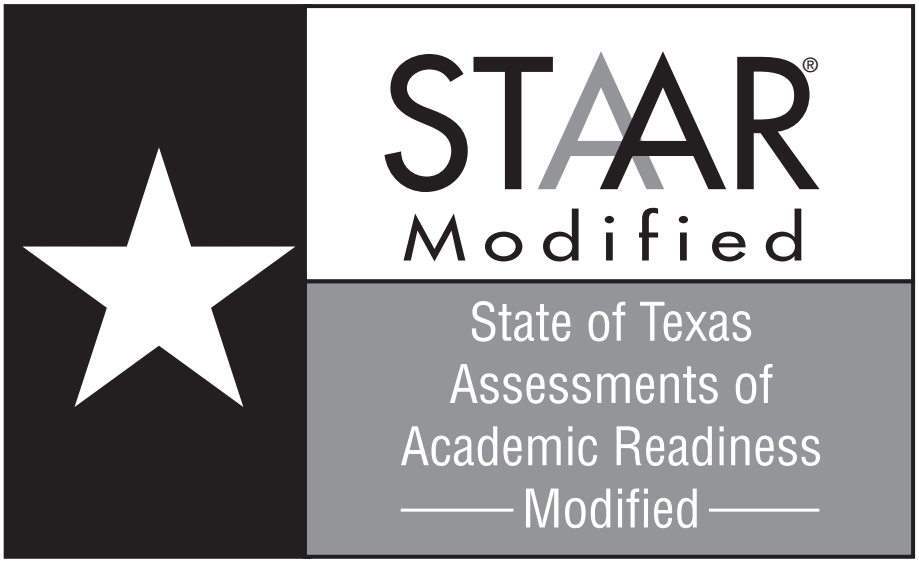


Biology

Modified

Administered May 2014

RELEASED

BIOLOGY

DIRECTIONS
Read each question and choose the best answer from the three choices provided. Then fill in the answer on your answer document.

1 Look at the picture below.

Fossil of a Marine Invertebrate

The picture shows the fossil of an extinct animal that had a hard outer shell. Based on this evidence, what living organism is closely related to this animal?

A Mollusk

B Sponge

C Jellyfish

GO ON

2 Some plants that live in the deserts of North America and Africa have many characteristics in common. Which of the following best explains the reason for these common characteristics?

F Adaptation to similar environments

G Variation among similar populations

H Geographic separation

---

3 The heart contains all of the following tissues. What is the main tissue type of the heart?

A Epithelial

B Muscle

C Nervous

GO ON

4 Look at the information in the box and the Punnett square below.

Pea Plants

- The gene for purple flowers (P) is dominant.
- The gene for white flowers (p) is recessive.

	?	?
?	Pp	pp
?	Pp	pp

What are the most likely genotypes of the parent plants?

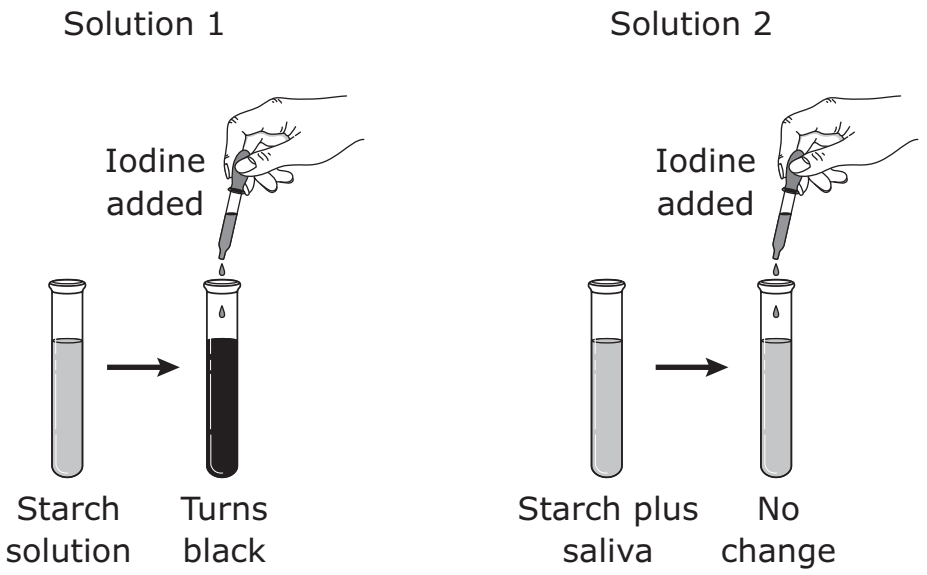
F PP and pp

G Pp and Pp

H Pp and pp

GO ON

5 The diagrams below show the results of a student investigation. Iodine was added to two different solutions to test for the presence of starch.



