce* the validity of this experiment's findings?
 a. XXXX b. XXXX c. XXXX d. XXXX

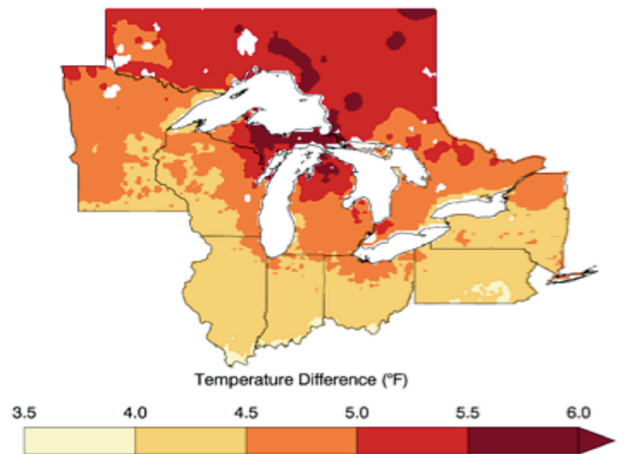
11. This data compares biomass per hectare (2.5 acres) in equatorial ecosystems versus the Apostle Islands. Which prediction is most likely based on this data?

- a. XXXX
- b. XXXX
- c. XXXX
- d. XXXX



12. Apostle Island ecosystems are threatened by changing climate conditions. Lake Superior has experienced significant decreases in ice cover in recent decades. Droughts now occur more often, and by 2050, the average temps in this region will likely be 2-6 degrees warmer. What is causing these changes? Is this just a natural cycle? Justify your claims with evidence & reasoning. [\(Image Source\)](#)

Difference in Average Temperature
Period: 2041-2070
Emission Scenario: A2



Score _____

_____/3

Complete

Accurate

Precise

13. Forest fires are a growing threat to the Apostle Islands as warmer temps and droughts become increasingly common. If a forest fire eliminated half of the vegetation burned on an island, predict how this would affect the carrying capacity of that island for *primary consumers* like deer, and for *secondary consumers* like wolves. Justify your prediction with evidence and reasoning. [\(Image Source\)](#)



Score _____

_____/3

Complete

Accurate

Precise

14. Rising temperatures and more frequent droughts are making wildfires more common throughout all of North America. In 2022, nearly 6 million acres of forest were lost to wildfires. In each case, a smaller amount of ashes was left behind. What happens to most of the atoms in trees that are burned? Support your claims with evidence & reasoning.

[\(Image Source\)](#)



Score	_____
_____ /3	_____
<input type="checkbox"/> Complete	_____
<input type="checkbox"/> Accurate	_____
<input type="checkbox"/> Precise	_____

_____ 15. During a wildfire, we would expect the concentration of O₂ to _____ in the surrounding air.
a. XXXX b. XXXX c. XXXX d. XXXX

_____ 16. During a wildfire, we would expect the concentration of CO₂ to _____ in the surrounding air.
a. XXXX b. XXXX c. XXXX d. XXXX

_____ 17. A molecule of CO₂ is shown here. How many atoms and how many elements does it have?
a. XXXX
b. XXXX
c. XXXX
d. XXXX



_____ 18. Wildfires release vast amounts of heat and light energy (e.g., more energy is released from western wildfires per year than is used by the entire state of California). Where does the energy of a fire primarily come from?
a. XXXX
b. XXXX
c. XXXX
d. XXXX

[Data Sources](#)

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