



RELEASED ITEMS

SCIENCE
GRADE 5

FALL 2005

MICHIGAN STATE BOARD OF EDUCATION
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PART 1

DIRECTIONS

In this test you will demonstrate your understanding of science.

This test includes both multiple-choice and written-response questions. For the multiple-choice questions, use only a No. 2 pencil to mark your answers. Make a dark mark that completely fills the corresponding circle in your **Answer Folder**. If you are not sure of the answer to a multiple-choice question, mark your *best* choice and go on to the next question. If you change an answer, be sure to erase the first mark completely. Remember, mark only one answer for each question.

Mixed in with the multiple-choice questions are written-response questions. These questions require you to write sentences or paragraphs in your **Answer Folder**. Try to show all that you know about the topics by writing as much as you can in response to the questions you are asked. Make sure you at least attempt to answer each question. Record your written responses in the **Answer Folder** on the lines or spaces provided. Make sure the number of the question corresponds to the number in the **Answer Folder**.

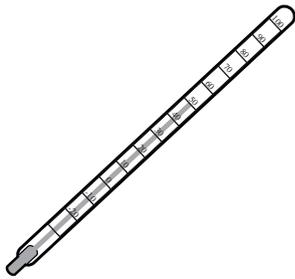
When you come to the end of page 12 in this test booklet, you have come to the end of Part 1. If you finish early, you may check your work for Part 1 only. Do **NOT** work on Part 2 of this test until you are told to do so.

If you do not understand any of these directions, please raise your hand.

You may now begin.

- 1 Water vapor exists in the atmosphere as
- A a visible gas.
 - B a visible liquid.
 - C an invisible gas.
 - D an invisible liquid.

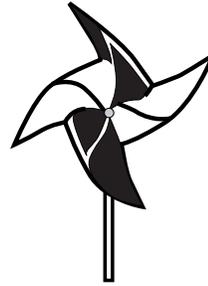
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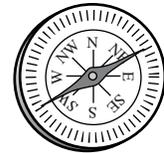
thermometer



ruler



pinwheel



compass

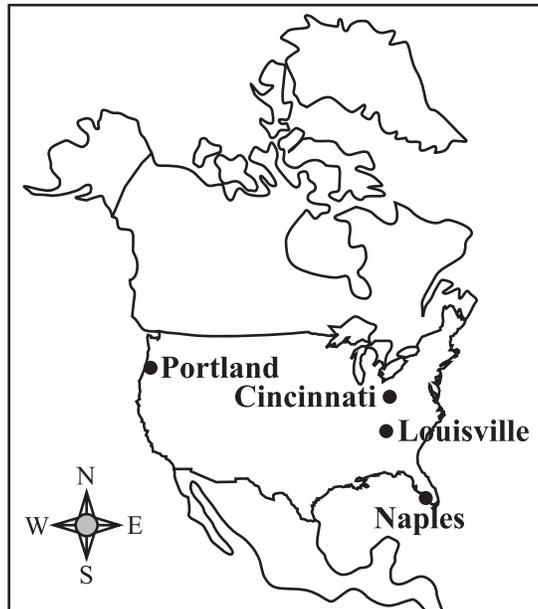
Which two items shown above can be used together to determine the direction of the wind?

- A the ruler and the compass
 - B the pinwheel and the ruler
 - C the compass and the pinwheel
 - D the thermometer and the compass
- 3 The state of Michigan is bordered by four of the five Great Lakes. *Most* geologists support the theory that the Great Lakes were formed by
- A movement of ancient glaciers.
 - B ancient meteors crashing into Earth.
 - C erosion of the land due to heavy rainfall.
 - D rivers dumping melted snow from Canada.

- 4 What factor is *most* responsible for the formation of sand dunes along Lake Michigan’s shoreline?
- A rain
 - B wind
 - C earthquakes
 - D glacial deposits

5

Map of North America



Which city on the map is *least likely* to experience snowfall during the winter months?