According to these results, saliva must contain —

A a protein that is changed into a starch

B an enzyme that breaks down a starch

C an oil that becomes a starch

GO ON

6 Read the information in the box below about a type of biomolecule.

- Transports substances into and out of cells
- Regulates the rate of chemical reactions
- Forms muscle and cartilage

Which type of biomolecule is described by the information in this box?

F A carbohydrate

G A nucleic acid

H A protein

---

7 Mice run from predators. What system first alerts the muscular system of a mouse to react to the presence of a predator?

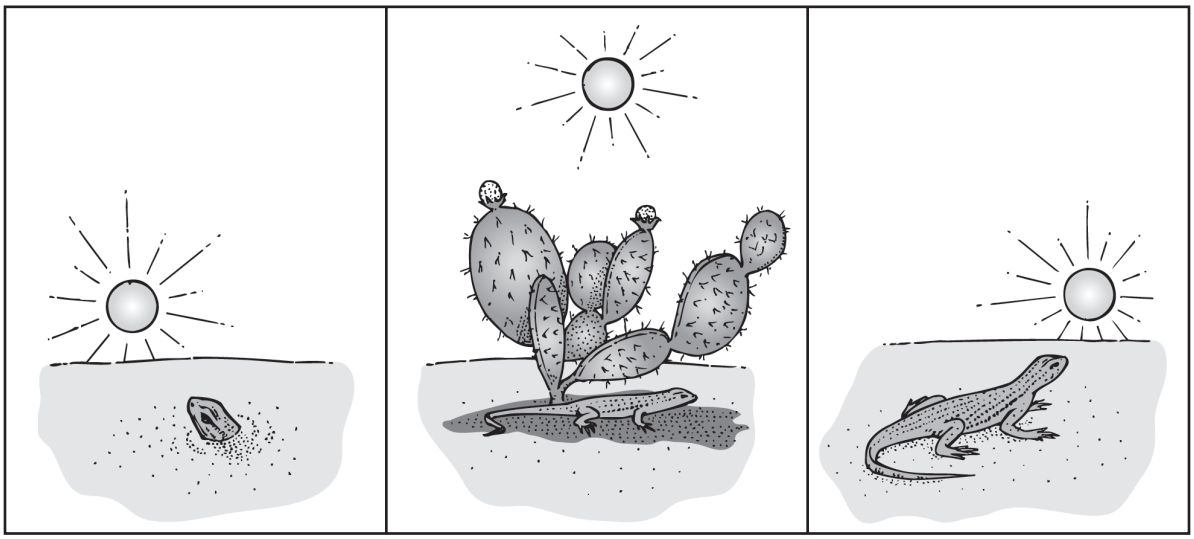
A Circulatory

B Nervous

C Endocrine

GO ON

8 The pictures below show a lizard at different times of day in a hot, sandy desert.



Morning Noon Late afternoon

What is the major benefit of the lizard's behavior throughout the day?

F The lizard can produce vitamins.

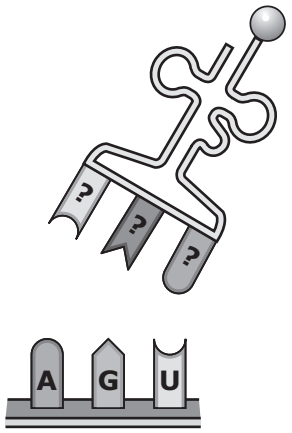
G The lizard can maintain homeostasis.

H The lizard can find more food.

GO ON

9 The table below identifies tRNA codes and the amino acids transferred during translation. A model of translation is shown next to the table.

tRNA Code	Amino Acid
UCA	Serine
GCA	Arginine
CUG	Aspartic acid



When tRNA bonds with the mRNA sequence AGU, what amino acid will be added to the peptide chain?

A Serine

B Arginine

C Aspartic acid

---

10 Xylem and phloem are vascular tissues found in plants. What is the primary role of xylem and phloem?

F They produce the reproductive cells.

G They transport substances.

H They secrete hormones.

