

Maryland School Assessment

**Science**

2008 Public Release

Grade 5

# Part 1



# Part 1

- 1** Chemical pesticides are sometimes sprayed on crops to kill insects that eat the crops. People have different viewpoints about the use of pesticides on crops.

What might be a concern about using pesticides on the crops?

- A** Will the food ripen?
- B** Will the food stay fresh?
- C** Will the food harm humans?
- D** Will the food harm bugs in the home?

- 2** Animals use resources in the environment to survive.

Which of the following resources does an animal use for energy?

- A** air
- B** food
- C** shelter
- D** water

# Part 1

## Directions

Use the passage below to answer Numbers 3 through 5.

### Hazy Summer Days and Air Pollution

Have you noticed that on some hot summer days the sky can look brownish instead of clear blue? Pollution causes poor air quality—and it can be bad for your health.

Scientists say that haze and smog are the problem.

“Smog comes from two words, smoke and fog,” said Alison Davis of the U.S. Environmental Protection Agency. Both haze and smog are caused largely by pollution from sources like power plants, factories, cars, and even wildfires.

Particle pollution is one type of pollution that affects air quality. The pollution is caused by tiny particles thrown into the air by factories and other sources. “If you took a grain of table salt. . . . That’s 40 times bigger than the biggest [tiny particle],” Davis said.

While something so small might seem harmless, Davis explained that the particles can get deep into your lungs and even affect your heart.

Air pollution from particles and other sources like ozone can also hurt trees and animals. Ozone is created when pollution from places like factories combines with sunlight.

The summer usually has the worst air quality, because there is more sunlight. Sunlight reacts with pollutants to create ozone. Ozone is helpful high in the atmosphere, because it helps block the sun’s harmful rays. But down closer to Earth, ozone can be harmful to people.

According to Davis, air quality in general has been improving in the United States. In 1970, the U.S. passed the Clean Air Act. “The act has helped make the air cleaner,” Davis said. In London, England, the air used to be so dark and polluted that cars would have to drive with their headlights on in the middle of the day!

# Part 1

- 3** Alison Davis states that air quality has been improving because of the Clean Air Act.

What evidence would help support her statement?

- A** a decrease in breathing disorders
- B** a decrease in the height of trees in forests
- C** an increase in the number of cars on the road
- D** an increase in the number of days with air that appears brown

- 4** Particle air pollution most likely increases when

- A** heavy rainfall occurs
- B** more factories are making products
- C** the number of green plants increases
- D** the number of small cars on roads decreases

# Part 1

- 5** The amount of harmful ozone in a city decreased during a year.

Explain why this decrease may have occurred. In your explanation, be sure to include

- how ozone pollution is produced
- specific reasons that may have caused a decrease in the ozone level



# Part 1

**6** Glaciers are slow-moving sheets of ice found on land.

What process occurs when glacial ice is heated to 5° Celsius?

- A** evaporation
- B** freezing
- C** melting
- D** precipitation



# Part 1

## Directions

Use the information below to answer Numbers 7 and 8.

Students placed 250 milliliters of water in three identical containers. Container 1 had a tightly sealed lid and was placed on a classroom counter. Container 2 had no lid and was placed on a classroom table. Container 3 had no lid and was placed on a table outside in the shade. The students measured the amount of water in each container at the end of each day for four days. Their results are shown in the data table below.

**VOLUME OF WATER IN THREE CONTAINERS**

Container	Starting Volume (mL)	End of Day 1 (mL)	End of Day 2 (mL)	End of Day 3 (mL)	End of Day 4 (mL)
1	250	250	250	250	248
2	250	242	219	203	188
3	250	219	172	125	63

# Part 1

**7** What question is this investigation designed to answer?

- A** How do water levels affect evaporation?
- B** Which container best holds evaporating water?
- C** Does evaporation of water affect the atmosphere?
- D** In which environment does water evaporate the fastest?

