

Mock EOCT Part II Section 2

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Use this data table to answer the question.

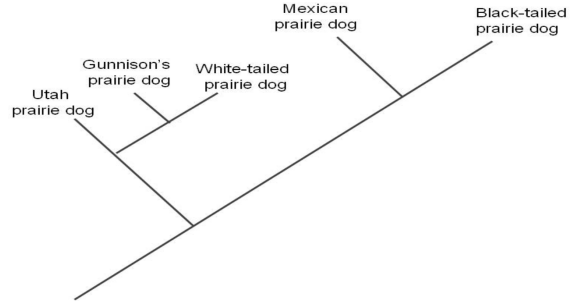
Insect Species on Different Trees

Tree	Number of Insects: Species A	Number of Insects: Species B
A	542	3
B	7	1098
C	0	763
D	876	5

A scientist examined the numbers of two different species of insects on four different kinds of trees in the same forest. The results of her examination are shown on the data table. What inference can the scientist make about the insects?

- A. Species B insects are the main food source for species A insects.
- B. Species A and species B insects are very closely related.
- C. There are more of species B insects than species A insects in the entire forest.
- D. Species A insects prefer different kinds of trees from species B insects.

2. The figure below shows the classification of several types of prairie dogs.



Which of the following statements is *best* supported by the classification in this figure?

- A. The Utah prairie dog was the ancestor of the Gunnison's prairie dog.
- B. The White-tailed prairie dog evolved from the Black-tailed prairie dog.
- C. The Mexican prairie dog and the Utah prairie dog share a common ancestor.
- D. The Mexican prairie dog is the closest relative of the White-tailed prairie dog.



5. Use the information and the table below to answer the following question(s).

A group of students wanted to determine how the ability to taste PTC, a nontoxic chemical, is passed from one generation to the next. The students decided to test families in their community for this ability. The students gave each family member a paper strip coated with a small amount of PTC. Those who experienced the bitter taste of PTC when they touched the paper strips to their tongues were called “tasters”; those who could not taste the PTC were called “nontasters.”

The results of the experiment are shown in the table below.

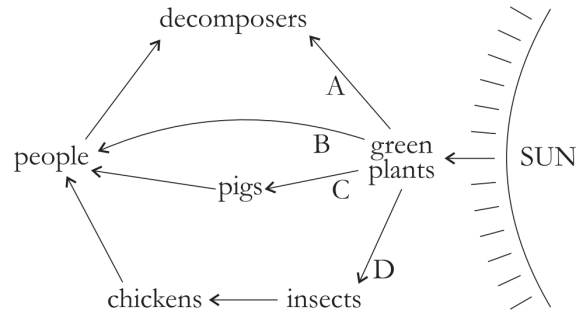
ABILITY TO TASTE PTC IN CHILDREN OF THREE GROUPS OF PARENTS

Parent Group	Children of Each Parent Group	
	Percent Tasters	Percent Nontasters
Both parents tasters	85	15
One parent taster, one parent nontaster	62	38
Both parents nontasters	0	100

Based on the data the students collected, the allele for tasting PTC is *most likely*

- A. dominant                      B. heterozygous  
C. recessive                      D. sex-linked

6. In ecosystems, the sun’s energy is transferred through food webs as shown below.



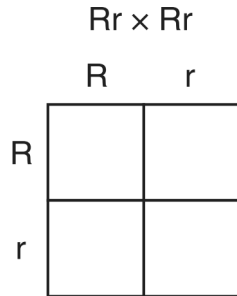
The sun’s energy is *most* directly available to people through

- A. path A.                      B. path B.  
C. path C.                      D. path D.

7. Which of the following base pair sequences could be produced in DNA replication?

- A. 5’ AGTCUT 3’              B. 5’ AGTCAT 3’ 3’  
3’ TCUGTA 5’              TCAGTA 5’  
C. 5’ AGTCAT 3’ 3’              D. 5’ AGTCAT 3’ 3’  
CTGACG 5’              UCAGUA 5’

8. The diagram below represents a cross between two pea plants.



In pea plants, the allele for round seeds (R) is dominant to the allele for oval seeds (r). In a cross between the two plants above, what percentage of the offspring will have round seeds?