GO ON

11 The bacterium *Staphylococcus aureus* can cause people to become very sick. In the past, antibiotics were effective in killing this bacterium. But now there are strains of the bacterium that cannot be killed by some antibiotics.

What has most likely caused the bacterium to become resistant to antibiotics?

A Phenotypes have determined the structure of the bacterium.

B The number of alleles that cause resistance has decreased.

C Genetic mutations result in a genotype that is not affected by antibiotics.

GO ON

12 Two cellular processes are described below.

Active Transport	Simple Diffusion
Active movement of particles from regions of lower concentration to regions of higher concentration	Passive movement of particles from regions of higher concentration to regions of lower concentration

How is active transport different from simple diffusion in cells?

F Active transport moves glucose. Simple diffusion is used to move amino acids.

G Active transport requires the input of energy. Simple diffusion does not require the input of energy.

H Active transport requires enzymes. Simple diffusion uses protein receptors.

GO ON

13 Pseudoscorpions are small arthropods that hide under the wings of beetles. The beetles protect the pseudoscorpion from predators. The pseudoscorpions do not harm or help the beetles. What term best describes the relationship between the beetle and the pseudoscorpion?

A Commensalism

B Mutualism

C Parasitism

---

14 The table below lists five cactus species found in Big Bend National Park.

Common Name	Scientific Name
Bunched cory cactus	*Coryphantha ramillosa*
Chisos Mountains hedgehog cactus	*Echinocereus chisoensis*
Nylon hedgehog cactus	*Echinocereus viridiflorus*
Slender-stem cactus	*Opuntia leptocaulis*
Texas barrel cactus	*Ferocactus hamatacanthus*

Which species of cactus below is probably most closely related to the Chisos Mountains hedgehog cactus?

F Texas barrel cactus

G Nylon hedgehog cactus

H Bunched cory cactus

GO ON

15 Giant pandas live in China. They live in only six small isolated forests of bamboo and conifers. Bamboo makes up 99% of the pandas' diet. All the bamboo plants in an area will flower and die at the same time. The giant pandas must move to a different area of the forest when the bamboo dies. Based on this information, what best represents one reason that giant pandas are endangered?

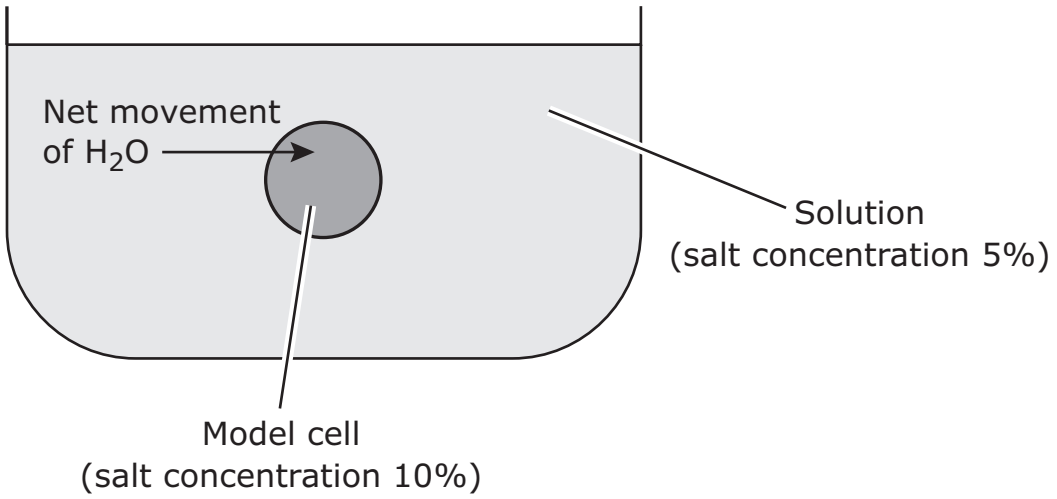
A They are commercially valuable.

B They have large territories.

C They occupy a specialized niche.

GO ON

16 The diagram below shows a lab investigation conducted by a scientist. The scientist put a model cell into a saltwater solution. The model cell began to increase in volume.



Which cellular process did the scientist investigate?

