



RELEASED ITEMS

SCIENCE
GRADE 8

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 items 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**.

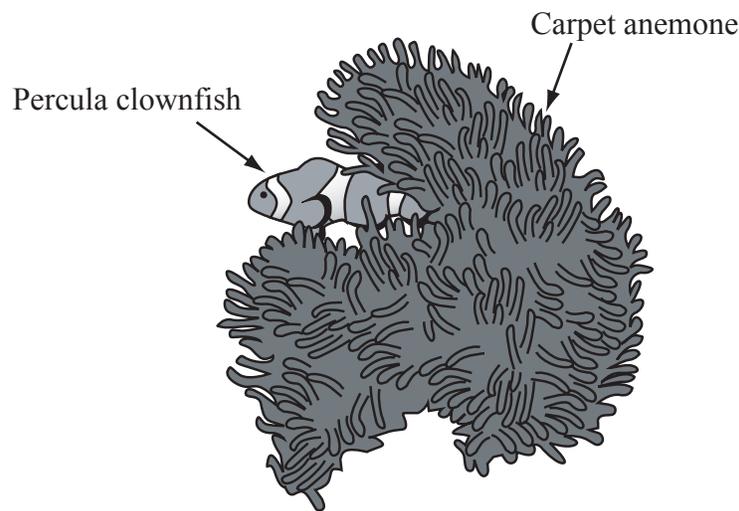
When you reach the bottom of page 14, you have come to the end of Part 1. You may check your work for Part 1 only. Do **NOT** work on Part 2 until you are told to do so.

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

You may now begin.

- 1 Which of the following is *most likely* to disrupt the natural balance in an ecosystem?
- A introduction of a non-native species
 - B reduced daylight hours during winter
 - C preventing the cutting of trees in forests
 - D riverbank erosion resulting from springtime flooding

2

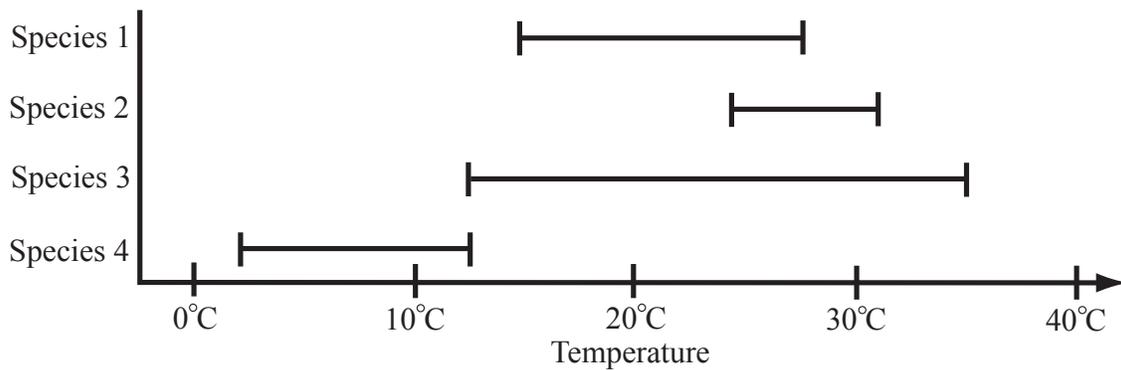


The Percula clownfish can often be seen hiding in the tentacles of the poisonous Carpet anemone. Clownfish are covered with a slime layer that protects them from the poisonous tentacles of the Carpet anemone. These tentacles keep clownfish safe from predators. Bits of food from the clownfish's meals provide the Carpet anemone with food. What type of relationship do the clownfish and the Carpet anemone share?

- A parasitic
- B competitive
- C predator-prey
- D mutually beneficial

3

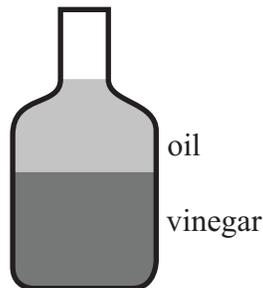
Fish Temperature Variation Tolerance



The graph above shows the range of tolerance to temperature for 4 (four) species of freshwater fish. Which species is *most likely* to survive large variations in temperature?