- A Portland
- B Cincinnati
- C Louisville
- D Naples

- 6 Tyrone taped a list of things to do on his mirror so he would not forget to do them. The list included the following tasks:

- Turn off the water while brushing your teeth.
- Turn off the lights when you leave a room.
- Close the refrigerator door quickly.
- Do not leave the outside doors open.
- Only take as much food as you can eat.

Based on Tyrone's list, what is he trying to accomplish by performing these tasks?

- A reduce waste
- B reuse materials
- C recycle resources
- D renew energy sources

Using the diagram below and what you know about Earth, answer questions 7 through 10.



- 7 Earth is closer to the sun than the planet Mars. Which of the following is the result of this difference in distance from the sun?
- A Earth is larger than Mars.
 - B A day on Earth is shorter than a day on Mars.
 - C Earth has one moon and Mars has two moons.
 - D The temperature on Earth is warmer than the temperature on Mars.
- 8 After Earth completes one full rotation (spin) on its axis, how much time has passed?
- A one 24-hour day
 - B one 7-day week
 - C one full month
 - D one full year

- 9 Which city in North America will receive the first morning light each day?
- A Washington, D.C.
 - B Denver, Colorado
 - C Detroit, Michigan
 - D Los Angeles, California

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

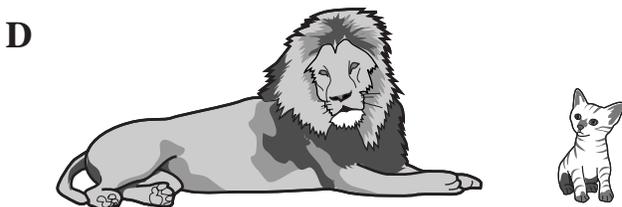
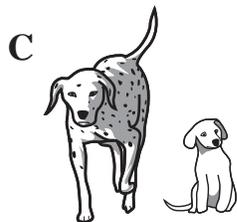
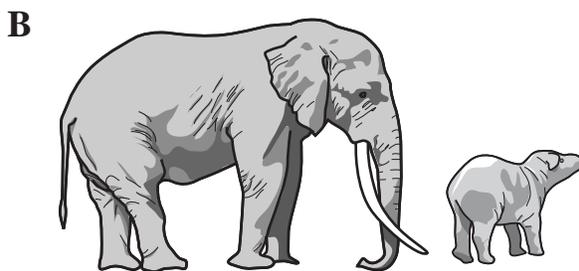
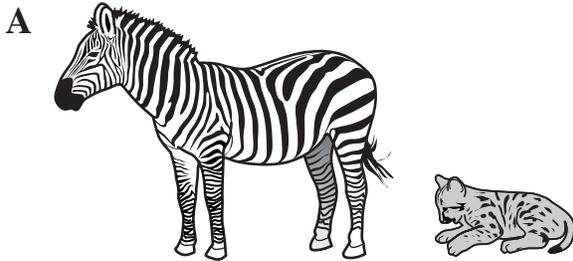
- 10 **Constructed-Response (3 points)** Earth and the sun are different from each other in many ways. They also have some similarities.
- Describe two ways that Earth is *different* from the sun.
 - Describe one way that Earth is *similar* to the sun.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

- 11 Fossils of *Deinonychus*, a dinosaur that lived 100 million years ago, have been found only in Montana and Wyoming. Suppose a *Deinonychus* fossil is discovered in Texas. What question could a scientist investigate to better understand the dinosaur's habitat preference?
- A How many *Deinonychus* fossils have been found in Texas, Montana, and Wyoming?
 - B Why are scientists just now discovering that the dinosaur, *Deinonychus*, lived in Texas?
 - C How did the environment in Texas compare to the environment in Montana and Wyoming 100 million years ago?
 - D Is the *Deinonychus* fossil from Texas larger or smaller than the *Deinonychus* fossils found in Montana and Wyoming?