F Evaporation

G Dehydration

H Osmosis

GO ON

17 What is a major difference between leaf cells and root cells in plants?

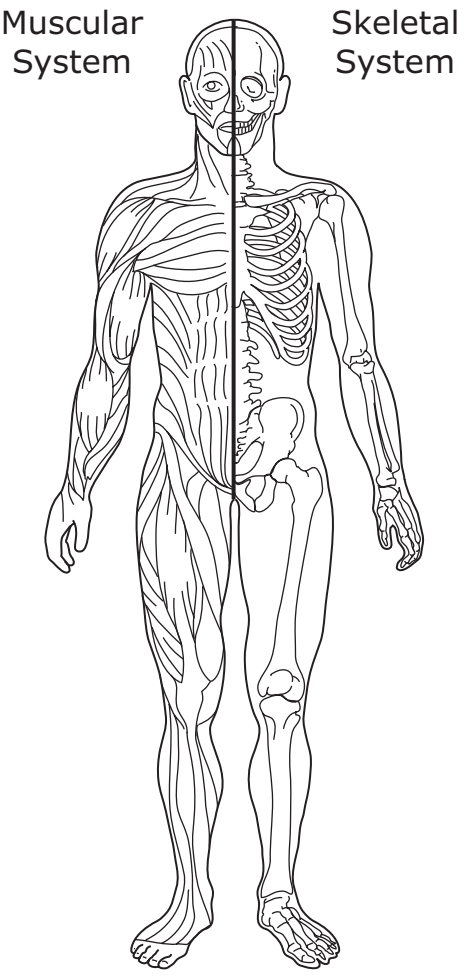
A Leaf cells divide by mitosis.

B Leaf cells perform photosynthesis.

C Leaf cells have cell walls.

GO ON

18 Look at the diagram below.



How do the muscular and skeletal systems relate to each other?

F The systems work only with each other and do not need other systems.

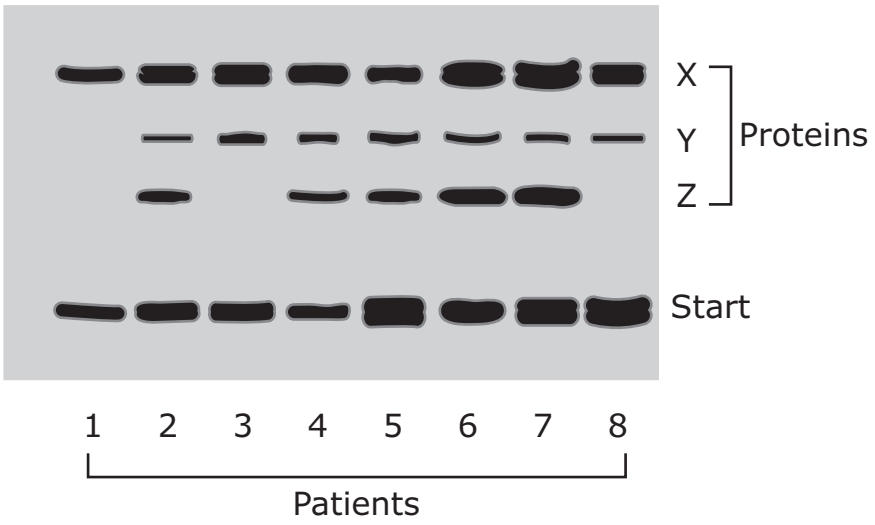
G The systems work together to perform complex movements.

H Each system performs its own function independently of the other.

GO ON

19 The process of gel electrophoresis can separate proteins in blood. A healthy body has proteins X, Y, and Z. A scientist used electrophoresis to test the blood of eight patients. The results below show evidence that three patients have the same disease.

Gel Electrophoresis



Which missing protein most likely indicates the disease in the three patients?