- A. 100%   B. 75%   C. 50%   D. 25%

9. Eukaryotic cells are differentiated from prokaryotic cells because eukaryotic cells

- A. are much smaller.  
 B. have permeable membranes.  
 C. have a higher rate of reproduction.  
 D. have nuclei.

10. Semi-conservative replication of DNA refers to the idea that

- A. DNA molecules need to unwind before duplication begins.  
 B. each new DNA molecule contains two new single RNA strands.  
 C. the two strands of DNA molecules run in opposite directions.  
 D. each half of the original DNA molecule is joined with a new complementary DNA strand.

11. The classification levels of three organisms are listed in the following chart.

**Classification of Cats**

House Cat	Lion	Tiger
Animalia	Animalia	Animalia
Chordata	Chordata	Chordata
Mammalia	Mammalia	Mammalia
Carnivora	Carnivora	Carnivora
Felidae	Felidae	Felidae
<i>Felis</i>	<i>Felis</i>	<i>Felis</i>
<i>domesticus</i>	<i>leo</i>	<i>tigris</i>

Which statement describes the relationship among the organisms in the chart?

- A. House cats and lions belong to the same species.  
 B. House cats are more closely related to lions than to tigers.  
 C. House cats, lions, and tigers belong to the same class and family.  
 D. House cats and tigers belong to the same genus but to different orders.

12. Which of the following introduces carbon dioxide into the carbon cycle?
- A. Using a windmill to pump water
  - B. Absorbing solar energy
  - C. Burning organic material
  - D. Generating hydroelectric power

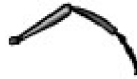
13. One piece of evidence that supports the modern theory of evolution is the presence of similar structures that serve different functions in different organisms.



**Human Arm**



**Bat Wing**



**Insect Leg**



**Human Leg**



**Bird Wing**



**Insect Wing**



**Lizard Claw**

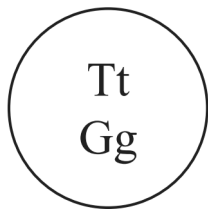


**Bird Beak**

Which pair of features shown are similar structures that are serving different functions?

- A. Human arm and bat wing
- B. Insect leg and human leg
- C. Bird wing and insect wing
- D. Lizard claw and bird beak

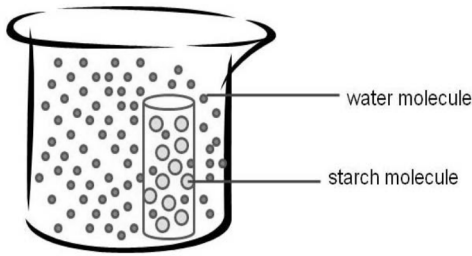
14. The diagram below represents a cell. The letters in the diagram represent alleles for two different genetic traits.