- A Species 1
- B Species 2
- C Species 3
- D Species 4

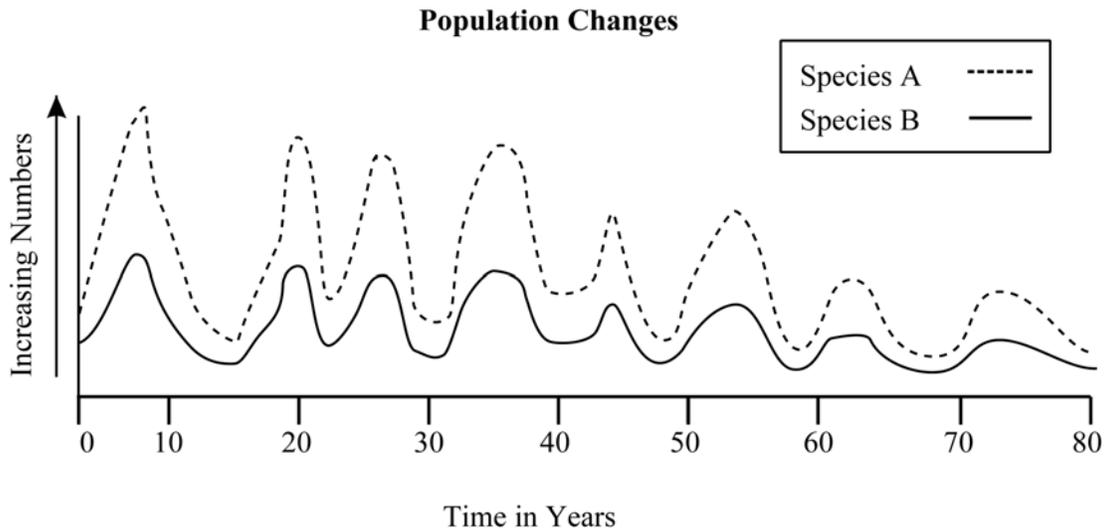
4



A student pours vinegar and oil into the same bottle. The two substances separate and the oil floats on top of the vinegar. What causes this separation?

- A The oil is less dense than the vinegar.
- B The vinegar is a liquid and the oil is a solid.
- C The vinegar was poured in first and stays on the bottom.
- D The volume of the oil is less than the volume of the vinegar.

5 Tanya is learning about ecosystems and how different animals depend on each other.



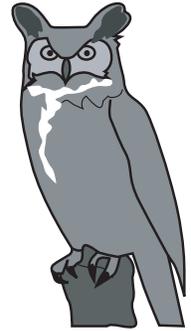
Looking at the graph above, what can Tanya conclude about the two species?

- A Species B has a greater population than species A.
 - B Species A and species B have no effect on each other.
 - C As the population of species A increases, species B decreases.
 - D Species A and species B are affected the same way by the ecosystem.
- 6 Environmental organizations have asked businesses to take action to reduce waste. Which of the following changes could a business make in order to become more “environmentally friendly”?
- A Purchase only recycled paper and paper products.
 - B When making photocopies, print on only one side of the paper.
 - C Purchase wood products manufactured only in other countries.
 - D When packing boxes, use Styrofoam™ filler instead of old newspapers.

- 7 Which of the following is an example of how insects are beneficial to humans?
- A Insects can spread diseases.
 - B Insects have short life spans.
 - C Insects pollinate flowering plants.
 - D Insects sometimes eat poisonous plants.
- 8 Which of the following is an example of an escape strategy that is used to avoid being killed and eaten by predators?
- A Deer shed their antlers in the fall.
 - B Newts drop their tails when threatened.
 - C Anglerfish produce light to attract other fish.
 - D Otters produce oil to coat their fur and make it waterproof.

Use the information below to answer questions 9 through 12.

The great horned owl is a powerful bird of prey. These owls have large ear tufts, have an average body mass of 900–1800 g, and have a wingspan of 91–152 cm. Their eyes face forward, and they are able to turn their heads in almost a full circle. They range in color from dark brown and gray to nearly white in the far north. Great horned owls have adapted to survive in forests, grasslands, swamps, and deserts. They often use abandoned nests left by other birds. They are night hunters, and they eat rodents, squirrels, rabbits, skunks, raccoons, ducks, chickens (and other birds), snakes, toads, fish, and occasionally road-killed animals. They have even been known to eat cats and small dogs.



Great Horned Owl

- 9 Suppose all the raccoons disappeared from the great horned owl's food web. What effect would this *most likely* have on the great horned owl?
- A This would have a negative effect, and the great horned owl would become extinct.
 - B This would have little if any effect because the great horned owl has a huge variety of food sources.
 - C This would have a positive effect and cause the great horned owl population to reach a natural balance with its environment.
 - D This would have a negative effect because raccoons are an important food source for other animals in the ecosystem as well.
- 10 Great horned owls have forward-facing eyes that are so large that they cannot move them in their eye sockets. What characteristic of a great horned owl makes up for the owls not being able to move their eyes?
- A being night hunters
 - B their large ear tufts
 - C having a wide-ranging habitat
 - D the ability to rotate their heads

11 Based on its feeding preferences, the great horned owl is classified as

- A prey.
- B parasite.
- C predator.
- D producer.

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

**12 Constructed-Response
(3 points)**

Overpumping of well water causes water levels in a great horned owl's swamp habitat to become very low, and the population of small animals decreases.

