Biology Spring Semester Final Exam (Preview Copy)

Name: _____ Hour_____ Date:_____ Score:_____ / 33

Background Information: Green anoles are a lizard that live in the southeastern United States. They tend to be 4 to 8 cm (1.5-3 in) long. They mostly live in tree branches, and their green color gives them camouflage.

1. **How does the <u>DNA</u> of the green anole relate to the <u>proteins</u> produced in its cells, and how do these factors influence <u>traits</u> such as its green coloration?** Use all underlined terms in your response.

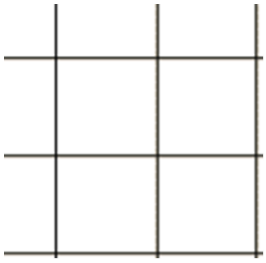
Score
_____/3
□ Complete
□ Accurate
□ Precise

HINT: A successful response will clearly explain how both DNA and proteins affect an organism's traits.

_____2. **Which of the following best summarizes <u>mitosis</u>?**
   a. □□□□□
   b. □□□□□
   c. □□□□□
   d. □□□□□

_____3. **Which of the following best summarizes <u>meiosis</u>?**
   a. □□□□□
   b. □□□□□
   c. □□□□□
   d. □□□□□

_____4. Some green anoles are born with a *recessive* mutation that can make them albino (white). Lizard A is <u>heterozygous</u> for this mutation. Lizard B is <u>homozygous recessive</u> for this mutation. **Which of the following claims would be accurate?**
   a. □□□□□
   b. □□□□□
   c. □□□□□
   d. □□□□□



5. **What are the odds that the offspring of Lizard A and Lizard B will be albino (white)?** Defend your claim using a Punnett square.

HINT: First complete the Punnett square to predict the most likely percentage of offspring with each trait. Then write your answer using this info.

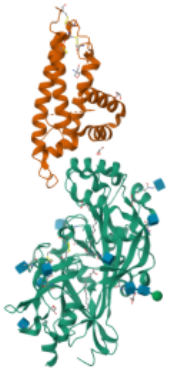
Score
_____/3
□ Complete
□ Accurate
□ Precise

_____6. **Which of the following summarizes what occurs during <u>transcription</u>?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐

_____7. **Which of the following summarizes what occurs during <u>translation</u>?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐



_____8. **The color of green anoles is created by a pigment protein called SCARB3 (shown here). How does the gene for this protein relate to the protein's shape and function?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐

9. The albino trait in these lizards is due to the substitution of one base in a gene. **Why would the entire trait change if only one base in this gene was changed?**

Score
_____/3
☐ Complete
☐ Accurate
☐ Precise

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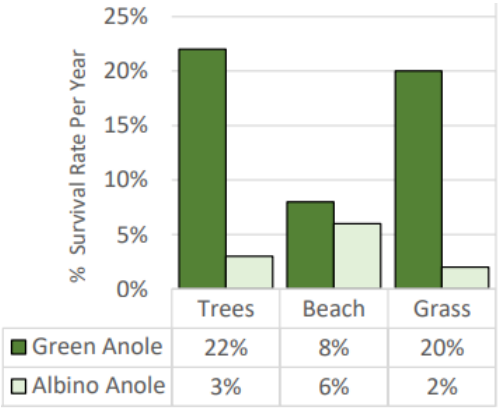
_____

HINT: How does changing one base in DNA affect amino acids and protein assembly? How does this change the protein's shape and function?

_____10. **Which of the following claims are supported by this data?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐



11. **Is this an example of natural selection and/or evolution?** Justify your claims with evidence. *HINT: How are natural selection and evolution different?*

Score
_____/3
☐ Complete
☐ Accurate
☐ Precise

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Background: 1) Green anoles are a lizard that lives in trees in Florida. A similar species called brown anoles invaded Florida from Cuba. Brown anoles live in similar habitats and eat similar food as the green anoles. Brown anoles also eat the newly hatched babies of green anoles.

2) Scientists were unsure how presence of the brown anoles would affect the green anoles. 3) They predicted that brown anoles would increase the rate of change in the green anole's adaptations. 4) They thought this because the arrival of the brown anoles increases competition for food and for survival.

5) To test this hypothesis, scientists collected measurements on islands with brown anoles. They measured the average height at which green anoles were found in trees (perch height), the average size of the green anole's toe pads, and the average number of sticky scales on their feet. They then collected this same data from green anoles on islands *without* brown anoles to see if there were any differences. Their results are on the next page.

_____12. **What is their <u>research question</u>?**

_____13. **What is their <u>hypothesis</u>?**

_____14. **What is their <u>rationale</u>?**

a.

_____15. **Which describes their <u>independent</u> variable(s)?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐

_____16. **Which describes their <u>dependent</u> variable(s)?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐

_____17. **Which describes their <u>control</u>?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐

_____18. **What could these researchers do to improve the validity & reliability of their research?**

a. ☐☐☐☐☐
b. ☐☐☐☐☐
c. ☐☐☐☐☐
d. ☐☐☐☐☐

	Green Anoles on Islands WITHOUT Brown Anoles	Green Anoles on Islands WITH Brown Anoles
Average Perch Height in Trees	70 cm	120 cm
Average Size of the Toe pads	1.27 cm	1.33 cm (4.5% increase)
Avg. Number of Sticky Scales on Feet	51 sticky scales	54 sticky scales (6.5% increase)

19. **A) How were the green anole's traits different between islands *with* brown anoles compared to those *without* brown anoles? B) How & why do changes to species' traits occur?**

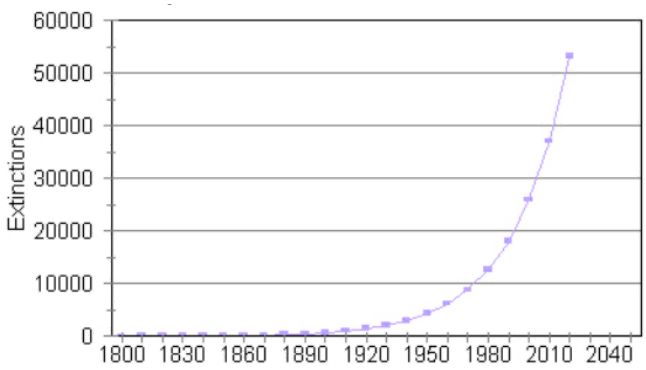
Score
_____/3
□ Complete
□ Accurate
□ Precise

HINT: Where do new traits come from? How do new traits emerge in species?

_____20. Invasive species (like the brown anole) generally reduce biodiversity in ecosystems. **If the brown anole <u>reduces</u> biodiversity, predict how this would affect ecosystem services and ecosystem resilience.**

a. □□□□□
b. □□□□□
c. □□□□□
d. □□□□□

21. Human activity has affected biodiversity throughout the world. **A) Predict how biodiversity levels will change in future decades & justify your prediction using this data → B) Then explain if and how changes to biodiversity will affect your life. Why do biodiversity levels matter to human populations?**



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