

# Ohio's State Tests

**PRACTICE TEST**

**BIOLOGY**

**Student Name**

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## Directions:

Today you will be taking the Ohio Biology Practice Assessment.

There are several important things to remember:

1. Read each question carefully. Think about what is being asked. Look carefully at graphs or diagrams because they will help you understand the question. Then, choose or write the answer you think is best in your Answer Document.
2. Use only a #2 pencil to answer questions on this test.
3. For questions with bubbled responses, choose the correct answer and then fill in the circle with the appropriate letter in your Answer Document. Make sure the number of the question in this Student Test Booklet matches the number in your Answer Document. If you change your answer, make sure you erase your old answer completely. Do not cross out or make any marks on the other choices.
4. For questions with response boxes, write your answer neatly, clearly and only in the space provided in your Answer Document. Any responses written in your Student Test Booklet will not be scored. Make sure the number of the question in this Student Test Booklet matches the number in your Answer Document.
5. If you do not know the answer to a question, skip it and go on to the next question. If you have time, go back to the questions you skipped and try to answer them before turning in your Student Test Booklet and Answer Document.
6. Check over your work when you are finished.

1.

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2. Scientists are studying the protein in the  $\text{Na}^+\text{-K}^+$  pump found in nerve and muscle cells from a pig. They are interested in learning how DNA and proteins from two different types of cells from the same organism compare to one another.

Describe the results scientists should see if they test both cells for the presence of the gene that produces this protein in the  $\text{Na}^+\text{-K}^+$  pump.

Describe how protein synthesis is required to express the gene that produces this protein in the  $\text{Na}^+\text{-K}^+$  pump.

Write your answer in the **Answer Document**.



3.

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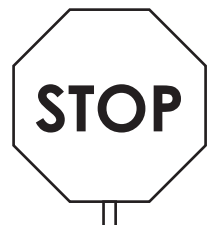
4. Scientists study the evolutionary relationships of species to better understand the history of life on Earth.

Describe two methods that scientists can use to determine whether two species (modern or extinct) are closely related.

Write your answer in the **Answer Document**.

5.

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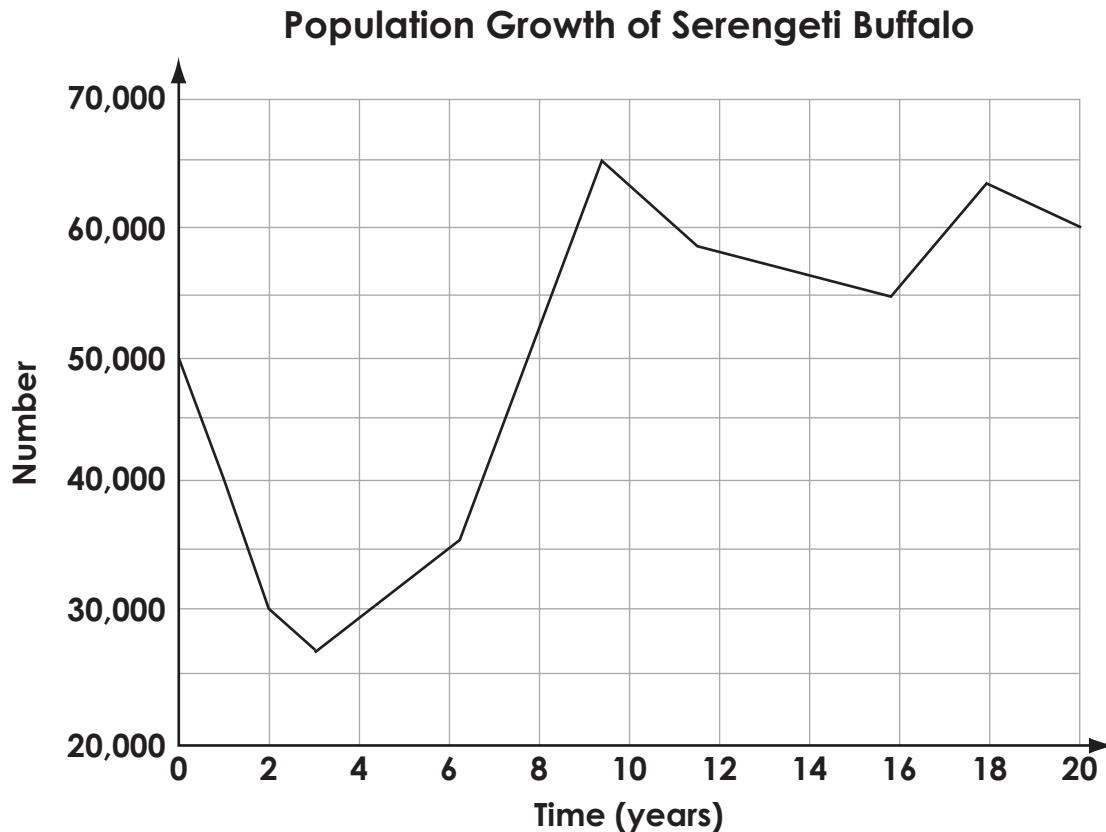