- Identify two characteristics that increase the great horned owl's ability to survive this habitat change.
- Choose one of these characteristics and describe how it aids the great horned owl in surviving a habitat change.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

13 The presence of fossil organisms in rocks can provide information about the environment at the time the sediments were deposited because

- A fossils occur only in sedimentary rocks.
- B many organisms survive for millions of years.
- C fossils do not undergo chemical or physical weathering.
- D different organisms usually inhabit specific environments.

- 14 When European settlers first came to North America, the average thickness of the top layer of soil was approximately 23 cm. Today, the average thickness of the top layer of soil is less than 15 cm. Which of the following factors has *most likely* had the *greatest* effect on erosion of the top layer of soil?
- A farming
 - B restoring wetlands
 - C species reintroduction
 - D excessive groundwater use
- 15 When rain falls on the land, some of it is absorbed by surface sediment. How porous the surface sediments are controls how much water is absorbed. Which of the following will *most likely* result in an area where surface sediment is **NOT** porous?
- A flooding
 - B droughts
 - C tornadoes
 - D spring formation
- 16 Which of the following is true regarding the properties of an air mass?
- A An air mass is warmer at the leading edge and cooler at the trailing edge.
 - B An air mass has similar temperature and moisture properties throughout it.
 - C An air mass is cooler near the edges and has greater moisture near the center.
 - D An air mass has greater moisture near the edges and is cooler near the center.

- 17 Why is it winter in North America when it is summer in South America?
- A The south is always warmer than the north.
 - B There is less land than water in the south.
 - C North America receives less direct sunlight during the winter.
 - D When it is December in North America, it is June in South America.
- 18 In clear weather, a bright light can be seen for a long distance. In conditions of heavy fog, the visibility is greatly reduced. Which of the following explains the reduced visibility?
- A Light is refracted by water vapor in the air.
 - B Light is scattered by water droplets in the air.
 - C Light is absorbed by water vapor near the ground.
 - D Light is reflected by water droplets on the ground.
- 19 Rocks that contain fragments of bones, shells, and plant remains are *most likely*
- A crystals.
 - B igneous.
 - C sedimentary.
 - D metamorphic.

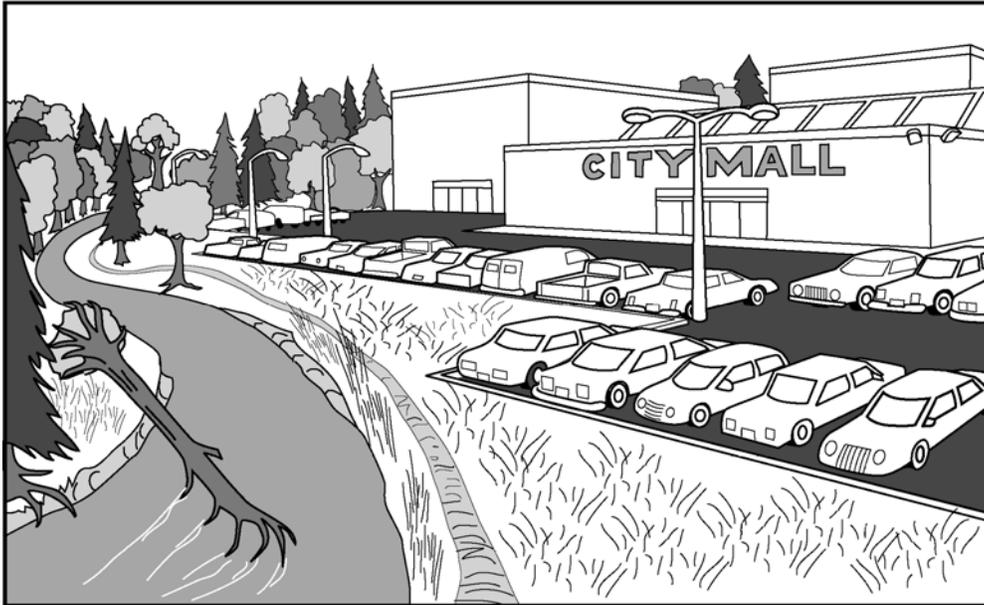
20

Based on information gathered during the scoring process, it has been determined that Item 20 is unusable. Item 20 was not included in the scoring for final reports.

- 21 Surface mining is a type of mining that is done at the surface of Earth. In addition to supplying valuable minerals to industry, surface mining might also
- A discourage landfills.
 - B increase Earth's surface area.
 - C eliminate groundwater pollution.
 - D create recreational ponds and lakes.