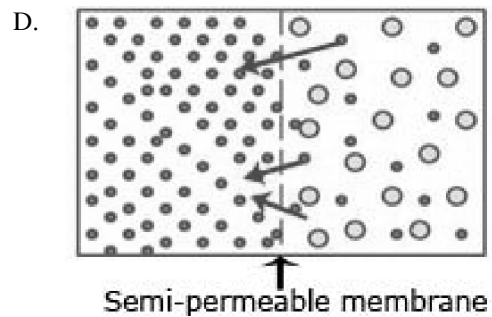
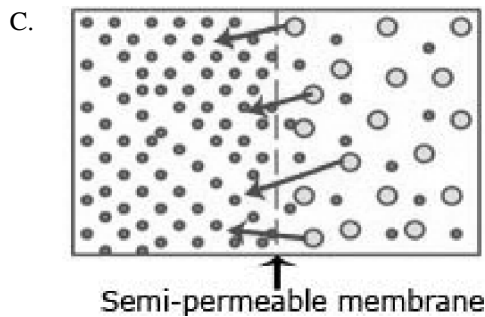
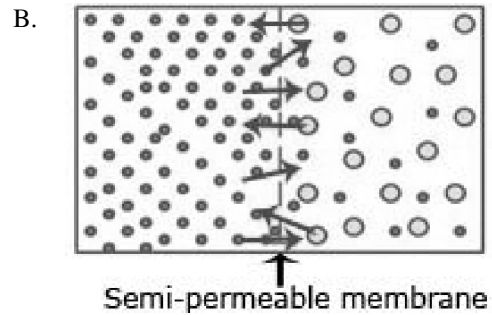
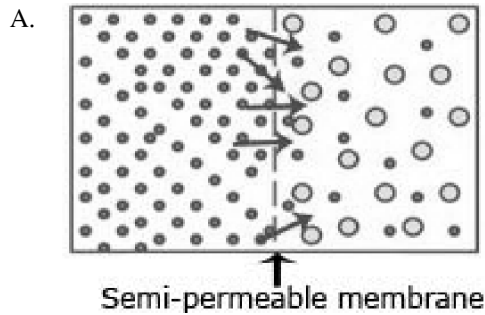
According to Mendel's law of independent assortment, which of the following shows all of the allele combinations expected in gametes produced by this cell?

- A. Four circles arranged horizontally. The first circle contains 'TT', the second 'tt', the third 'GG', and the fourth 'gg'.
- B. Four circles arranged horizontally. The first circle contains 'TG', the second 'TG', the third 'tg', and the fourth 'tg'.
- C. Four circles arranged horizontally. The first circle contains 'TG', the second 'tG', the third 'Tg', and the fourth 'tg'.
- D. Four circles arranged horizontally. The first circle contains 'Tt', the second 'Tt', the third 'Gg', and the fourth 'Gg'.

15. A potato core was placed in a beaker of water as shown in the figure below.



Which diagram *best* represents the net movement of molecules?



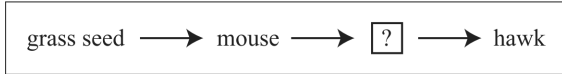
16. A cell from heart muscle would *probably* have an unusually high proportion of

- A. lysosomes.
- B. mitochondria.
- C. mRNA.
- D. Golgi bodies.

17. Which of the following best describes the purpose of the chromosomes in the nucleus of a cell?

- A. to store the genetic instructions needed to specify traits
- B. to release energy by breaking down food molecules
- C. to transport nutrients into and out of the cell
- D. to protect the cell from microorganisms

18. An incomplete food chain is shown below.



Which of the following organisms would best complete the food chain?

- A. rabbit   B. robin   C. snake   D. tree

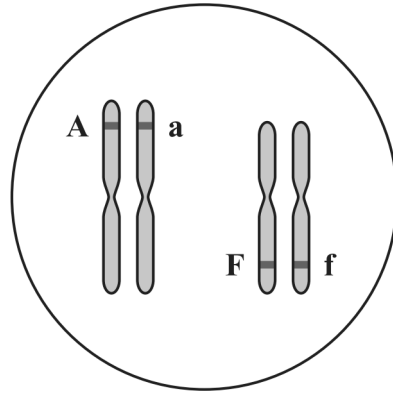
19. How can humans *best* help an endangered species avoid extinction?

- A. They can feed the animals.  
B. They can put the animals in a zoo.  
C. They can protect the animal's habitat.  
D. They can take the animal to new habitats.

20. The red maple tree is known by the scientific name *Acer rubrum*. The sugar maple tree is known as *Acer saccharum*. What is the smallest classification division these trees have in common?

- A. Phylum                      B. Order  
C. Genus                          D. Species

21. Two chromosome pairs from a diploid organism are shown below.



Assuming meiosis and fertilization occur normally, which of the following pairs of alleles can an offspring receive from this parent?

- A. **A** and **A**                      B. **A** and **a**  
C. **A** and **f**                        D. **F** and **F**



22. Partial amino acid sequences for a particular protein in three animal species are shown below. Each letter in the sequence stands for an amino acid. For example, Q stands for glutamine, and L stands for leucine.

