



RELEASED ITEMS

**SCIENCE
GRADE 5**

Fall 2006

**MICHIGAN STATE BOARD OF EDUCATION
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PART 1

DIRECTIONS

In this test, you will demonstrate your understanding of science.

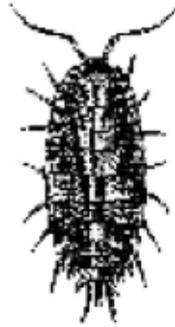
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You may now begin.

1

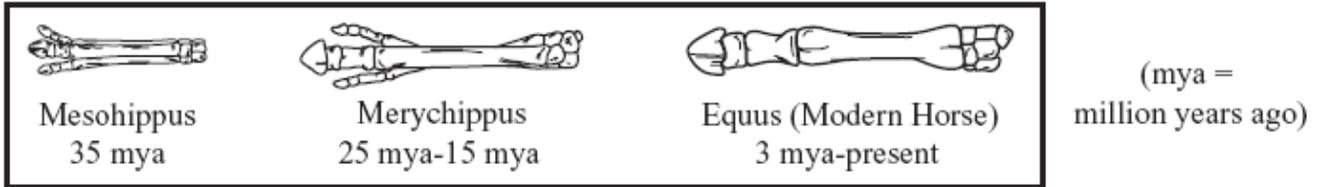
Pill Bug

Pill bugs can often be found underneath rocks and rotting logs. When exposed to light, they immediately try to find a dark place to hide. This reaction by the pill bugs is a result of

- A** migration.
 - B** feeding behavior.
 - C** energy requirements.
 - D** changing environmental conditions.
- 2** If two trees in a yard are parent and offspring, it must be true that both trees
- A** have the same number of flower blooms.
 - B** have leaves that are the same shape.
 - C** produce the same amount of fruit.
 - D** are the same height.

- 3 The picture below shows the fossil leg bones of two extinct horses and the leg bones of a modern horse.

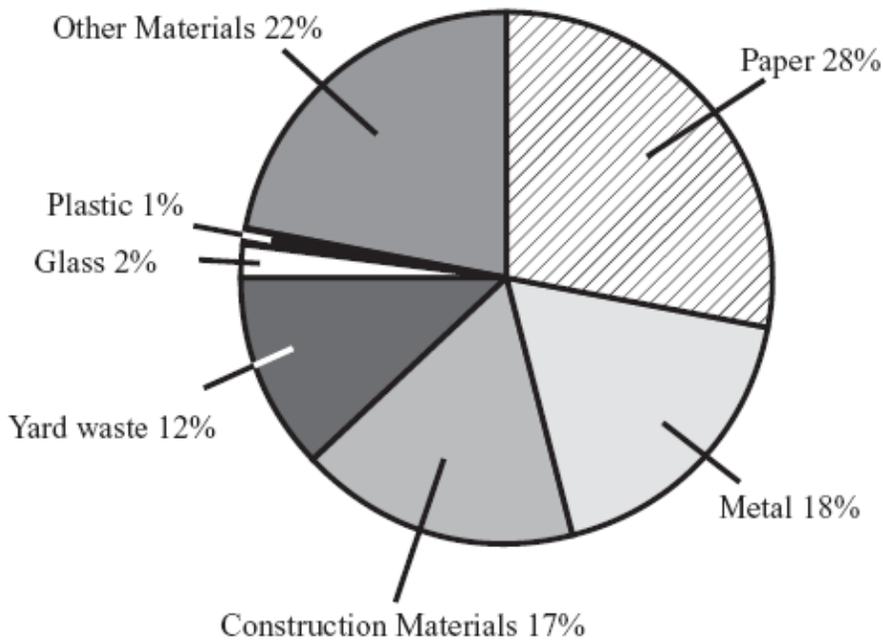
Foreleg Bones of Horse Species



What conclusion is *best* drawn from the evidence in the picture?