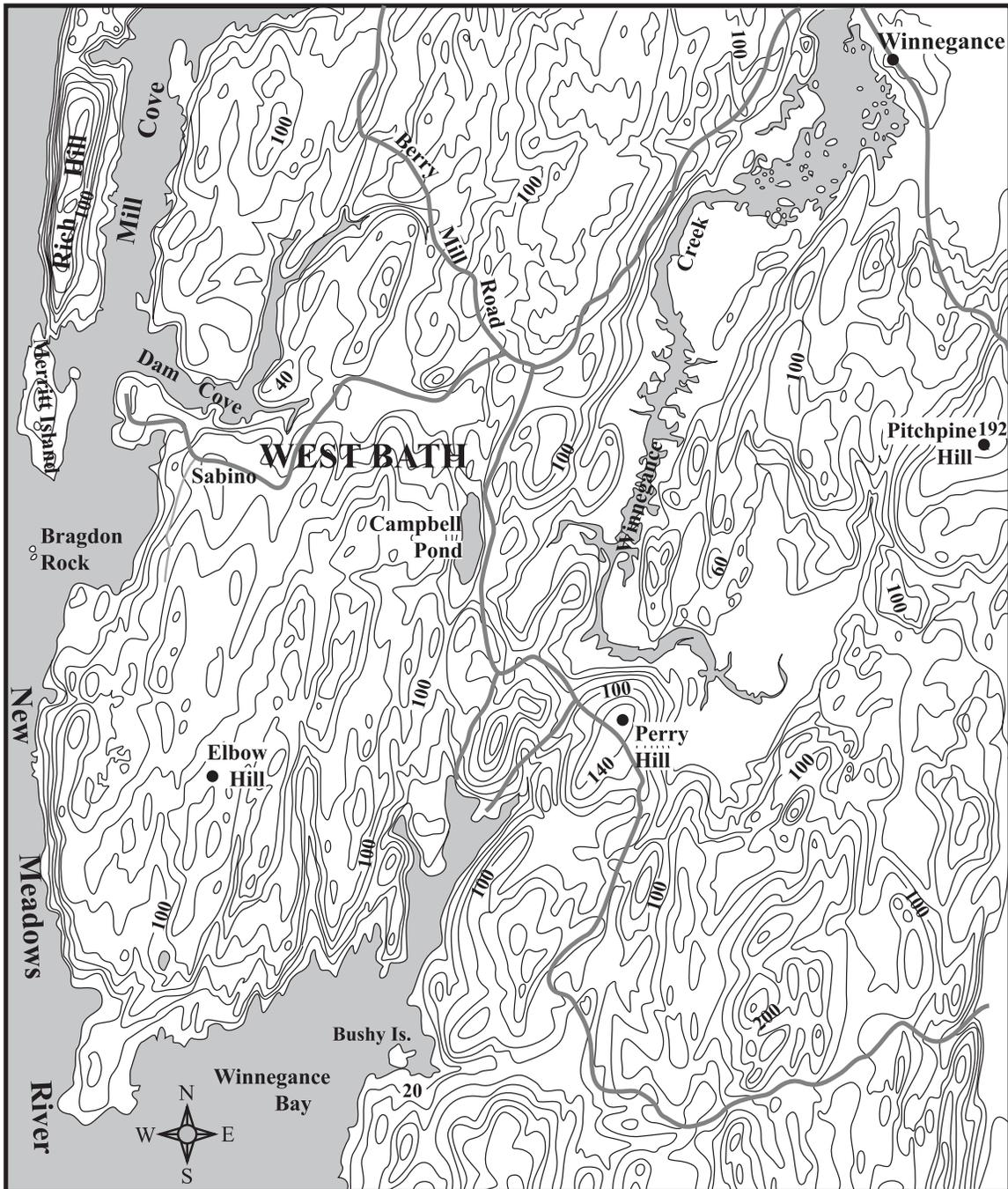
Use the information below to answer question 22.

Sawmill River flows through a little valley near Jocelyn's house. For years, the valley has been a natural habitat for wildlife. Other than a footpath along the river, there have been few signs of human disturbance surrounding the ecosystem. This year, the river has flooded more than usual. In places, the banks have been washed out, the water appears muddy, and several trees have fallen into the water. Jocelyn suspects that recent construction of a mall and huge parking lots is affecting the river.



- 22 Jocelyn noticed that a great deal of sediment had accumulated on the curves of the creek since her visit last year. Which of the following does **NOT** contribute to the wearing down of rocks to form sediment?
- A gravity and pressure
 - B a decrease in rainfall
 - C breakdown by lichen
 - D erosion by wind and water

Use the information below to answer questions 23 through 26.



The topographic map above shows West Bath, Maine, and surrounding areas. West Bath is only a few miles to the north of the Atlantic Ocean. You could travel to the ocean by going south on the New Meadows River.

- 23 If you were to drive along Berry Mill Road, located in the northern part of the map, you would find the local topography to be
- A flat.
 - B hilly.
 - C very steep.
 - D mountainous.
- 24 The town of Winnegance is located in the northeast corner of the map. Based on the map, the riverbank near the town appears to be
- A flat.
 - B sloped.
 - C wooded.
 - D farmland.
- 25 Agricultural runoff from the elevations around Elbow Hill would *most likely* flow into
- A Mill Cove.
 - B Campbell Pond.
 - C Winnegance Bay.
 - D Winnegance Creek.