Species	Amino Acid Sequence
Green junglefowl (bird)	QHEPHERKRM
Nile crocodile (reptile)	SHDPAQQKRL
Domestic chicken (bird)	QHEPHKRKRM

Which of the following statements *best* explains how these sequence data are evidence for evolution?

- A. All species translate the amino acid sequences of their proteins in a similar way.
- B. The species that are most closely related have the most similar amino acid sequences.
- C. Individual organisms acquire changes in their amino acid sequences over their lifetimes.
- D. The organisms that evolved at the same time in geologic history have identical amino acid sequences.

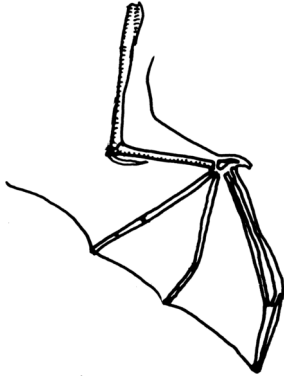
23. Some characteristics of a recently discovered organism are listed in the following table.

Organism Characteristics
Eukaryotic
Multicellular
Produces spores
Can reproduce sexually and asexually
Lacks chlorophyll
Non-motile

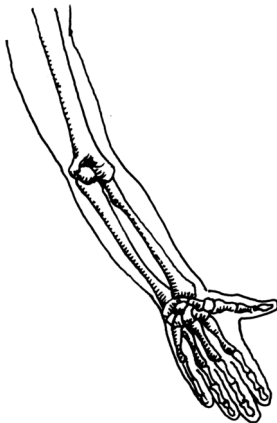
Based on the given characteristics, this organism would be classified in which kingdom?

- A. Eubacteria
- B. Fungi
- C. Plantae
- D. Protista

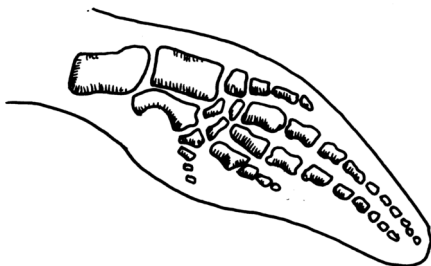
24. The pictures below show bone structures in three animals.



Bat Wing



Human Arm



Dolphin Flipper

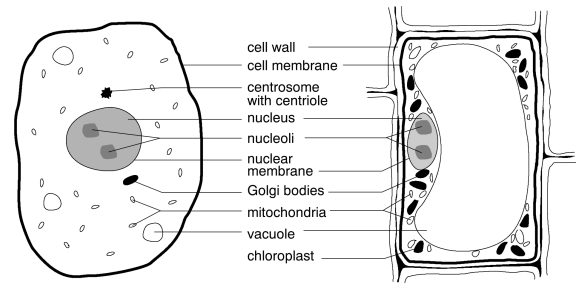
The similarity in structure of the bones of these animals suggests that

- A. the size of these bones is the same.
- B. these species share common ancestors.
- C. these species developed at the same time and location.
- D. the chemical make-up of these animals is exactly the same.

25. Usable nitrogen is released into soil from animal wastes by the breakdown of—

- A. plant proteins.
- B. water.
- C. ammonia.
- D. sugar molecules.

26. Use the diagrams below of an animal cell and a plant cell to answer the following question.



Features of plant cells that clearly make them different from animal cells are

- A. a larger nucleus and fewer chromosomes.
- B. a rigid cell wall and chloroplasts.
- C. more cytoplasm and smaller vacuoles.
- D. a changing size and indefinite shape.

27. Use the information below to answer the following question(s).

A scientist is studying a group of related flowering plants. She set up a series of experiments to study relatedness, classification, and patterns of inheritance within this group of plants.

To study the relatedness among plants, the scientist compared a specific RNA sequence in four different species of plants. The results are shown in the table below.

**PERCENT SIMILARITY OF A SPECIFIC RNA SEQUENCE**

		Plant Species			
		1	2	3	4
Plant Species	1	—	88	92	85
	2	88	—	93	95
	3	92	93	—	87
	4	85	95	87	—

Which two species are *most closely* related?