- A** Horses have become larger over time.
- B** Ancient horses could run faster than modern horses.
- C** In 35 million years, modern horses will become extinct.
- D** Modern horses are predators and ancient horses were prey.
- 4 A cattle rancher has three separate fields where cattle can graze at his ranch. Each spring he moves the cattle herd to a different field. What is the **MOST** important reason for the rancher to move the cattle each year?
- A** The rancher can collect the manure for fertilizer more easily.
- B** The grass can grow back in the last field that the cattle grazed in.
- C** The cattle can get some exercise when moving from field to field.
- D** The fields cannot be properly irrigated when the cattle are present.

- 5 Deinonychus was a meat-eating dinosaur that lived 100 million years ago. Paleontologists uncovered the bones of several Deinonychus individuals along with the bones of a large plant-eating dinosaur. What does this discovery **MOST LIKELY** indicate about Deinonychus?
- A They may have hunted in packs.
 - B They may also have eaten plants.
 - C They may have mated with plant-eating dinosaurs.
 - D They may have attacked and eaten each other when food was scarce.

6 **Percentage by Weight of Recycled Materials in New York State**

Which conclusion is supported by the data in the chart?

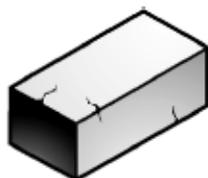
- A** Construction materials are more expensive to recycle than metal.
- B** A greater number of containers are made from glass than from plastic.
- C** Very few people in the state of New York have yards and therefore have no need to compost.
- D** Paper products are recycled in greater amounts than any other individual product.

- 7** The pitch of a sound is controlled by
- A** the speed of the vibrations produced.
 - B** the loudness or softness of the sound.
 - C** the length of time that the sound lasts.
 - D** the direction from which the sound comes.
- 8** A student has been given five samples of different substances: salt, sugar, gravel, wood chips, and iron filings. Which two substances, if mixed together in a glass of water, will the student be unable to easily separate from each other once the water has been evaporated?
- A** salt and sugar
 - B** sugar and gravel
 - C** gravel and iron filings
 - D** iron filings and wood chips

9



gold ring



brick

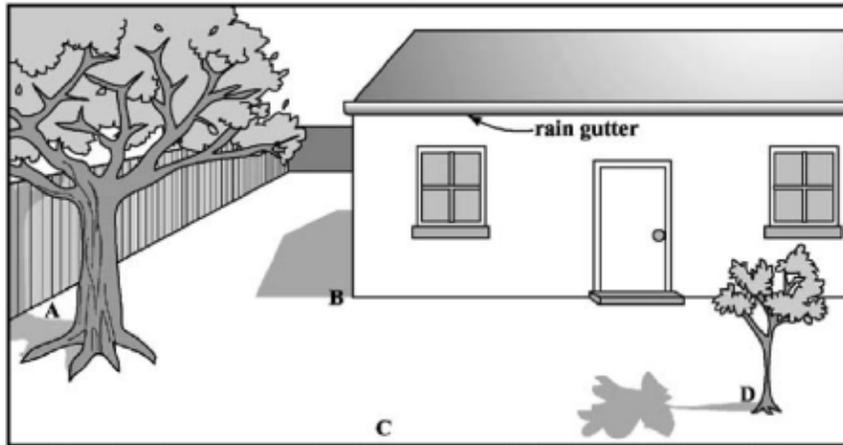


quarter

Which of the following properties is **NOT** shared by all the objects shown above?

- A They are all solids.
- B They will all sink in water.
- C They will all attract a magnet.
- D They are all made from earth materials.

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER DOCUMENT.



10 Constructed-Response
(3 points)

Dominique must choose a place to put her rain gauge.

- Which location in the picture (A, B, C or D) is the **BEST** location for her rain gauge? Explain your choice.
- Choose and record one of the remaining locations and explain why it is **NOT** a good location for the rain gauge.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER DOCUMENT.**11 Constructed-Response
(3 points)**

A family hired an expert to determine the best way to irrigate their fields. The expert collected the following data on the local water sources.