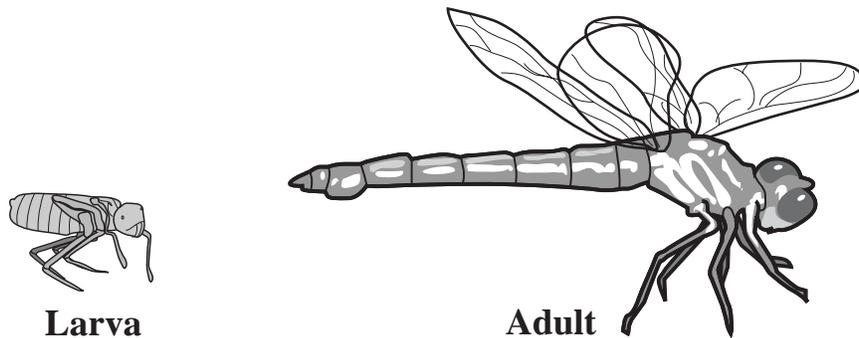
- 12 A farmer has three large fields where he plans to grow grasses to harvest for hay. Grasses should be harvested only after two years of growth. What could the farmer do to make sure he has a hay crop each year?
- A Plant each field at one-year intervals.
 - B Plant the grasses as close together as possible.
 - C Plant all the fields at the same time, but with different types of grasses.
 - D Plant warm-season grasses and cool-season grasses in each field at the same time.

- 13 Which of the following is a correct parent-offspring pair?



- 14 Which of the following is a valid food chain?
- A water → grass → fox → hawk
 - B sun → rabbit → moose → wolf
 - C grass → spider → mouse → rabbit
 - D dead mouse → flies → frog → snake
- 15 Organisms have many methods of surviving winter conditions. Which of the following is **NOT** an example of an organism adapting to survive the cold winter months?
- A Robins fly from Michigan to Georgia in the fall.
 - B Chameleons change color to match their surroundings.
 - C White-tailed deer grow longer hair that is hollow inside.
 - D Carp settle on the bottom of a pond and cover themselves with mud.
- 16 When butterfly eggs hatch, the young are called
- A worms.
 - B cocoons.
 - C caterpillars.
 - D little butterflies.

Use the following information to answer questions 17 through 20.



The Hines Emerald Dragonfly can be found in Michigan and was one of the first insect species to be listed as endangered under the Endangered Species Act. Female dragonflies deposit eggs in shallow water, near plants or in soft mud. After the larvae hatch, they live underwater for two to four years. In this time, they shed their exoskeletons eight to fifteen times. The larvae have large lower lips with bristles that can be extended up to one-third of their body length. They consume large quantities of mosquito larvae, water insects, worms, and even small fishes and tadpoles. Once larval growth is complete, they emerge from the water to begin a life in the air. They shed their final exoskeleton to reveal a bright green body, and their wings expand. These dragonflies have large eyes that are capable of seeing nearly 360 degrees (in all directions) and can detect even the slightest movement. They have two sets of wings that work independently of each other, allowing the dragonflies to fly forward, backward, change directions in mid-air, and hover motionless. They feed on mosquitoes, flies, and other insects for four to seven weeks before returning to the water to mate and die.

- 17 Based on its feeding preferences, the dragonfly is *best* classified as a
- A predator.
 - B producer.
 - C vertebrate.
 - D decomposer.
- 18 A large area of wetlands is being drained for development. The *most likely* effect of this change will be that the population of
- A dragonflies will increase.
 - B dragonflies will decrease.
 - C dragonfly larvae will increase, but the adult population will decrease.
 - D dragonfly larvae will decrease, but the adult population will increase.
- 19 Shedding its exoskeleton *most likely* allows the dragonfly to
- A grow.
 - B breathe.
 - C capture prey.
 - D detect movement.

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

- 20 **Constructed-Response (3 points)** Michigan is one of the few states where the endangered Hines Emerald Dragonflies live.
- Identify three actions that could be taken by Michigan government and citizens to maintain the population of the Hines Emerald Dragonflies in Michigan.

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Use the following information to answer questions 21 through 23.

Frogs: Fun and Facts

Frogs and toads are amazing creatures and are found on every continent except Antarctica. You may think all frogs and toads lay their eggs in bodies of water, but some frogs and toads don't just lay their eggs, they carry them in some rather unusual ways.