- A. 1 and 3                      B. 1 and 4  
C. 2 and 3                      D. 2 and 4

Use the information to answer the the following question(s).

### DNA

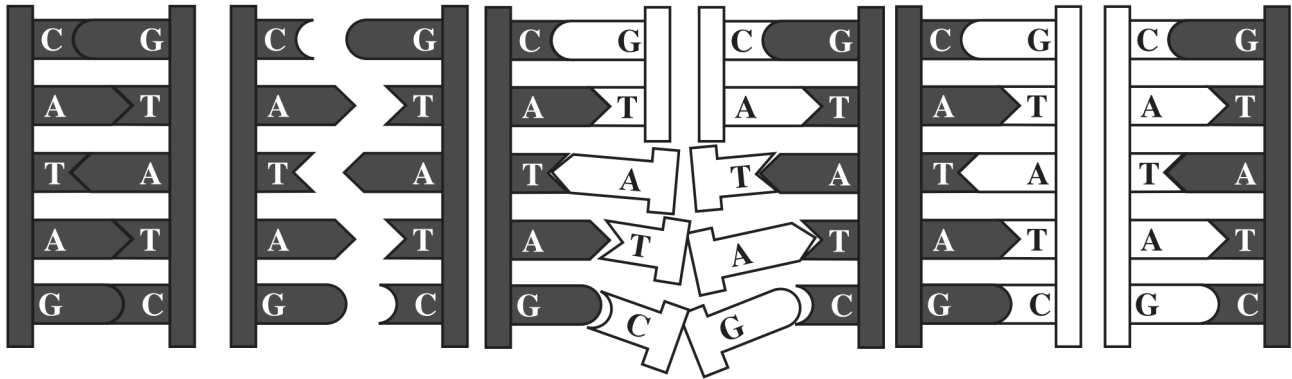
Scientists study DNA to understand heredity, disease, and the evolutionary history of organisms. During these studies, DNA must first be separated into two complementary strands. Next, the appropriate nucleotides are attached to the nucleotides in each original strand to produce two new complete DNA strands. The diagram below shows a simple model of this process. The letters A, T, C, and G represent the four nucleotides.

**Original DNA Molecule**

**Stage 1**  
Original molecule is separated into two complementary strands.

**Stage 2**  
Nucleotides are attached to original strands.

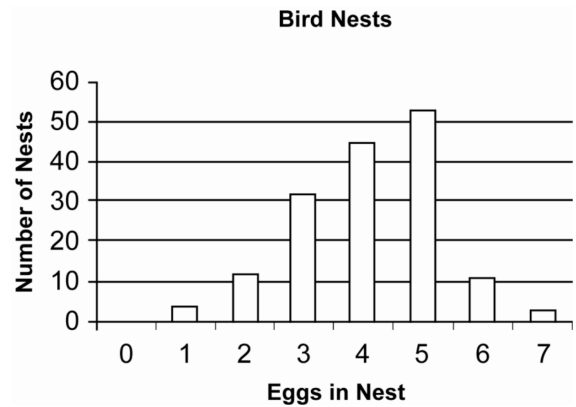
**Stage 3**  
The result is two complete DNA molecules.



28. Which of these has been *most* directly affected by discoveries in DNA research in the last 60 years?
- A. the rock cycle
  - B. classification of organisms
  - C. the periodic table
  - D. trophic levels in ecosystems

29. American alligators used to be an endangered species, but they are not endangered anymore. Which of the following is the *best* reason why there are more American alligators in Louisiana today than there were 50 years ago?
- A. American alligators have learned to live in new places.
  - B. American alligators are bigger now than they were 50 years ago.
  - C. American alligators are now protected from hunting by humans.
  - D. American alligators have much more habitat than they did 50 years ago.