A Protein X

B Protein Y

C Protein Z

---

20 Which structures are listed in order from least complex to most complex?

F Skeleton, leg bone, bone cell

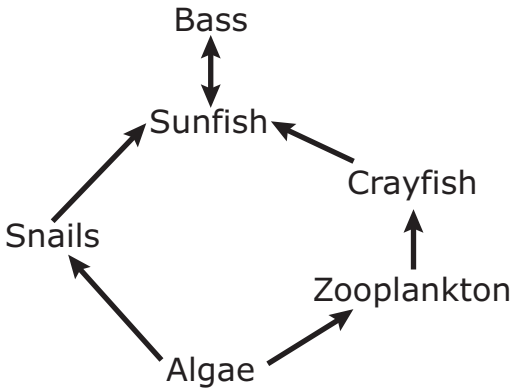
G Bone cell, leg bone, skeleton

H Leg bone, bone cell, skeleton

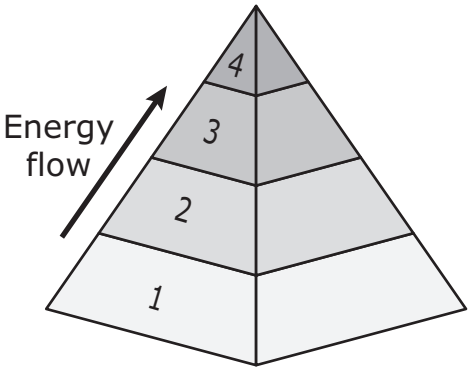
GO ON

21 Look at the partial food web and energy pyramid below.

Freshwater Food Web



Energy Pyramid



Which event represents a flow of energy from Level 2 to Level 3?

A Sunfish eating snails

B Zooplankton eating algae

C Bass eating sunfish

---

22 In a changing environment, it is an advantage to a plant species to reproduce sexually.

- In sexual reproduction, a new individual is produced by combining gametes from two parents.
- All living things that reproduce sexually inherit traits from both parents.

What is one benefit of sexual reproduction?

F The plants are able to divide into smaller plants.

G The plants are able to produce clones.

H The plants are able to produce genetically diverse offspring.

GO ON

23 A virus causes disease by infecting cells. Which box below shows the correct sequence of steps during a viral infection?

A

1. Inject nucleic acid
2. Take over cell control center
3. Make new viral parts
4. Attach to cell surface

B

1. Make new viral parts
2. Take over cell control center
3. Attach to cell surface
4. Inject nucleic acid

C

1. Attach to cell surface
2. Inject nucleic acid
3. Take over cell control center
4. Make new viral parts

GO ON

24 A random mutation in a certain beetle population will sometimes produce offspring that look like stinging wasps. Most beetle predators will not attack the beetles that look like wasps. Over time, the beetles that look like wasps will most likely —

F become more common in the population

G die off, because mutations are always lethal

H be killed by the normal-looking beetles in the population

---

25 A DNA strand has the sequence shown below.

5′-ATATACCCA-3′

Which sequence represents the complementary DNA strand?

A 3′-TATATCCCA-5′

B 3′-CCCCGCTTT-5′

C 3′-TATATGGGT-5′

GO ON

26 Read the information in the box below.

Noctiluca scintillans

- Are single-celled organisms
- Have flagella
- Can float near the surface of water

Based on these characteristics, which of these kingdoms does the species *N. scintillans* belong to?

F Animalia

G Protista

H Plantae

---

27 Golden-cheeked warblers are endangered birds. These birds pull off tiny bits of bark from mature juniper trees to build nests. The warblers build their nests only in the mature oak and juniper forests of Central Texas. What could humans do to help these birds survive in their ecosystem?

A Allow more oak and juniper trees to mature

B Partially remove bark from mature juniper trees

C Use oak bark and wood chips as mulch

28 Read the information in the box below.

> Solar radiation can cause mutations in skin cells on a cat's nose. These mutations can lead to cancer in new skin cells on the cat's nose.

Which statement best explains why the offspring of a cat with cancerous skin cells will most likely be born with healthy skin cells on its nose?

F Mutations in cancer cells heal when gametes form.

G Mutations in skin cells are not passed on to offspring.

H Skin cancer tends to skip a generation.

GO ON

29 Look at the information below about an ethylene-gas feedback mechanism.

Ethylene-Gas Feedback Mechanism

- Fruit releases a gas called ethylene as it ripens.
- The ethylene gas causes nearby fruit to ripen.
- This ripening fruit then releases more ethylene gas in a feedback mechanism.

What is most likely to happen when an ethylene-gas feedback mechanism occurs in a fruit tree?

A All the fruit will not ripen for long periods of time.

B Most of the fruit on the tree will ripen at about the same time.

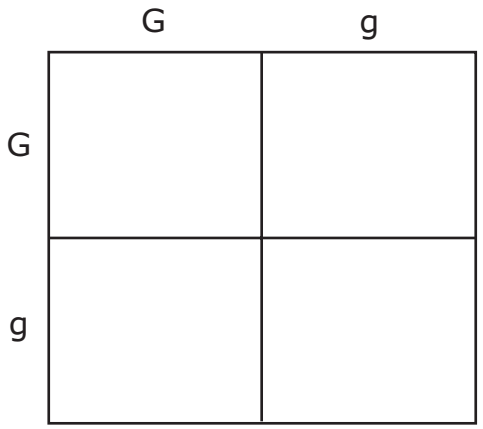
C The fruit on the tree will not have time to ripen and form seeds.