Do not go on

Do not go on

## Biology—Part 2

1. The graph shows how a Serengeti buffalo population changed over a period of years. During this time period, the buffalo were affected by the rinderpest virus, a debilitating disease with a high mortality rate. However, within five years, the virus was eliminated.



What was the ecosystem's carrying capacity for buffalo, based on the graph, once rinderpest was eliminated?

- A. 35,000 buffalo
- B. 55,000 buffalo
- C. 60,000 buffalo
- D. 65,000 buffalo





2.

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3.

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## Biology—Part 2

4. A scientist isolates a number of non-photosynthetic prokaryotes.

Which structure would be found in these cells?

- A. cell walls
- B. chloroplast
- C. golgi
- D. nucleus

5.

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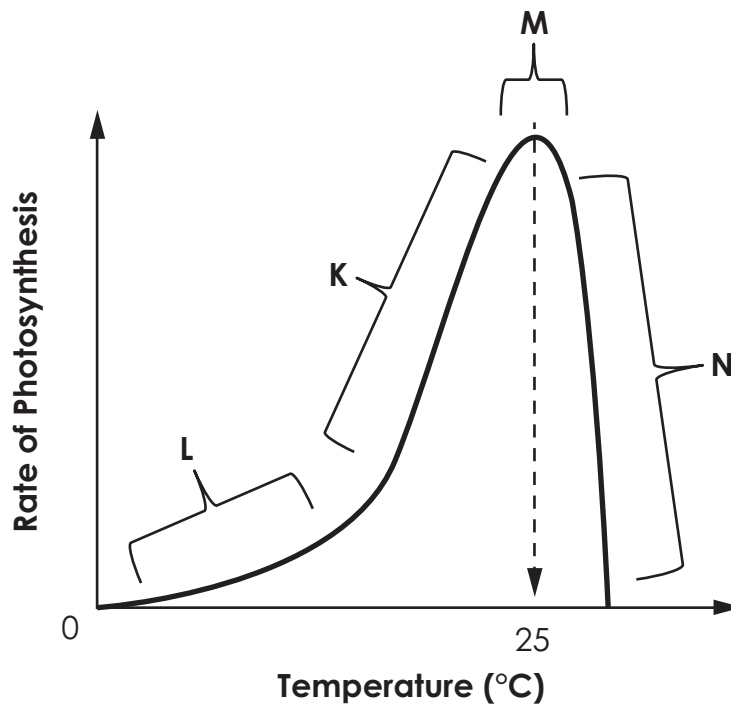
## Biology—Part 2

6. The following question has two parts. In the **Answer Document**, first, answer Part A. Then, answer Part B.

### Part A

Students in a biology class conduct an experiment to determine the effect of temperature on the rate of photosynthesis in a plant. They place an *Elodea* plant into a test tube filled with water. Then, the students place the test tube under a light and slowly increase the temperature of the water. They record their results and display them on a graph as shown.

### Photosynthesis vs. Temperature Experiment



Which statement is supported by the data in the graph?