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

**26 Constructed-Response
(3 points)**

There is very little land development along the bank of the New Meadows River.

- Explain why this area is **NOT** used for land development.
- Identify two geologic processes that may have contributed to the shape of the riverbank.

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PART 2

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If you finish early, you may check your work for Part 2 only. Do **NOT** work on Part 1 of this test.

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

You may now begin Part 2.

Read the article below and answer questions 27 through 29.

Spiders have been around for over 400 million years. Early spiders mainly used their silk to construct a hiding place. Today, although many spiders—such as giant tarantulas, trap-door spiders, and some other species—still use their silk mainly for shelter, most build various types of aerial webs. The primary victims of the spider's web are insects—a lot of insects. A British researcher once calculated that local farmland was home to more than two million spiders per acre, and that insects eaten annually by spiders nationwide would outweigh the human population. In fact, the change from ground-based webs to vertical, aerial webs was a reaction to the rise of winged insects.

The increase in spiders in so many places is mainly because of their ability to move. To travel, a spider goes to a high point, lets out enough silk to catch the wind, and floats away. The spider may travel many miles this way. This helps them distance themselves from other spiders competing for food and also aids them in spinning a web across a gap they would otherwise have trouble crossing.

Spiders release silk from silk glands called spigots to weave their webs. Hundreds of these spigots cover the three pairs of spinnerets that most spiders have. This allows spiders to combine multiple strands of silk into single threads with characteristics that differ for different uses. Some spiders, like tarantulas, only make one type of silk, but others make silk to use for drag lines, web frames, egg cases, or to trap insects. The webs also help spiders hide from predators such as birds. Other animals also make use of the spider's web. A *Hymenoepimecis* wasp will attack a *Plesiometa argyra* spider and sting it. While the spider is paralyzed, the wasp deposits her egg on the spider's abdomen. The spider goes about its business, catching and eating prey, while the wasp larva feeds on the spider's blood.

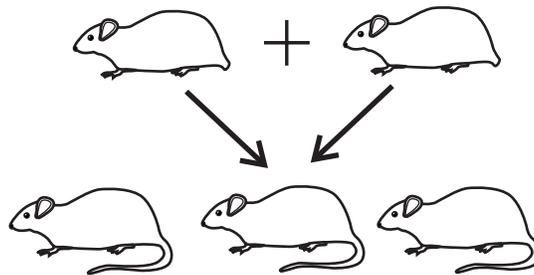
Source: *National Geographic*, August 2001, pp. 32–44

27 The spider's ability to spin silk is

- A an acquired trait.
- B an inherited trait.
- C a life cycle stage.
- D a learned behavior.

- 28 The *most likely* reason that spiders benefited from building vertical webs is
- A that insects began to fly.
 - B to avoid other spiders.
 - C that vertical webs were easier to build.
 - D to stay above post-Ice Age flood waters.
- 29 Which of the following shows the spider's correct place in the food chain?
- A plants → insects → birds → spiders → sun
 - B sun → plants → insects → spiders → birds
 - C birds → insects → sun → plants → spiders
 - D spiders → insects → sun → plants → birds
-
- 30 An experiment is being conducted to determine the air quality inside a building. In order to come to a conclusion, scientists must gather data. Which of the following would be an excellent source of data from which to draw a conclusion?
- A naked-eye viewing
 - B calculations of air mass
 - C demonstrations of air pressure
 - D measurement of airborne particulates

- 31 When mining for coal, a mining company removes the plants and layers of soil and rock above the coal deposit, and takes the coal. When the operation is complete, the mining company returns soil and rock, covers it with a layer of topsoil, and plants trees and grass. The trees and grass help to
- A prevent a collapse of the underlying sediment.
 - B limit the types of pollutants that can enter the soil.
 - C increase water absorption by the replaced sediments.
 - D reduce soil erosion and provide new habitat for animals.
- 32 In 1889, biologist August Weismann attempted to breed a strain of mice with no tails. He did this by removing the tails of the parent mice and then observing the offspring from the tailless parents.