GO ON

30 Look at the information in the box and the incomplete Punnett square below.

Parakeets

- The gene for green feathers (G) is dominant.
- The gene for blue feathers (g) is recessive.



A parakeet with the gene combination Gg mates with a parakeet with the gene combination Gg. What is the probability that the offspring will have green feathers?

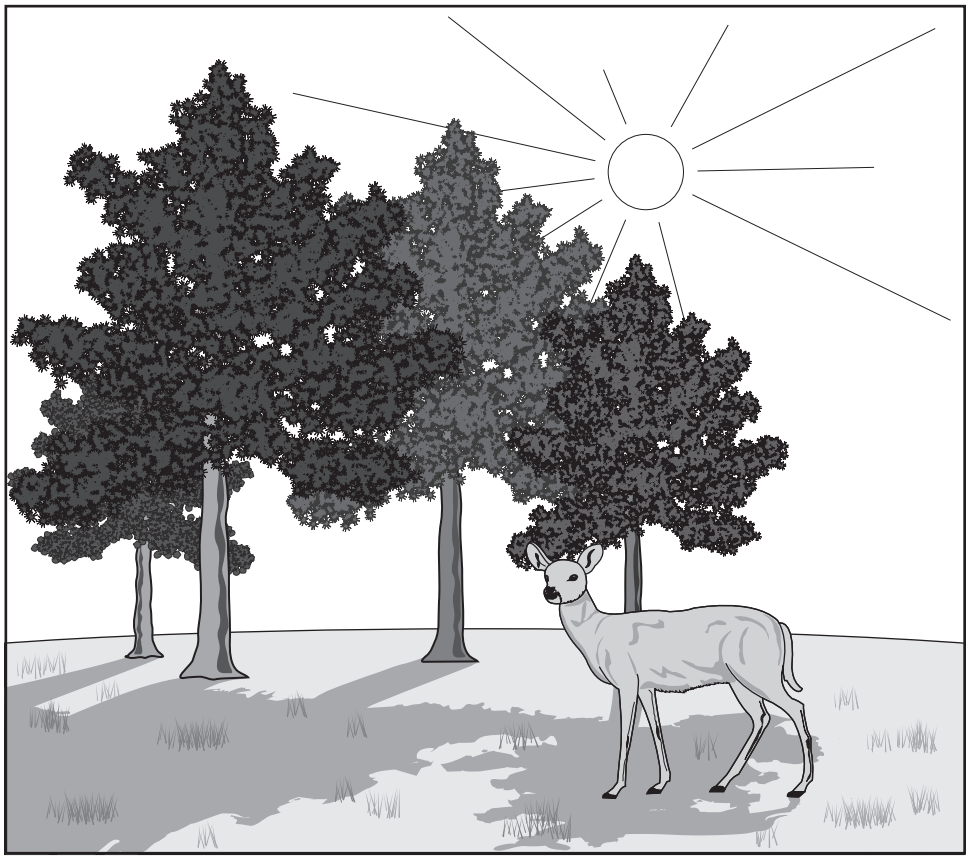
F 50%

G 25%

H 75%

GO ON

31 Look at the forest ecosystem below.



Grasses absorb energy from the sun. When an animal eats grass, some of the energy stored in the grass transfers to the animal. How does this flow of energy occur?

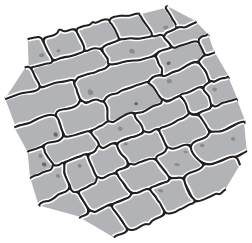
A Chemical energy from the sun → light energy in the grass → heat energy in the animal

B Heat energy from the sun → chemical energy in the grass → light and heat energy in the animal

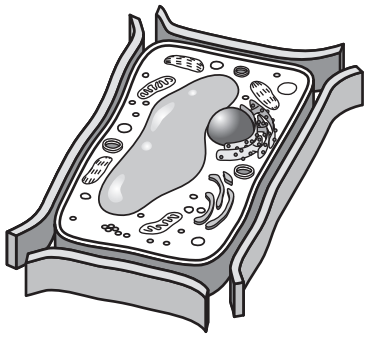
C Light energy from the sun → chemical energy in the grass → work and heat energy in the animal

GO ON

32 The three structures below are all part of a multicellular organism.



Tissue



Cell

Flower

Which of these shows the structures in order from simplest to most complex?