30. Use this graph to answer the question.



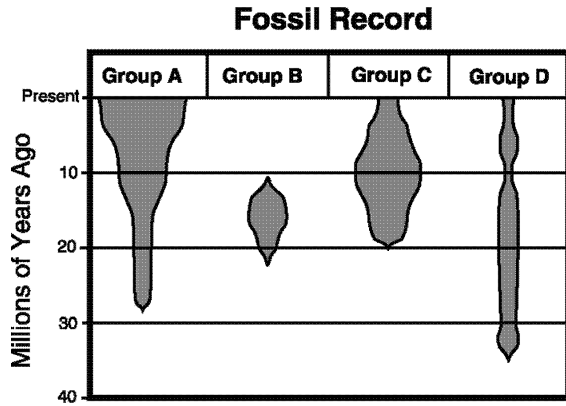
A scientist studied 160 bird nests and counted the number of eggs in each nest. Her results are shown in the bar graph above. Which statement *best* describes the scientist's results?

- A. The mode is 5, but the median is less than 5.
  - B. The mode is 5, but the median is greater than 5.
  - C. The median is 5, but the mode is less than 5.
  - D. The median is 5, but the mode is greater than 5.
31. 5' ATCAGCGCTGGC 3'
- The above sequence of DNA is part of a gene. How many amino acids are coded for by this segment?
- A. 4
  - B. 8
  - C. 12
  - D. 20

32.

**Fossil Record**

In a section of the Grand Canyon, scientists have found the fossil remains of several different groups of organisms. The diagram below represents the number and age of the fossils the scientists found. The width of each shaded area in the diagram below indicates the relative number of fossils found.



The scientists hypothesize that the four groups of fossilized organisms originated from a common ancestor. Which of the following would provide the best evidence that their hypothesis is correct?

- A. The number of fossils found in each group is similar.
- B. Present-day members of the groups live in the same environment.
- C. Fossils from each group were found in the same rock layer.
- D. Members of the groups have similar physical structures.

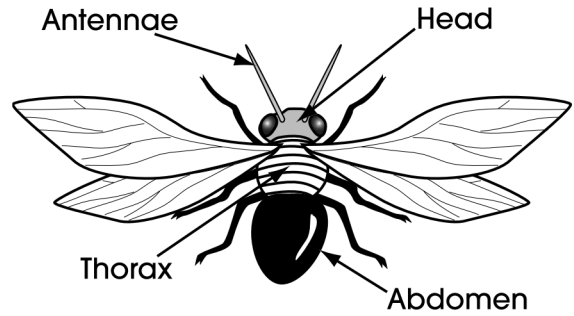
33. Which of the following organelles releases energy from sugars?

- A. ribosomes
- B. vacuoles
- C. chloroplasts
- D. mitochondria

34. The chart below is a taxonomic key for the fictitious insect genus *Problematica*.

Characteristics of the Genus <i>Problematica</i>		
1	Thorax and abdomen entirely black Thorax striped and abdomen black	<i>Problematica alva</i> Go to 2
2	Antennae curled Antennae straight	<i>Problematica brancus</i> Go to 3
3	Wings longer than body Wings shorter than body	<i>Problematica cantrellis</i> Go to 4
4	Wings white Wings black	<i>Problematica differensis</i> <i>Problematica fortunatas</i>

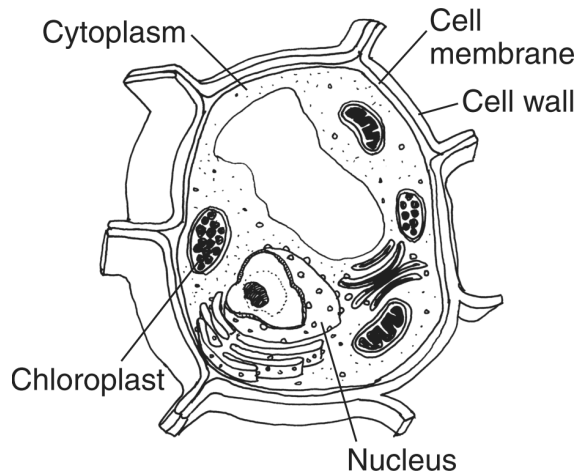
A student has been asked to identify the following insect.