- A. The rate of oxygen production is lowest in section M.
- B. The rate of oxygen production is greatest in section M.
- C. The production of water molecules is greatest in section L.
- D. The number of carbon dioxide molecules in the beaker is greatest in section K.

**Part B**

Which statement explains the effect of temperature on the rate of photosynthesis?

- A. Oxygen molecules break down at temperatures above 25°C.
- B. The rate of photosynthesis is unaffected by the temperature of the water.
- C. The number of chloroplasts in the cell decreases as temperature increases.
- D. Enzymes involved with plant photosynthesis are disrupted at temperatures above 25°C.



## Biology—Part 2

7. A scientist is examining a pedigree that includes several generations of an organism with XX/XY chromosome sex determination.

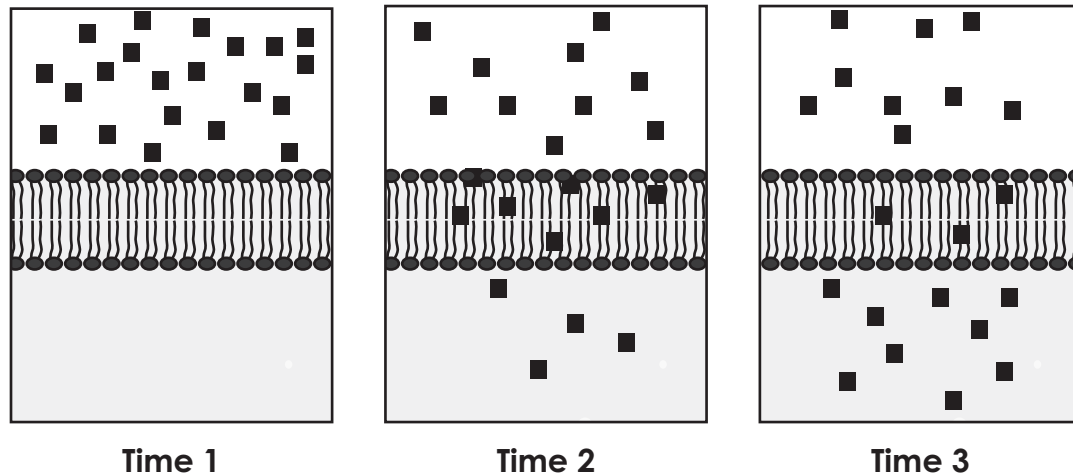
Which pattern of inheritance would support the hypothesis that the trait being studied is a recessive sex-linked trait found on the X chromosome?

- A. The trait is only expressed in males who have a father with the trait.
- B. The trait is expressed in half of the female organisms and all of the male organisms.
- C. The trait is mostly expressed in males who have a maternal grandfather with the trait.
- D. The trait is mostly expressed in females who have a paternal grandmother with the trait.



8. The diagram models the time-lapse movement of particles across a cell membrane. The particles have characteristics that allow them to pass freely across the membrane.

### Particles Crossing a Membrane over Time



In the **Answer Document**, select all of the statements that describe the particles or their movement based on the time-lapse diagram.

- A. The particles crossing the membrane do not have a charge.
- B. The movement across the membrane requires energy from ATP.
- C. The movement across the membrane requires energy from glucose.
- D. The movement across the membrane does not require added energy.
- E. The particles crossing the membrane could be proteins or carbohydrates.
- F. The particles crossing the membrane could be water ( $\text{H}_2\text{O}$ ) or oxygen ( $\text{O}_2$ ).
- G. The particles crossing the membrane have a strong positive or negative charge.



9.

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10. The table shows sample cells taken from tissues of two individuals of the same species. DNA from each cell is analyzed using gel electrophoresis.

**Gel Electrophoresis Cell Comparison**

Cell	Tissue Source Individual A	Tissue Source Individual B
1	Liver	Liver
2	Lung	Skin
3	Muscle	Muscle
4	Blood	Pancreas

Which prediction will be supported by the results of the gel electrophoresis analysis?