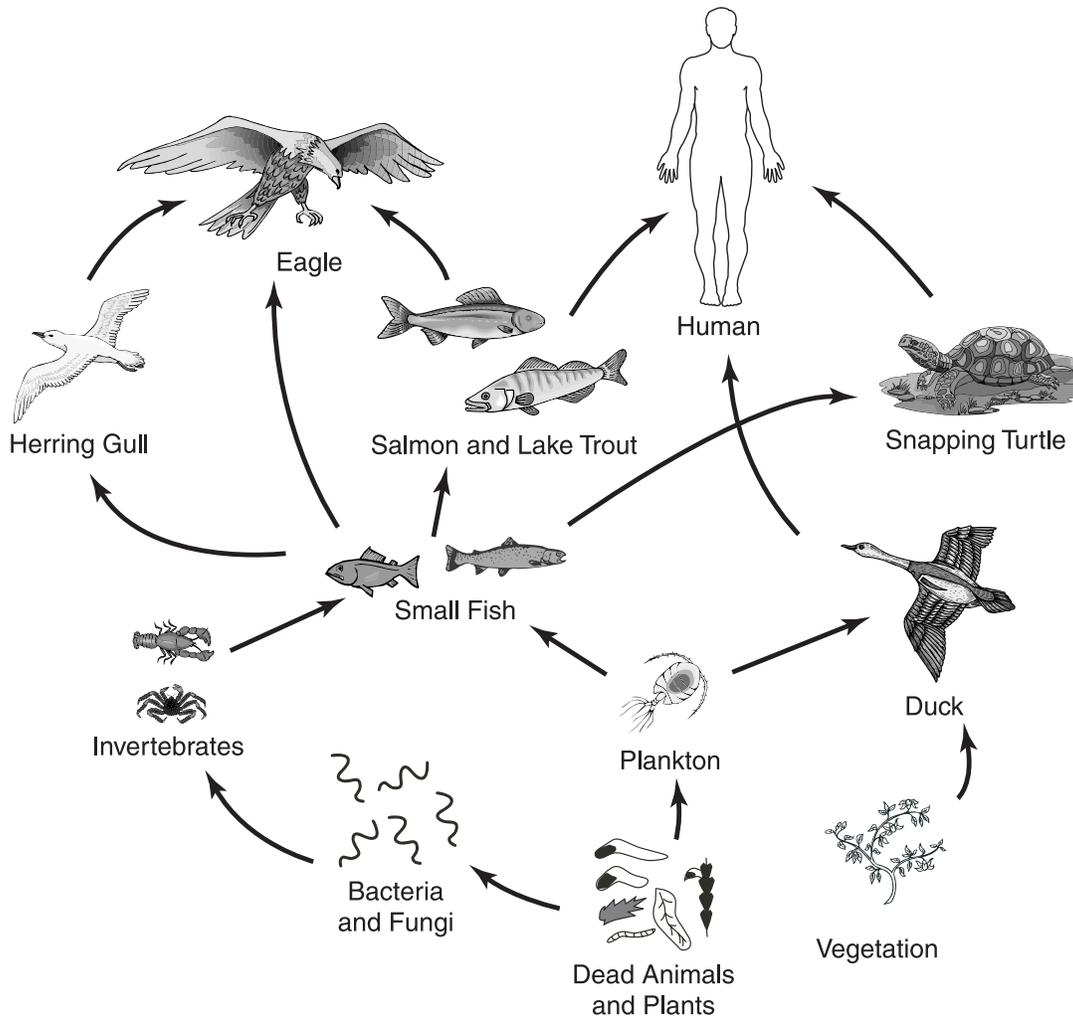
He repeated this procedure 22 times, and each time, all of the offspring were born with tails, supporting the theory that

- A acquired characteristics are not inherited.
- B inherited characteristics are not acquired.
- C tails in mice are neither acquired nor inherited from their parents.
- D inheritance of tails in mice is determined by environmental factors.

- 33 When soil becomes saturated during rainfall, excess water begins to collect on the surface. Downslope movement of this excess water to rivers, lakes, and streams is called
- A runoff.
 - B filtration.
 - C groundwater.
 - D condensation.
- 34 A snowball is made the exact size of a golf ball. Both the golf ball and the snowball are dropped from the same height onto a concrete sidewalk. The snowball breaks, but the golf ball bounces. Which of the following *best* describes a reason for the *difference* in reaction of the two balls?
- A The snowball is colder than the golf ball.
 - B The snowball is less dense than the golf ball.
 - C The effects of friction are greater on the golf ball.
 - D The effects of Earth's gravity are greater on the snowball.

Use the information below to answer questions 35 through 38.

The picture below shows one possible food web for a Great Lakes ecosystem. Based on your understanding of ecosystem interactions, answer the following questions.



- 35 An increase in salmon and trout fishing by humans in recent years has *most likely* resulted in
- A greater plant productivity.
 - B a reduced food supply for eagles.
 - C reduced tourism on the Great Lakes.
 - D an increase in the life expectancy of ducks.

- 36 The relationship between the small fish and invertebrates is *best* described as
- A predator – prey.
 - B producer – predator.
 - C consumer – parasite.
 - D consumer – decomposer.
- 37 Which of the organisms in the food web produces its own food?
- A invertebrates
 - B vegetation
 - C small fish
 - D ducks

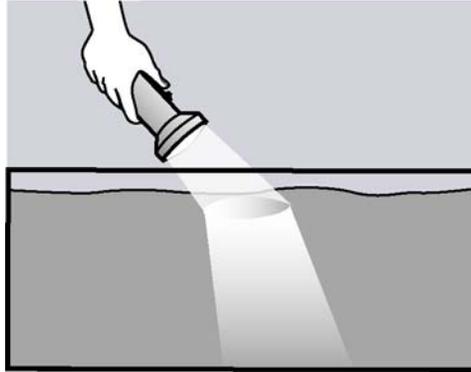
ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER FOLDER.