Water Source Data

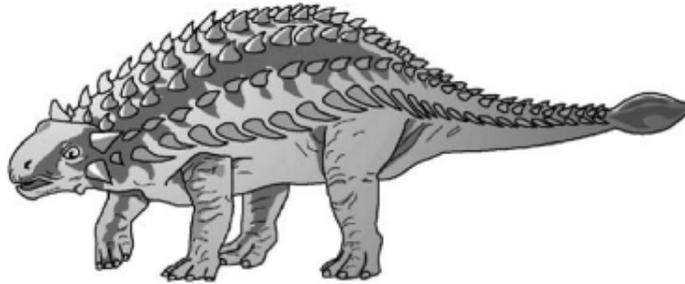
Water Source	Distance to Field	Cost per Year to Deliver Water to Field	Water Availability
Pond	70 meters	\$ 10,000	limited
River	150 meters	\$ 25,000	unlimited
Mountain Ice	18,000 meters	\$2,000,000	unlimited
Rain	0 meters	No cost	limited

The expert suggests that the river is the best source to use for irrigation.

- Provide one reason why the river is a better source than the pond.
- Provide one reason why the river is a better source than the mountain ice.
- Provide one reason why the river is a better source than the rain.

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Use the following information to answer questions 12 through 15.



Ankylosaurus was a large armored dinosaur that lived from 70-65 million years ago. They had many unique features including rows of spikes along their entire bodies, large horns on the sides of their heads, and club-like tails. They were approximately 10 m long and weighed up to 2700 kg (as much as a small truck). The top parts of their bodies were covered with thick plates fused into their leathery skin and they had bony plates around their eyes. The undersides of their bellies were not plated. Scientists believe Ankylosaurus was a plant-eater. Partial skeletons of Ankylosaurus have been found in Montana, USA and Alberta, Canada. Fossilized tracks that scientists believe were made by Ankylosaurus have also been found in Bolivia, South America.

- 12** Many of the physical features of the Ankylosaurus indicate that it was well adapted for
- A** running with a herd.
 - B** surviving long, cold winters.
 - C** hunting other organisms for food.
 - D** defending itself against predators.
- 13** Ankylosaurus is **BEST** classified as a
- A** predator.
 - B** vertebrate.
 - C** invertebrate.
 - D** decomposer.

14 Scientists have found partial skeletons of Ankylosaurus only in North America. However, scientists believe they have identified fossil tracks found in South America as belonging to Ankylosaurus. Which of the following discoveries would **BEST** allow them to confirm that Ankylosaurus did live in South America?

- A** multiple sets of fossilized tracks in South America
- B** skeletal remains of Ankylosaurus in South America
- C** data about ancient environmental conditions in South America
- D** fossilized tracks located between the sites in North America and South America

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER DOCUMENT.

Selected Data on Dinosaurs

Dinosaur Species	Food Source	Approximate Length (meters)	Time of Existence (millions of years ago)
Allosaurus	Meat	36 – 38	154 – 144
Gigantosaurus	Meat	13 – 15	99 – 95
Chasmosaurus	Plants	5 – 8	76 – 70
Tyrannosaurus Rex	Meat	12 – 13	85 – 65
Edmontosaurus	Plants	12 – 13	73 – 65
Oviraptor	Plants/Meat	2 – 3	88 – 70
Deinonychus	Meat	2 – 3	110 – 100

15 Constructed-Response (3 points)

The chart above provides partial data on several different dinosaurs.

- Identify one dinosaur that may have preyed upon Ankylosaurus.
- Explain your choice using two pieces of relevant data from the charts.

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16 Materials are often shipped across the Great Lakes from Canada to the United States. This is an example of using water for

- A** irrigation.
- B** recreation.
- C** transportation.
- D** generating electricity.

17



In the picture above, what is the feature that runs along the eastern part of the United States?

- A** sand dunes
- B** Great Lakes
- C** mountain chain
- D** Mississippi River

18 If a winter storm watch is issued in your area, that means hazardous winter weather conditions are expected. Which of the following is *least* important to have in case of blizzard conditions?

- A extra food and water
- B emergency heat source
- C pair of waterproof boots
- D battery-powered radio or television

19



What is the smallest unit of measure for reporting the length of the line above?