The female Midwife Toad lays a string of 50 eggs. The male takes these eggs and wraps them around his legs. He will carry them everywhere he goes, until they are ready to hatch, at which time he releases them in a pool of water. He keeps the eggs from drying out by dipping them into puddles of water.

The Gastric Brooding Frog from Australia has a guaranteed way to keep her eggs safe—she swallows them! The tadpoles develop inside of the mother's stomach, and when they become froglets she spits them out!

The Surinam Toad, which is actually a frog, lays her eggs and then places them on her back. A tough skin forms over each one, and the tadpoles grow inside these tiny skin pockets. After three months, the mother sheds the skin and the baby froglets hop out.

Frogs come in all sizes. One tadpole even grows larger than its mother. The tadpoles of the Paradoxical Frog, from South America, grow three times larger than their parents. As they grow into adult form, they shrink down to normal size. The largest known frog is called the Goliath, growing up to 32 centimeters long; the smallest known frog is the Poison-Arrow Frog, measuring less than a centimeter as an adult.

Most frogs live on a diet of insects, and each frog eats as much as its body's weight each day. They have very sticky tongues which they use to grab their food with. Frogs never chew their food, but swallow it whole.

Many frogs use camouflage to hide themselves from predators, but some are brightly colored to let a predator know they are poisonous. The Kokoi Poison-Arrow Frog from Columbia is considered one of the most poisonous frogs in the world. The poison of a single frog is strong enough to kill an adult elephant.

As amazing as these frogs are, they are just a sampling of over 4,000 known species of frogs worldwide.

- 21 The text mentions several different frogs. What do all of these frogs have in common?
- A They all use poison to avoid being eaten.
 - B They all go through the same life cycle stages.
 - C The males of each species protect the eggs until they hatch.
 - D The eggs are always laid in water and remain there until they hatch.

- 22 Which of the following would be the unit of measure used for reporting the mass of a Poison-Arrow Frog?
- A grams
 - B meters
 - C milliliters
 - D tablespoons
- 23 Which of the following *best* identifies the frog's role in a food web?
- A pupa
 - B tadpole
 - C producer
 - D consumer

PART 2

DIRECTIONS

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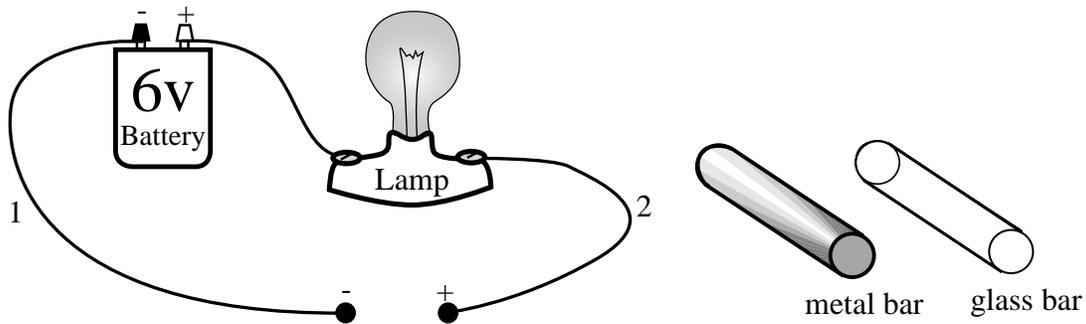
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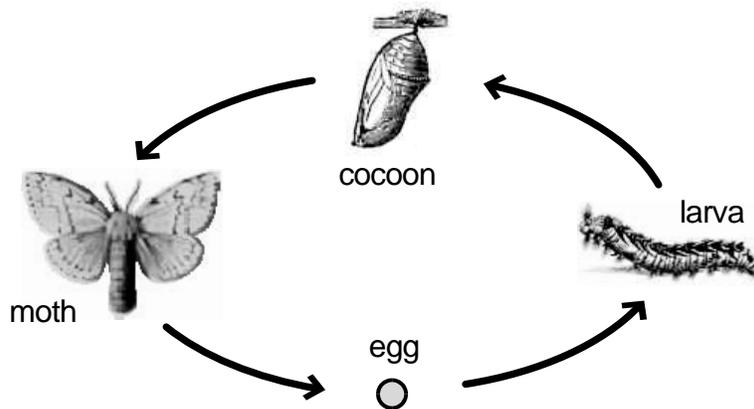
24



Using the battery and light bulb shown above, how could you show that metal conducts electricity and glass does not conduct electricity?