**8** Which process changes evaporated water into liquid water?

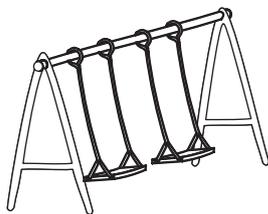
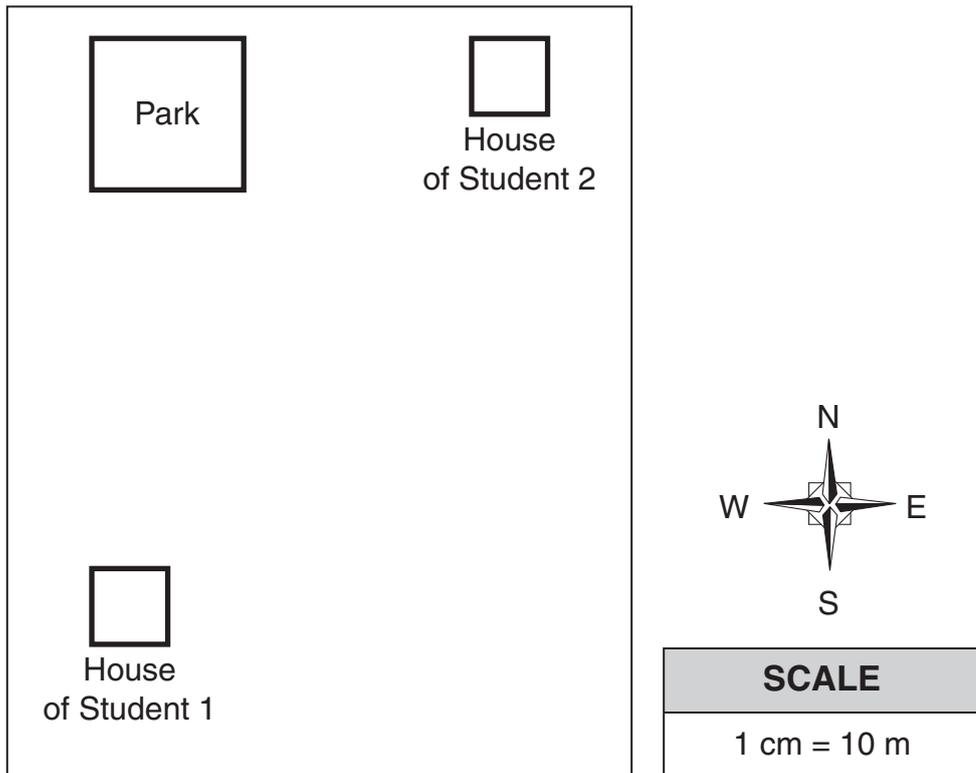
- A** competition
- B** condensation
- C** erosion
- D** precipitation

# Part 1

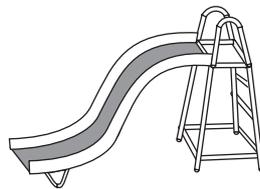
## Directions

Use the information below to answer Numbers 9 through 11.

Two students met at a local park. Student 1 lives farther from the park than does Student 2. Both students left their houses at 10:00 A.M. and arrived at the park at 10:20 A.M. While at the park, the students played on the swings, slide, and merry-go-round.



Swings



Slide



Merry-go-round

# Part 1

**9** Which of these statements best explains how the two students arrived at the park at the same time?

- A** Student 1 took a longer route.
- B** Student 1 walked faster than Student 2.
- C** Student 2 walked faster than Student 1.
- D** Student 2 took more short-cuts than Student 1.

**10** Each student has a different mass, yet they both reached the same height while swinging.

Which of these statements explains why the students reached the same height while swinging?

- A** The students had the same speed while on the swing.
- B** The students used different amounts of force while swinging.
- C** The students were on the swing for the same amount of time.
- D** The students used the same amounts of force while swinging.

**11** Both students played on the slide. Student 1 wore shorts, and Student 2 wore long pants.

Which of these explanations best identifies why Student 2 moved down the slide more smoothly than Student 1?

- A** less gravity
- B** less friction
- C** more weight
- D** more acceleration

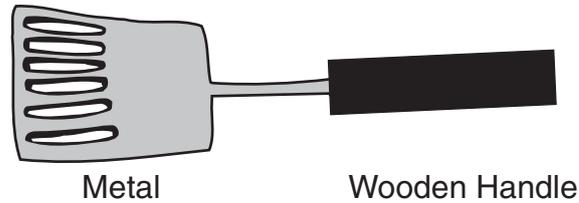


# Part 2



# Part 2

- 12 Some metal tools used for cooking have wooden handles.



Which property of wood makes it a good material for the handle on a cooking tool?

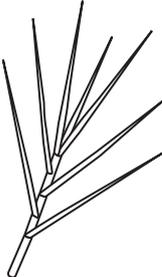
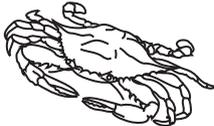
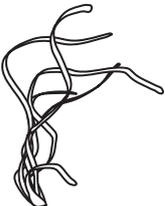
- A Wood is a natural material.
- B Wood is unaffected by metal.
- C Wood does not conduct heat well.
- D Wood does not conduct electricity well.

# Part 2

## Directions

Use the information below to answer Numbers 13 through 15.

A scientist studied an estuary, the area where fresh water from a river empties into salty ocean water. The scientist classified nine estuary organisms into the three groups shown below.