- A grams
 - B milliliters
 - C millimeters
 - D centimeters
- 20** The ground temperature in two Michigan cities was taken at the same time. In Curtis, Michigan it was measured at -6°C (21.2°F). In Jackson, Michigan it was measured at 6°C (42.8°F). If rain fell in each city, what would **MOST LIKELY** result?
- A Hail would fall in Curtis but not in Jackson.
 - B The rain would turn to snow in both Curtis and Jackson.
 - C Ice would form on roadways in Curtis but not in Jackson.
 - D Frost would form on the ground in both Curtis and Jackson.

PART 2

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You may now begin Part 2.

- 21** A scientist is helping the city design a new zoo. They want to make sure that the habitat they design will encourage a natural balance among the organisms. What could they do to make sure their design is successful?
- A** interview people that have gone to the zoo
 - B** use a design that no other zoo has ever used
 - C** hire only experienced employees to run the zoo
 - D** observe the natural habitats of organisms that will be in the zoo
- 22** The presence of fog near a river bank indicates that
- A** the river could dry up.
 - B** the river could overflow.
 - C** there is a lot of water in the soil.
 - D** there is a lot of moisture in the air.

23

Map of North America

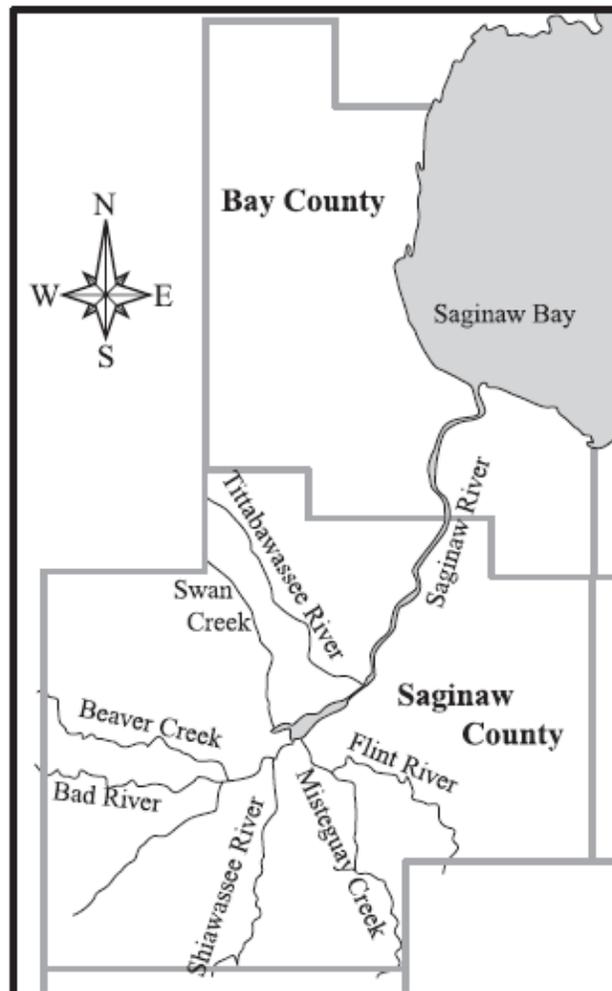


Which city on the map is **MOST LIKELY** to experience four distinct seasons each year?

- A Anchorage
- B Detroit
- C Brownsville
- D Mexico City

- 24** In Michigan, which day of the year would have the *most* hours of daylight?
- A** March 21
 - B** June 21
 - C** September 21
 - D** December 21
- 25** A scientist is analyzing a fossilized deer bone that has tooth marks on it. The pattern and spacing of the tooth marks will help the scientist to
- A** determine the age of the animal that left the marks.
 - B** identify the species and size of the animal that left the marks.
 - C** identify how long it took the animal that left the marks to eat the deer.
 - D** determine if the animal that left the marks killed the deer or found it dead and then ate it.

26 The map below shows the river systems in Saginaw and Bay Counties.



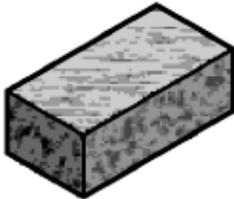
Which of the following is a path that river water could take before reaching Saginaw Bay?