- A Touch the metal and glass bars together.
- B Touch wire 1 to the metal bar and then to the glass bar.
- C Touch wire 2 to the metal bar and then to the glass bar.
- D Touch wires 1 and 2 to opposite ends of the metal bar and repeat with the glass bar.

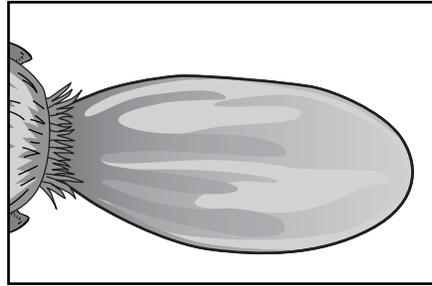
25 The picture below shows the life cycle of a gypsy moth.



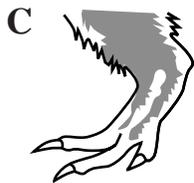
During which stage of its life cycle is the gypsy moth *most likely* to cause damage to crops?

- A 
- B 
- C 
- D 

26



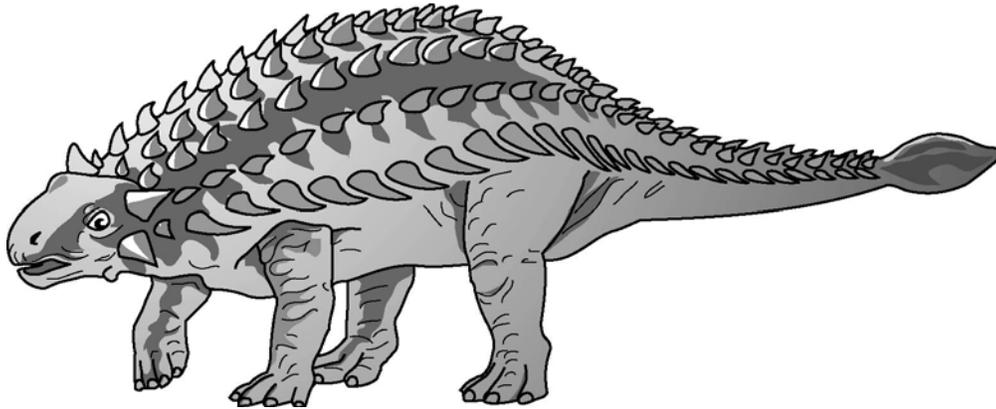
Look at the beaver tail in the picture above. This tail is adapted to help the beaver move swiftly through the water when swimming. Which of the following foot structures *most likely* belongs to the beaver?



27 A family goes on vacation for a week. When they return home they discover that some vegetables in their refrigerator have gone bad. What is the *most* environmentally responsible thing for them to do with the rotten food?

- A** toss it into a fire pit and burn it
- B** throw it in the trash to be taken to a landfill
- C** put it in a compost pile to use for plant food
- D** take it back to the grocery store and try to get their money back

Use the following information to answer questions 28 through 31.



Ankylosaurus was a large armored dinosaur that lived between 65 and 70 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, with an average body mass of 2,700 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.

- 28 Which of the following fossil discoveries *most likely* allowed scientists to decide whether the Ankylosaurus was a plant-eating or meat-eating animal?
- A teeth
 - B club-like tail
 - C eye plates
 - D armor plates

29

Selected Data on Dinosaurs

Dinosaur Species	Feeding Preference	Length (meters)	Time of Existence (millions of years ago)
Allosaurus	Meat	36–38	144–154
Gigantosaurus	Meat	13–15	95–99
Carcharodontosaurus	Meat	8–14	90–110
Tyrannosaurus rex	Meat	12–13	65–85

The chart above provides partial data on four different dinosaurs. Which of these dinosaurs might have preyed on Ankylosaurs?