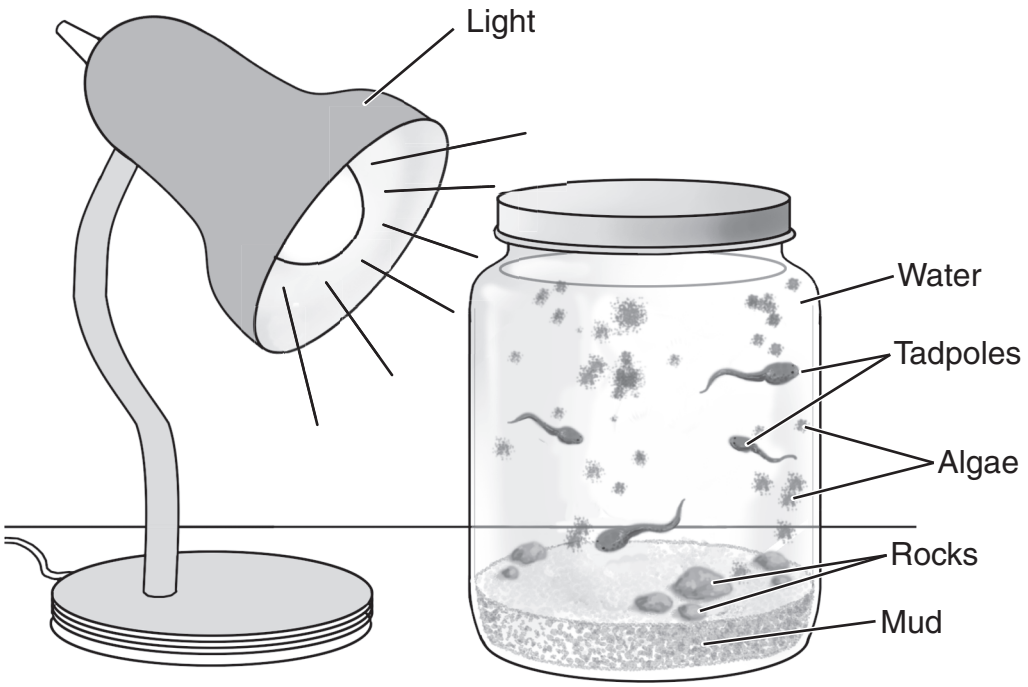
F Flower, tissue, cell

G Cell, tissue, flower

H Tissue, cell, flower

GO ON

33 Look at the diagram below.



Students wanted to study a tadpole community. The students made a model community to closely match a natural tadpole community. The students added water, mud, rocks, algae, and tadpoles to the model community. They put the model near a light. What is a limitation of the model community?

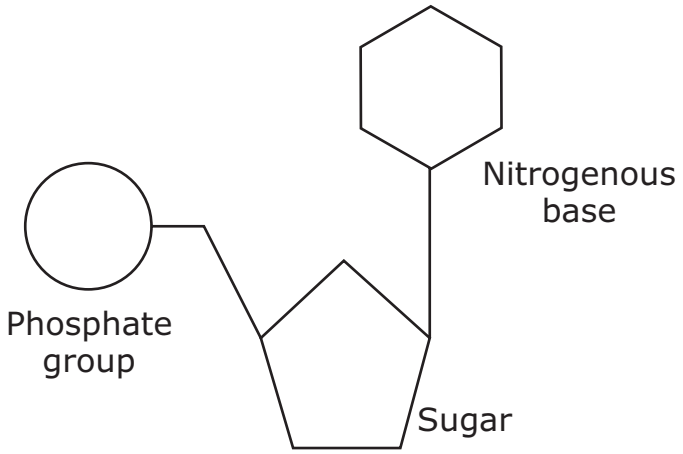
A The model has too much water.

B The model has no source of energy.

C The model lacks predators.

GO ON

34 Look at the diagram below.



Which component of DNA has a nitrogenous base, a phosphate group, and a five-carbon sugar?