- A Swan Creek → Flint River → Saginaw Bay
- B Flint River → Misteguay Creek → Saginaw River → Saginaw Bay
- C Flint River → Saginaw River → Saginaw Bay
- D Shiawassee River → Flint River → Tittabawassee River → Saginaw Bay

27 Juanita is making toast for breakfast and the bread gets stuck in the toaster. She gets a metal fork to pull the bread out. What is *most* important for Juanita to do before she pulls the toast out of the toaster?

- A wash her hands
- B turn the toaster upside down
- C unplug the toaster from the wall outlet
- D wait until the toast has reached room temperature

28



brick



bones



baseball glove



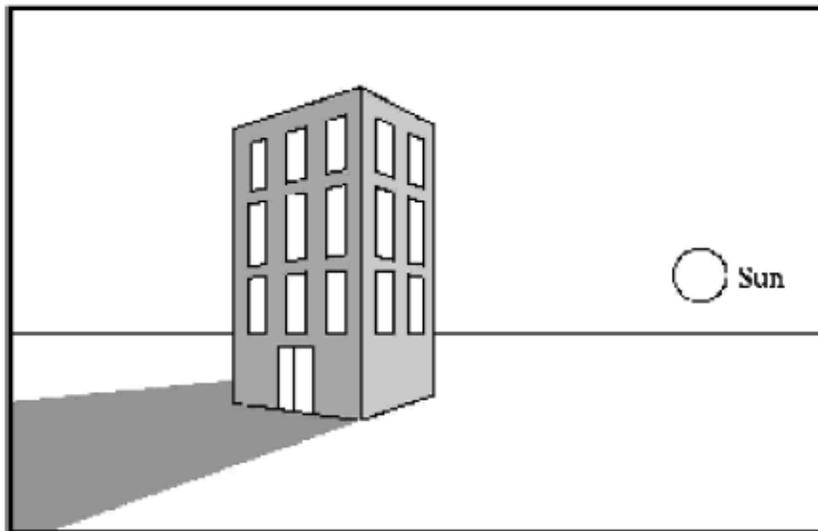
ice cube

Which of the following properties is shared by all of the items above?

- A all are solids
- B all are flexible
- C all have the same weight
- D all have the same hardness

- 29 Marcus has a mixture of sugar, sand, and iron filings. The *best* method for separating one of these substances is to
- A pour the mixture into a sieve to remove the sugar.
 - B use a magnet to remove the sand.
 - C use a magnet to remove the iron filings.
 - D pour the mixture into water.

30



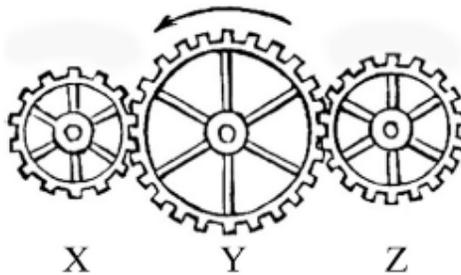
The sun rises at 7:00 a.m. to the east of an office building casting a shadow, as shown above. At what time during the day will the building's shadow be shortest?

- A 10:00 a.m.
- B 12:00 noon
- C 4:00 p.m.
- D 7:00 p.m.

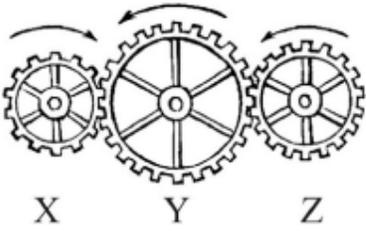
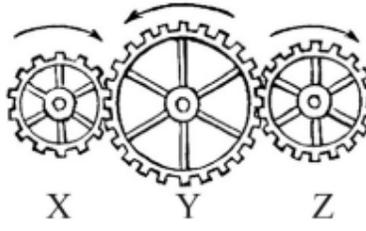
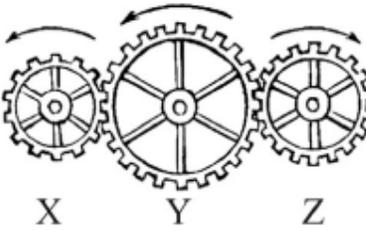
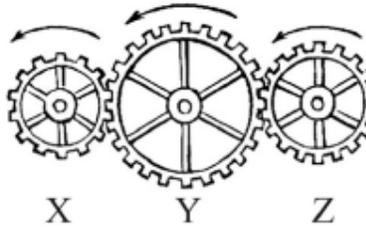
31 Which of the following is an example of a simple way that students can help conserve trees?