- A Allosaurus
- B Gigantosaurus
- C Carcharodontosaurus
- D Tyrannosaurus rex

30 In order for the tracks of an animal to be fossilized, they must be buried with sediment shortly after they are made. If the tracks remained exposed at Earth’s surface, they would *most likely*

- A be filled with volcanic ash and dissolve.
- B erode over time and disappear completely.
- C fossilize much faster than if they were buried.
- D sink into the sediment where they would never be discovered.

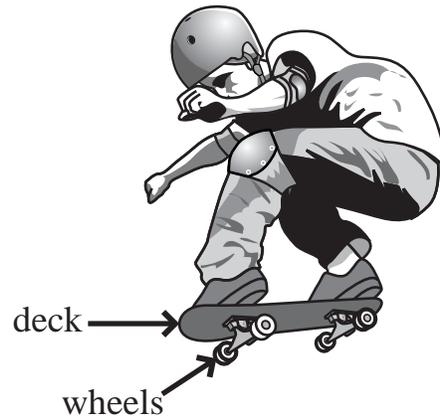
ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER FOLDER.

31 **Constructed-Response (3 points)** The Ankylosaurus had many defense adaptations for survival.

- Identify and record two *different* adaptations that the Ankylosaurus used to protect/defend itself from predators.
- Choose one of these adaptations and explain how it *probably* helped to protect the Ankylosaurus.

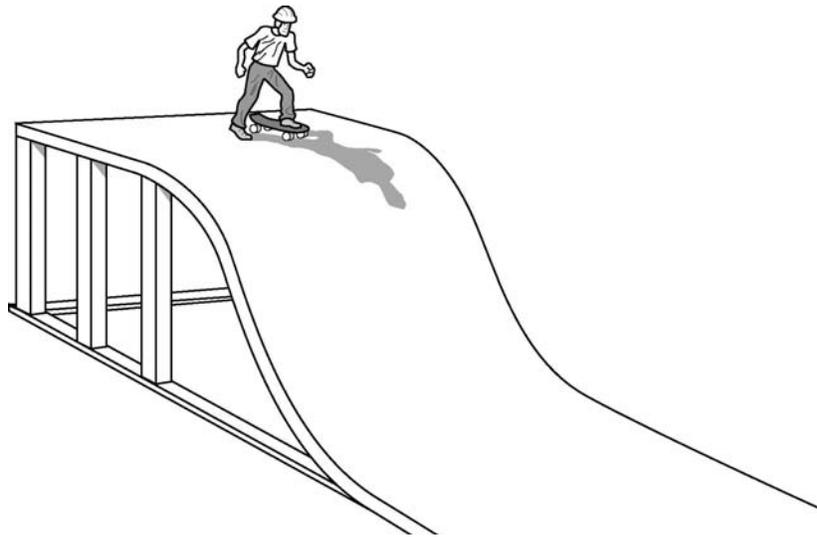
NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

Use the following information to answer questions 32 through 35.



Chris has joined a skateboarding team and purchased a new skateboard. The team captain tells Chris that being a good skateboarder means understanding and using physical science. Use your knowledge of physical science to answer the following questions.

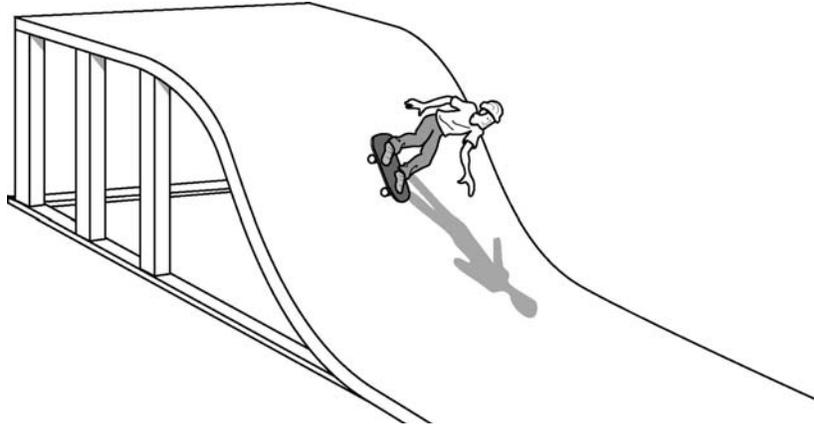
32



Chris pushes off the ramp platform with his right foot. He quickly places his foot back on the board and rides down the ramp. What force acts between Chris's foot and the platform as he pushes off?