- 38 **Constructed-Response** (3 points) Based strictly on the interactions in this food web:
- Identify one organism that the salmon and lake trout compete with for food.
 - Identify one consumer or group of consumers that have no competition for food.
 - Identify a predator-prey relationship.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

- 39 Electricians wear rubber boots and gloves while working with circuits. The main reason for this is because
- A rubber is used as a transmitter.
 - B rubber helps to ground them.
 - C rubber is a nonconductor.
 - D rubber is a conductor.
- 40 Which of the following is **NOT** a description of compounds?
- A They can exist in the form of atoms or molecules.
 - B They consist of atoms of two or more elements bonded together.
 - C They have properties that are different from their component elements.
 - D They can be broken down into elements by chemical means but not physical means.
- 41 Two pool (billiard) balls collide, causing each to move in a different direction. Eventually, both come to a stop. The *most* important factor in causing them to stop is
- A balance.
 - B friction.
 - C gravity.
 - D size.

42



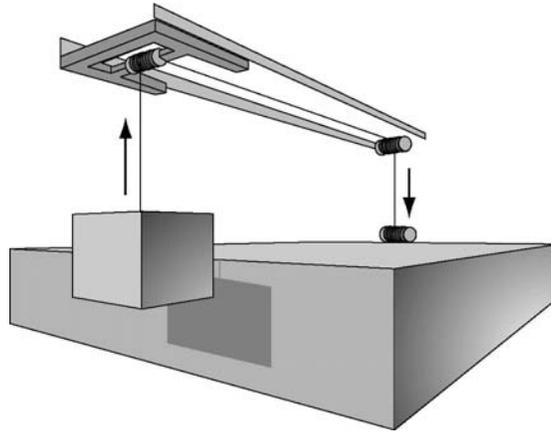
When light rays pass through air at an angle and then pass into water, they are refracted. What causes the light to refract?

- A There is a change in the speed of light as it passes from air to water.
- B There is a change in the brightness of the light as it passes from air to water.
- C There is a change in the temperature of the light as it passes from air to water.
- D There is a change in the illumination of the light as it passes from air to water.

43 Astronauts weigh more on Earth than they do on the moon because

- A they have less mass on the moon.
- B their density decreases on the moon.
- C the moon has less gravity than Earth.
- D the moon has less friction than Earth.