To which species does the insect belong?

- A. *Problematica alva*
- B. *Problematica brancus*
- C. *Problematica cantrellis*
- D. *Problematica differensis*

35. The diagram below shows a cell.



Where would this cell *most likely* be found?

- A. bark
- B. frog
- C. leaf
- D. mushroom

36. In cats, the allele for short hair (**H**) is dominant to the allele for long hair (**h**). If a heterozygous short-hair cat is crossed with a long-hair cat, what percentage of the offspring is expected to be heterozygous for hair length?

- A. 0%
- B. 25%
- C. 50%
- D. 75%

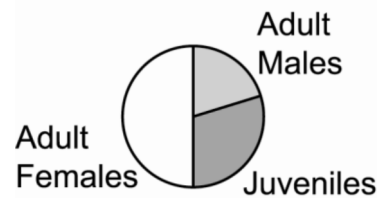
37. A scientist was studying a mammal population. The data table below shows some of her results.

**Mammal Population**

Segment of Mammal Population	Number of Individuals in Population
Adult Males	49
Adult Females	52
Juveniles	104

Which graph best represents the information in the table?

A. **Mammal Population**



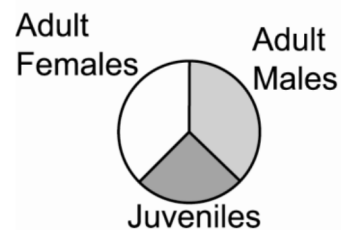
B. **Mammal Population**



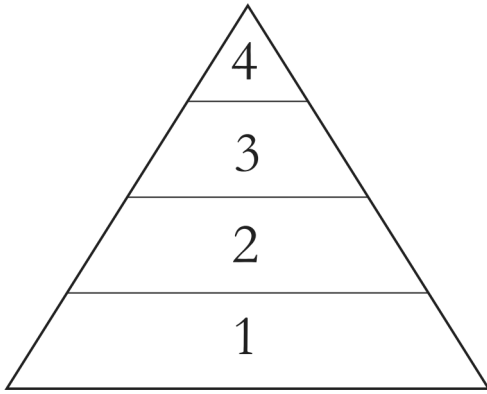
C. **Mammal Population**



D. **Mammal Population**



38. Use the diagram below to answer the question.



In this energy pyramid, which organism would most likely be in level 2?

- A. bird
- B. fox
- C. caterpillar
- D. tree



Mock EOCT Part II Section 2      8/12/2019

1.		15.	
Answer:	D	Answer:	A
Points:	1	Points:	1
2.		16.	
Answer:	C	Answer:	B
Points:	1	Points:	1
3.		17.	
Answer:	C	Answer:	A
Points:	1	Points:	1
4.		18.	
Answer:	B	Answer:	C
Points:	1	Points:	1
5.		19.	
Answer:	A	Answer:	C
Points:	1	Points:	1
6.		20.	
Answer:	B	Answer:	C
Points:	1	Points:	1
7.		21.	
Answer:	B	Answer:	C
Points:	1	Points:	1
8.		22.	
Answer:	B	Answer:	B
Points:	1	Points:	1
9.		23.	
Answer:	D	Answer:	B
Points:	1	Points:	1
10.		24.	
Answer:	D	Answer:	B
Points:	1	Points:	1
11.		25.	
Answer:	C	Answer:	C
Points:	1	Points:	1
12.		26.	
Answer:	C	Answer:	B
Points:	1	Points:	1
13.		27.	
Answer:	A	Answer:	D
Points:	1	Points:	1
14.		28.	
Answer:	C	Answer:	B
Points:	1	Points:	1
		29.	
		Answer:	C
		Points:	1

30.  
Answer: A  
Points: 1
31.  
Answer: A  
Points: 1
32.  
Answer: D  
Points: 1
33.  
Answer: D  
Points: 1
34.  
Answer: C  
Points: 1
35.  
Answer: C  
Points: 1
36.  
Answer: C  
Points: 1
37.  
Answer: C  
Points: 1
38.  
Answer: C  
Points: 1