- A gravity
- B friction
- C conductivity
- D magnetic attraction

33



What force acts to pull Chris down the ramp once he begins his downward motion?

- A gravity
- B friction
- C conductivity
- D magnetic attraction

34 Chris attaches a sheet of sandpaper to the surface of the skateboard deck. What purpose does the sandpaper *most likely* serve?

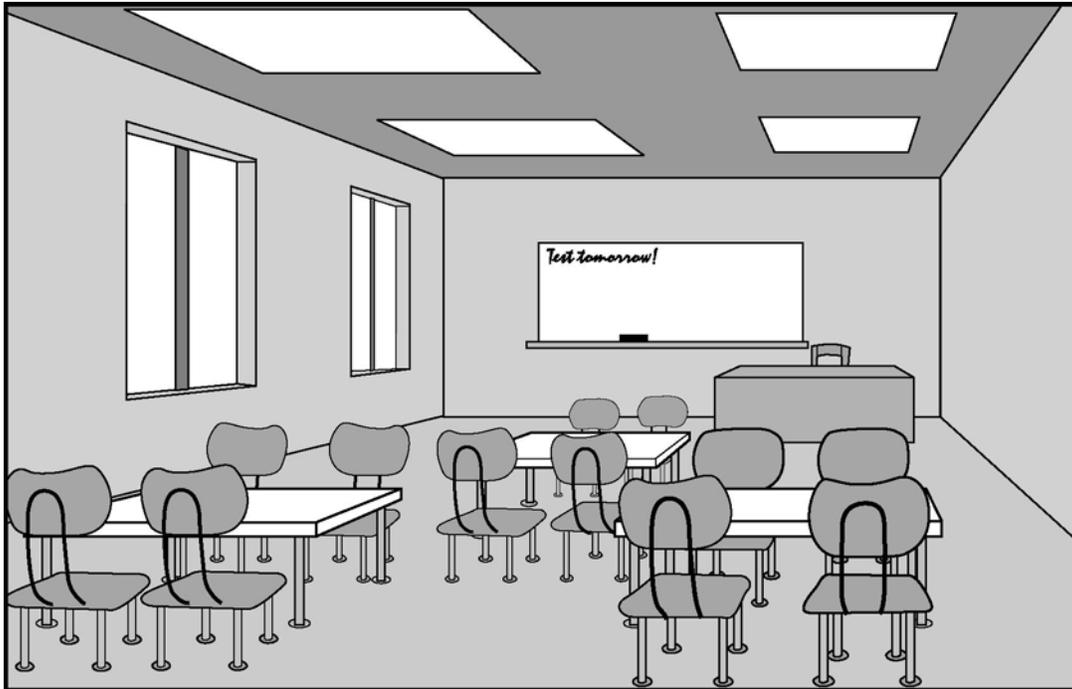
- A It provides a protective coating to help prevent damage to the skateboard.
- B It reduces the effect that gravity has on the board as it moves down the ramp.
- C It allows Chris to crouch lower on the board to increase his speed on the ramp.
- D It increases the friction between Chris's shoes and the deck to keep him from sliding off.

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

- 35 **Constructed-Response** (3 points)
- Identify two forces that act on the skateboard as it moves down the ramp.
 - Explain how these forces affect the motion of the skateboard.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

36



The picture above shows a typical classroom setup. Why would shadows be difficult to see in this room?

- A Shadows do not occur in buildings.
- B Ceiling lights do not produce shadows.
- C There are multiple light sources in the classroom.
- D The windows are on only one side of the room.