- A Purchase paper when it is on sale.
- B Only use colored paper for art projects.
- C Bring lunch in a paper bag instead of a lunchbox.
- D Write on both sides of each sheet of notebook paper.

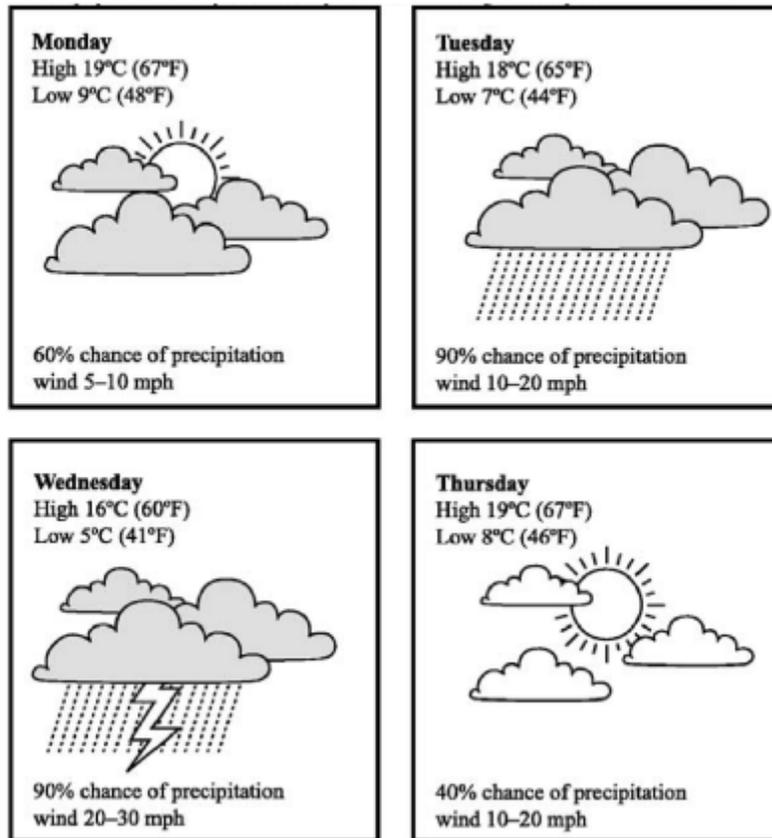
32



If gear Y turns in the direction shown by the arrow above, in what direction will gears X and Z turn?

- A** 
- B** 
- C** 
- D** 

Use the following information to answer questions 33 through 36.



- 33 Which instrument was **MOST LIKELY** used to measure the amount of precipitation for each day?
- A ruler
 - B rain gauge
 - C measuring tape
 - D measuring spoon
- 34 Which of the following is an opinion that a person might form after reading the four day weather forecast?
- A The chance of precipitation increases from Monday to Tuesday.
 - B The predicted cloud cover is the same for Monday and Thursday.
 - C The wind speed for Thursday is lower than Wednesday.
 - D Thursday is the best day of the week for no precipitation.

35 Which of the following types of severe weather is **LEAST LIKELY** to occur during the predicted weather conditions?

- A flooding
- B blizzards
- C tornadoes
- D thunderstorms

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER DOCUMENT.

36 **Constructed-Response** (3 points) A student read the weather forecast in the newspaper on Sunday. He decided to measure the accuracy of the forecast. For the four days, he took measurements for wind speed, air temperature, and amount of rainfall. He recorded his measurements in the table below.