- A. Cell 1 from Individual A will have an identical banding pattern compared to Cell 1 from Individual B.
- B. Cell 1 from Individual A will have an identical banding pattern compared to Cell 2 from Individual A.
- C. Cell 1 from Individual A will have a different banding pattern compared to Cell 3 from Individual A.
- D. Cell 1 from Individual A will have a different banding pattern compared to Cell 4 from Individual A.



11.

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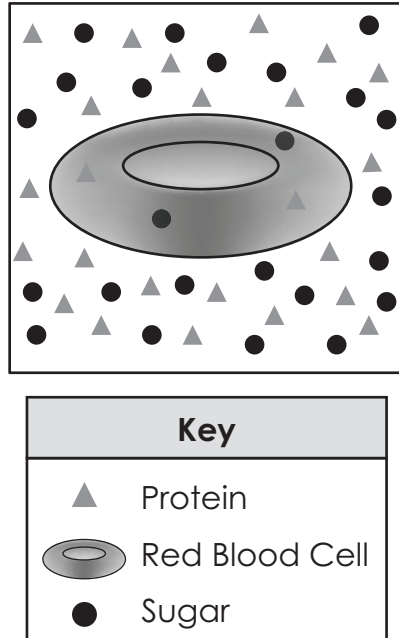
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14. A red blood cell is placed into an aqueous solution. The red blood cell has a lower concentration of protein and sugar than the aqueous solution, as shown in the diagram. In the diagram, the volume of the cell is equal to the volume outside the cell.



What is most likely to occur?

- A. Water from the solution will diffuse into the red blood cell.
- B. Water from the red blood cell will diffuse into the solution.
- C. Protein and sugar from the solution will diffuse into the red blood cell.
- D. Protein and sugar from the red blood cell will diffuse into the solution.



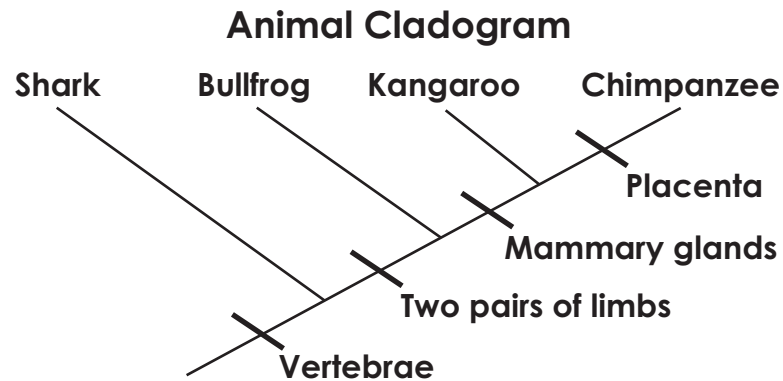
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16.

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17. The evolutionary relationships among four animals and four animal traits are shown in the cladogram.



In the **Answer Document**, select the boxes to identify the trait(s) that each animal possesses.

	Bullfrog	Chimpanzee	Kangaroo	Shark
Placenta	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
Vertebrae	<input type="checkbox"/> E	<input type="checkbox"/> F	<input type="checkbox"/> G	<input type="checkbox"/> H
Mammary glands	<input type="checkbox"/> I	<input type="checkbox"/> J	<input type="checkbox"/> K	<input type="checkbox"/> L
Two pairs of limbs	<input type="checkbox"/> M	<input type="checkbox"/> N	<input type="checkbox"/> O	<input type="checkbox"/> P



18.

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19. A scientist is trying to determine the evolutionary relationships among species with very similar physical characteristics. One method to determine the relationships is by comparing amino acid sequences of proteins.

Why would the scientist compare the amino acid sequences of proteins common to those similar species?

- A. Amino acid sequence differences provide evidence of gene flow among the species.
- B. Amino acid sequence differences reflect the accumulated differences in the DNA of the species.
- C. Amino acid sequence differences are the only useful data for constructing accurate cladograms of the species.
- D. Amino acid sequence differences are the result of mutations caused by different selection pressures experienced by the species.