44

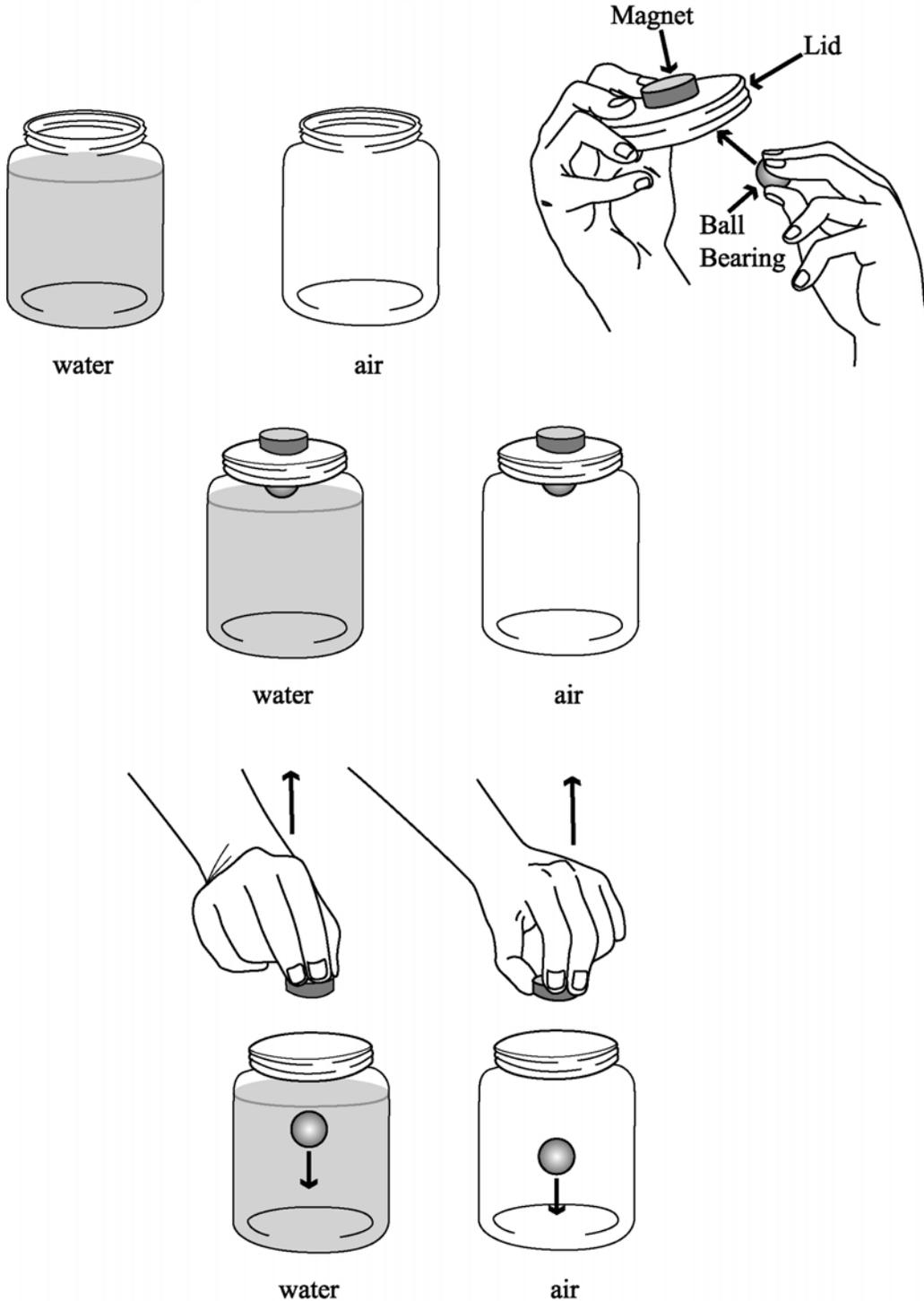


Which of these simple machines is shown in the picture above?

- A lever
 - B screw
 - C pulley
 - D wedge
- 45 A student is investigating how light behaves when it strikes different surfaces. She has a frosted window glass pane, a clear window glass pane, a mirror, and a piece of cardboard. Which of these objects will scatter the *most* light?
- A the mirror, because it is reflective
 - B the piece of cardboard, because it is opaque
 - C the clear window glass, because it is transparent
 - D the frosted window glass, because it is translucent
- 46 The depth of Lake Superior can be measured by sending sound waves to the bottom and measuring the period of time it takes for the reflected sound waves to return to the surface. Which of the following would indicate a shallow depth?
- A There is no return signal.
 - B The return signal is very weak.
 - C The return signal appears almost instantaneously.
 - D The return signal comes back at a different speed

Use the information below to answer questions 47 through 50.

Casey has two glass jars of the same size. He fills one with water; the other contains air. He places a flat magnet on the top of each lid and a metal ball bearing on the inside of each lid under the magnet. He then screws each lid onto a jar. The magnets hold the ball bearings in place under the lids. Casey then removes the magnets at the same time, and the ball bearings drop into the jars.



- 47 Suppose Casey adds a third glass jar containing syrup to the experiment. The picture below shows his new experimental design. He follows the same procedure, removing the magnets from all three jars at the same time.



Will Casey be able to draw a valid conclusion from the new data?

- A Yes, because the jars are all made of the same material.
 - B No, the syrup jar is shorter and it will invalidate the results.
 - C Yes, the same procedure is followed and results will be valid.
 - D No, syrup is a colored liquid and it will invalidate the results.
- 48 How does the molecular arrangement of water *differ* from the molecular arrangement of air?
- A The molecules in water are much larger than the molecules in air.
 - B The molecules in water are closer together than the molecules in air.
 - C The molecules in water are vibrating faster than the molecules in air.
 - D The molecules in water are opaque, and the molecules in air are transparent.

- 49 When Casey removes the magnets, the ball bearings drop into the jars at the same time. Why does the ball bearing in the air jar hit the bottom before the ball bearing in the water jar?
- A The buoyant force of the air is greater than the buoyant force of the water.
 - B The gravitational pull of the air is greater than the gravitational pull of the water.
 - C The ball bearing in the water jar has greater mass than the ball bearing in the air jar.
 - D There is greater friction between the ball bearing and the water than there is between the ball bearing and the air.

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

- 50 **Constructed-Response** (3 points) Water and air have several different properties.
- Describe two ways that water *differs* from air.
 - Describe one way that water is *similar* to air.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.



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Scoring Key

Part 1:

Item #	Answer Key
1	A
2	D
3	C
4	A
5	D
6	A
7	C
8	B
9	B
10	D
11	C
13	D
14	A
15	A
16	B
17	C
18	B
19	C
20	Not Scored
21	D
22	B
23	B
24	B
25	C

Part 2:

Item #	Answer Key
27	B
28	A
29	B
30	D
31	D
32	A
33	A
34	B
35	B
36	A
37	B
38	C
40	A
41	B
42	A
43	C
44	C
45	D
46	C
47	C
48	B
49	D