Weather Data

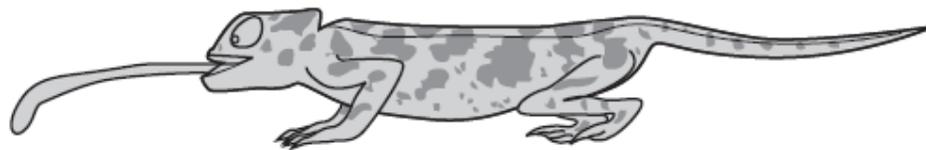
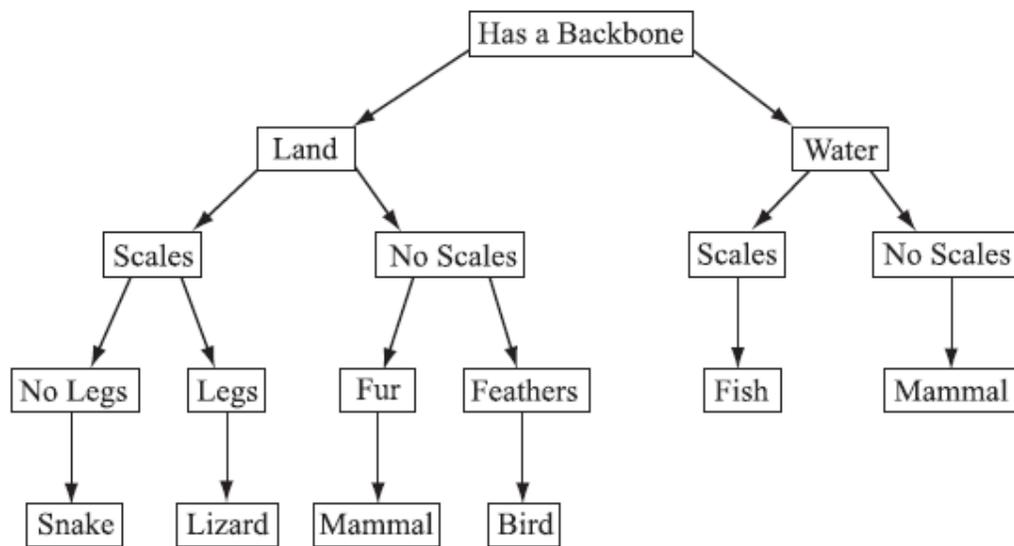
	Temperature (°F)		Wind Speed (mph)	Rainfall (cm)
	Low	High		
Monday	48	64	10	6
Tuesday	39	63	25	0
Wednesday	37	59	28	12
Thursday	50	68	8	3

- On which day was the weather prediction **MOST** accurate?
- Explain why you think the weather predictions were accurate on this day. Make sure to use **at least two** pieces of information from the table.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

- 37 A group of scientists uncovered a fossilized whale skeleton. Many of the fossilized bones had scratch marks on them and several shark teeth were found with the skeleton. What does this information tell the scientists?
- A Whales and sharks competed for food.
 - B The whale was probably eaten by sharks.
 - C The whale died before the sharks fed on it.
 - D Whales and sharks hunted for food together.

38



This picture shows a chameleon. A chameleon is a reptile that is often found in trees.

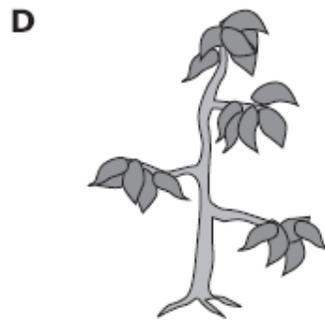
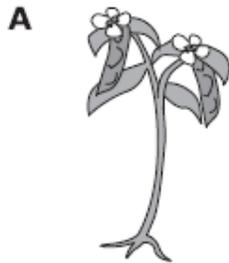
Using the key above, which organism is the chameleon **MOST** closely related to?

- A fish
- B bird
- C snake
- D mammal

39



The young plant shown above was grown from a seed that *most likely* came from which of the following plants?