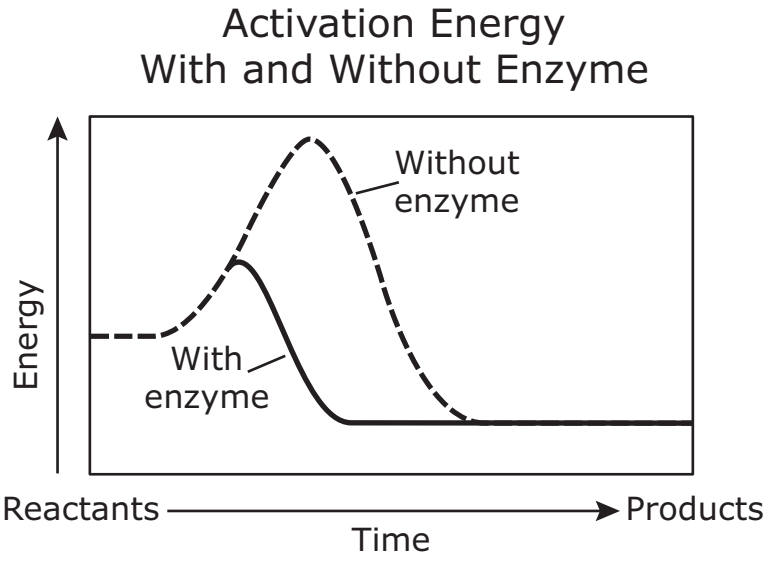
F Lipid

G Nucleotide

H Protein

GO ON

35 Look at the graph below.



As shown in this graph, what is the effect of the enzyme on this reaction?

A The enzyme lowers the activation energy needed for the reaction.

B The enzyme reverses the flow of activation energy in the reaction.

C The enzyme maintains the activation energy needed for the reaction.

GO ON

36 The DNA of an unidentified organism was compared with that of several known animals. The amount of similarity between the DNA of the unknown organism and that of each animal is listed in the table below.

Animal	Order	Percentage of Similarity Between Unidentified Organism's DNA and Animal's DNA
Red fox	Carnivora	92%
Gray wolf	Carnivora	91%
Deer	Artiodactyla	88%
Elk	Artiodactyla	86%
Red-tailed hawk	Falconiformes	70%
Ferruginous hawk	Falconiformes	65%

The unidentified organism is most closely related to which of the orders listed in the table above?

F Artiodactyla

G Carnivora

H Falconiformes

---

37 A virus can —

A produce ATP for energy

B produce food by photosynthesis

C replicate inside host cells

GO ON

38 Mosses and lichens grow in soil developed during primary succession. During secondary succession, which organisms most likely replace mosses and lichens?

F Fruit trees from neighboring orchards

G Grasses and shrubs from windblown seeds

H Seedlings grown from acorns buried by squirrels

---

39 The brown-headed cowbird lays its eggs in the nests of other types of birds. The other birds take care of their own babies and the baby cowbirds. The baby cowbirds often eat most of the food, which harms the other baby birds. What type of interaction exists between the cowbirds and the other birds?

A Parasitism

B Mutualism

C Commensalism

GO ON

40 The following adaptations were observed on different plants in a particular environment.

- Stomata open only at night to conserve water
- Small leaves with a waxy coating
- Very deep roots
- Spines (modified leaves)

In which type of environment would plants with these adaptations be found?

F Desert

G Forest

H Grassland

---

41 Part of a DNA strand is shown below.

CGTAACCGT

What complementary strand of DNA will form during replication?

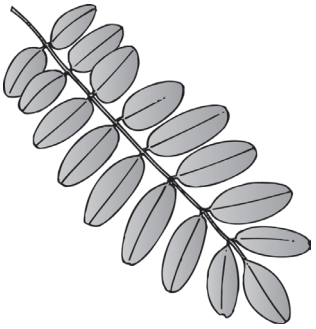
A ATGCCAATG

B GCATTGGCA

C AUGCCAAUG

GO ON

42 A leaf and part of a taxonomic key for trees are shown below.



If the tree has:	Go to pair number:
1a simple leaves (a single leaf blade)	2
1b compound leaves (more than one leaflet)	3
2a heart-shaped leaves	Catalpa
2b leaves in three different shapes, one like a mitten	Sassafras
3a compound leaves with round-tipped leaflets	Black locust
3b compound leaves with 7 leaflets	Ash

According to the taxonomic key, what is the name of this tree?

F Sassafras

G Catalpa

H Black locust

GO ON

43 Which two organ systems are primarily responsible for removing waste products from the body?

A Circulatory and nervous

B Digestive and excretory

C Immune and respiratory

BE SURE YOU HAVE RECORDED ALL OF YOUR ANSWERS ON THE ANSWER DOCUMENT.

STAAR MODIFIED
Biology
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