Birds	Plants	Animals
 <p>Great Blue Heron</p>	 <p>Salt Grass</p>	 <p>Blue Crab</p>
 <p>Laughing Gull</p>	 <p>Eelgrass</p>	 <p>Horseshoe Crab</p>
 <p>Osprey</p>	 <p>Sallow Sedge</p>	 <p>Hard Clam</p>

# Part 2

13 The physical features of an animal are described in the table below.

Physical Features
<ul style="list-style-type: none"><li>• Hard shell</li><li>• Hinged shell</li><li>• Fleshy inside</li></ul>

Which animal best fits this description?

- A blue crab
- B hard clam
- C laughing gull
- D sallow sedge



## Part 2

- 14** Some young fish develop in estuaries. While these fish develop, they hide in water plants. When the fish reach a certain age, they leave for the ocean.

If the water plants were removed from the estuary, the young fish would

- A** decrease in number
- B** move to a new estuary
- C** find another food source
- D** swim to the ocean earlier

- 15** Which organism in the estuary relies on the sun to make food?

- A** horseshoe crab
- B** hard clam
- C** salt grass
- D** osprey

## Part 2

16 A student leaves a bucket of water outside on a warm, sunny day.

Which process most likely happens to the water in the bucket?

- A melting
- B freezing
- C evaporation
- D condensation





# Part 2

**18** People use water in different ways.

Which of these activities wastes water?

- A** filling a glass with water
- B** leaving a faucet on
- C** soaking vegetables in water to clean them
- D** adding cups of water as directed by a recipe

**19** In October, the constellations Gemini and Orion appear in the sky after midnight. In January, Orion appears at sunset.

At which time will Gemini most likely appear in January?

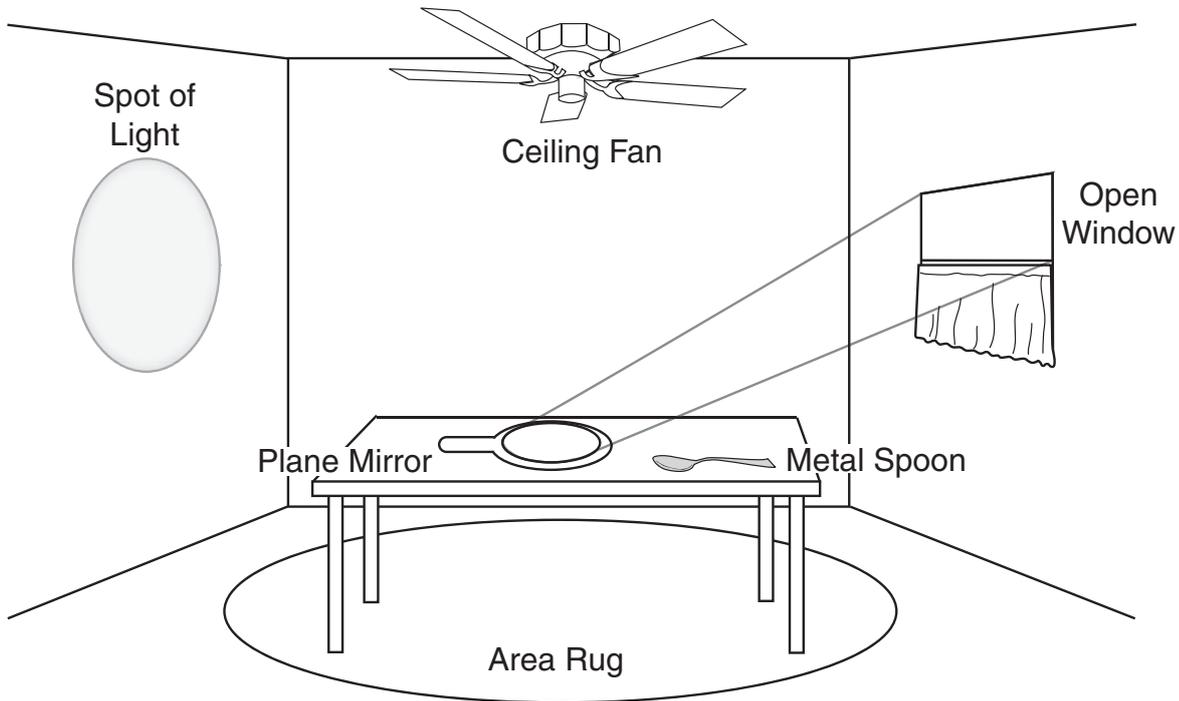
- A** at noon
- B** at sunset
- C** after midnight
- D** before sunrise

# Part 2

## Directions

Use the information below to answer Numbers 20 through 22.