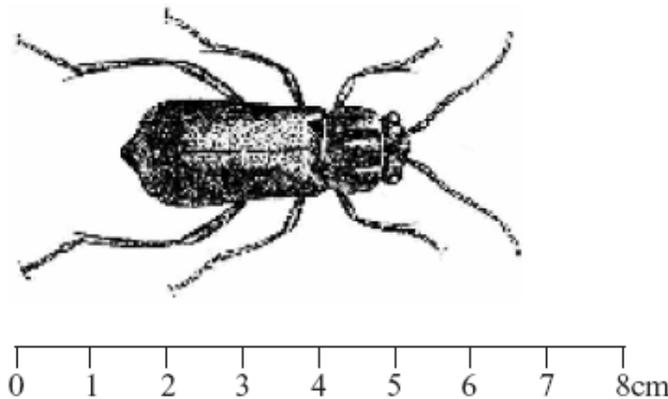


40 A gardener is choosing tomato seeds to grow in the spring. She wants to plant tomatoes that will grow quickly and produce large fruit. The *best* source of information for her would likely be a

- A** science teacher.
- B** vegetable cookbook.
- C** seed supply Web site.
- D** life science textbook.

- 41** A building located in Michigan has an indoor garden containing plants that normally only grow in Florida. The building has a glass ceiling to allow plenty of sunlight and an indoor watering system. What is the best reason why these plants are able to survive in Michigan?
- A** The plants were able to adapt quickly to Michigan weather conditions.
 - B** The glass ceiling lets sunlight in and reduces the amount of fertilizer needed.
 - C** The indoor watering system prevents the plants from being affected by pollution.
 - D** The conditions inside the building match basic requirements of the plants.

42



Approximately how long is the beetle's back leg?

- A** 1 cm
- B** 3 cm
- C** 4 cm
- D** 6 cm

Scoring Key: Part 1

Item Number	Correct Answer	Standard/ Benchmark	Description
1	D	III.4.e.2	Adaptations
2	B	III.3.e.1	Evidence of heredity
3	A	III.4.e.1	Fossils
4	B	III.5.e.3	Design systems for growth
5	A	III.4.e.1	Fossils
6	D	II.1.e.1	Need for evidence
7	A	IV.4.e.1	Describe sounds
8	A	IV.2.e.2	Mixtures
9	C	IV.1.e.1	Classify substances
10	CR	I.1.e.2	Observe, investigate, reason
11	CR	II.1.e.1	Need for evidence
12	D	III.4.e.2	Adaptations
13	B	III.2.e.2	Classify familiar organisms
14	B	II.1.e.1	Need for evidence
15	CR	I.1.e.5	Gather information
16	C	V.2.e.3	Sources and uses of water
17	C	V.1.e.1	Earth features
18	C	V.3.e.3	Safety precautions in bad weather
19	C	I.1.e.4	Measure
20	C	V.3.e.1	Weather conditions

Scoring Key: Part 2

Item Number	Correct Answer	Standard/ Benchmark	Description
21	D	II.1.e.4	Uses of technology
22	D	V.3.e.2	Seasons in Michigan
23	B	V.3.e.2	Seasons in Michigan
24	B	V.4.e.2	Motions of Earth and moon
25	B	II.1.e.1	Need for evidence
26	B	V.2.e.2	Path of rain water
27	C	IV.1.e.5	Electrical hazards
28	A	IV.1.e.1	Classify substances
29	C	IV.2.e.2	Mixtures
30	B	IV.4.e.4	Shadows
31	D	V.1.e.6	Conserve resources and reduce pollution
32	B	IV.3.e.5	How simple mechanical devices work
33	B	V.3.e.1	Weather conditions
34	D	II.1.e.1	Need for evidence
35	B	V.3.e.3	Safety precautions in bad weather
36	CR	II.1.e.1	Need for evidence
37	B	III.4.e.1	Fossils
38	C	III.2.e.2	Classify familiar organisms
39	C	III.3.e.1	Evidence of heredity
40	C	I.1.e.5	Gather information
41	D	III.2.e.4	Needs of organisms
42	B	I.1.e.4	Measure