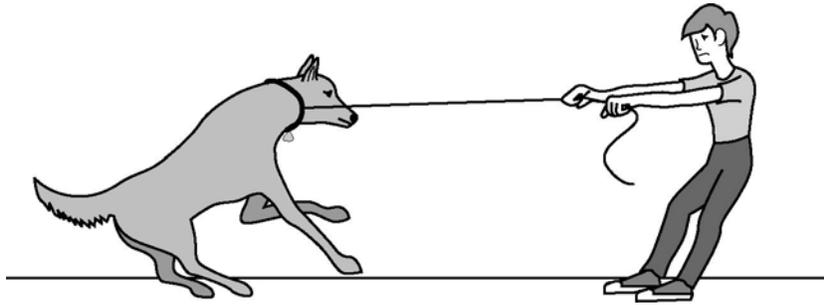
37 Matter that is vibrating is producing

- A gas.
- B light.
- C sound.
- D shadows.

- 38 As an airplane climbs in the sky, the pilot notices ice crystals forming on the windshield. This happens because
- A blizzards occur more often at higher altitudes.
 - B friction with the atmosphere causes ice to develop.
 - C water evaporates faster at higher altitudes, resulting in ice crystals.
 - D moisture on the outside of the plane freezes due to colder air at higher altitudes.
- 39 In a container, a mixture of water and salt is stirred so that the salt dissolves completely. Sand is added to this solution and allowed to settle to the bottom of the container. If the container is placed on a heat source and the liquid evaporates completely, what will be left in the container?
- A Nothing will remain in the container.
 - B Only salt will remain in the container.
 - C Only sand will remain in the container.
 - D Salt and sand will both remain in the container.
- 40 A student has been given several different color filters for a light investigation. The *best* way to determine which filter will allow red light to pass through is to
- A shine red light through the filters, one at a time.
 - B shine white light through a prism to separate the colors.
 - C stack the filters and shine red light through all of them at once.
 - D shine red light through a prism and then through the stacked filters.

- 41 Why is it more difficult to see your shadow on a cloudy day than on a sunny day?
- A Clouds create multiple shadows.
 - B There is very little direct sunlight on cloudy days.
 - C It is more difficult for your eyes to focus on cloudy days.
 - D Clouds cause the shadows to spread out and blend in with the ground.

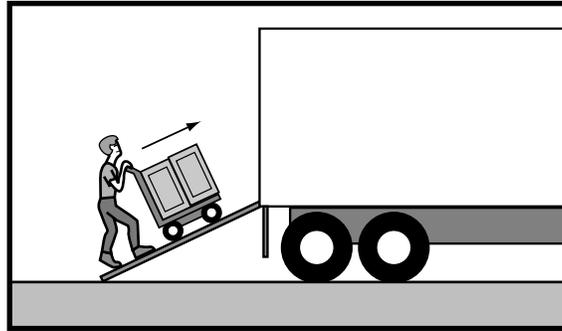
42



Which of the following *best* describes the forces being used by the dog?

- A The dog is pulling on the ground and pulling on the rope.
- B The dog is pulling on the ground and pushing on the rope.
- C The dog is pushing off the ground and pulling on the rope.
- D The dog is pushing off the ground and pushing on the rope.

43

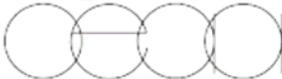


Which combination of simple machines is the worker using to move these boxes into the truck?

- A gears and inclined plane
- B lever and wheel and axle
- C pulley and inclined plane
- D inclined plane and wheel and axle



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Scoring Key

Part 1:

Item #	Answer Key
1	C
2	C
3	A
4	B
5	D
6	A
7	D
8	A
9	A
11	C
12	A
13	C
14	D
15	B
16	C
17	A
18	B
19	A
21	B
22	A
23	D

Part 2:

Item #	Answer Key
24	D
25	B
26	D
27	C
28	A
29	D
30	B
32	B
33	A
34	D
36	C
37	C
38	D
39	D
40	A
41	B
42	C
43	D