Sunlight enters a room through an open window. The sunlight shines on the wood table, area rug on the floor, and the plane mirror and metal spoon on the table. A spot of light appears on the wall opposite the window.



# Part 2

**20** Which object in the room is the best conductor of heat?

- A** the area rug
- B** the wood table
- C** the plane mirror
- D** the metal spoon

**21** An image of the ceiling fan appears in the plane mirror on the table.

How does the image of the fan in the mirror compare to the actual fan on the ceiling?

- A** larger
- B** smaller
- C** reversed
- D** upside down

**22** Which tool should be used to measure the length of the table?

- A** a balance
- B** a stopwatch
- C** a spring scale
- D** a centimeter ruler



# Part 3



# Part 3

## Directions

Use the information below to answer Numbers 23 through 25.

Many natural resources are found in Maryland and the surrounding area. Some of these natural resources are renewable and some are nonrenewable. People use both kinds of resources in daily activities. Using natural resources often produces waste products.

**23** Which of these natural resources found in Maryland is nonrenewable?

- A** coal
- B** soil
- C** water
- D** wood

- 24** Recycling centers are where people take materials that may be reused to make new products.

How does recycling paper positively affect the environment?

- A** reduces air pollution
- B** increases soil erosion
- C** reduces trees that are cut
- D** increases habitat destruction

- 25** Burning fossil fuels, such as oil, coal, and gasoline produces pollution.

Which type of pollution is most often produced by burning fossil fuels?

- A** air pollution
- B** land pollution
- C** noise pollution
- D** water pollution

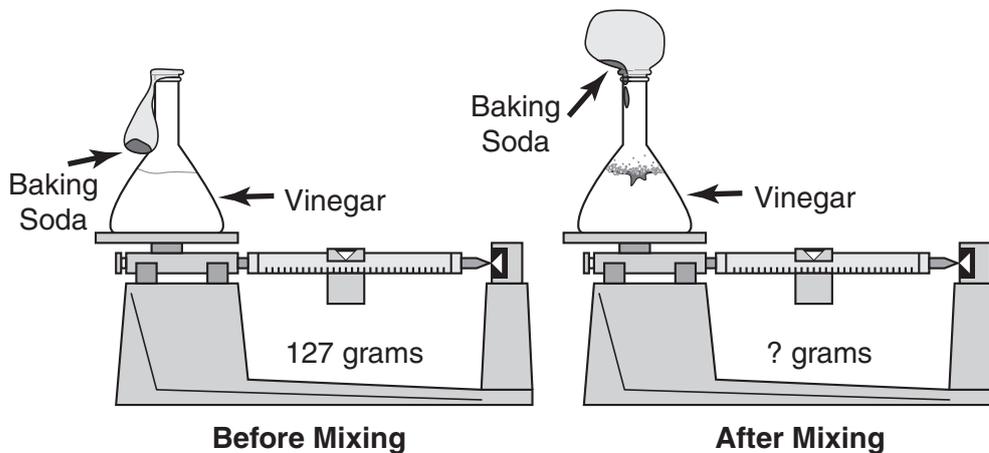


# Part 3

## Directions

Use the information below to answer Numbers 26 and 27.

Students investigated the reaction that occurs when mixing baking soda and vinegar. The procedure for the investigation is shown below. The students recorded their observations in the data tables below the diagram.



Material	Mass (grams)
Baking soda	24
Balloon	3
Vinegar	20
Flask	80

Before Mixing
<ul style="list-style-type: none"><li>Balloon is limp.</li><li>Vinegar is clear.</li><li>Baking soda is a white, powdery solid.</li><li>Flask feels cool.</li></ul>

After Mixing
<ul style="list-style-type: none"><li>Liquid is cloudy at first.</li><li>Bubbles in the liquid.</li><li>Balloon inflates.</li><li>Flask stays cool.</li><li>Liquid becomes clear over time.</li></ul>

**26** Which observation shows that a chemical reaction took place when the baking soda was mixed with the vinegar?

- A** The flask stays cool.
- B** The liquid is cloudy at first.
- C** The bubbles form in the liquid.
- D** The liquid becomes clear over time.

**27** The students conducted the same investigation, but doubled the amount of baking soda and the amount of vinegar used.

What change in the results did the students most likely observe?

- A** The flask became warm.
- B** The balloon inflated more.
- C** The vinegar remained cloudy.
- D** The baking soda did not dissolve.



**28** All living things need energy to survive.

What is the primary source of energy for all living things?

- A** plants
- B** the sun
- C** water
- D** the wind

**29** Rocks and minerals are common materials found on Earth.

Which property do most rocks and minerals share?

- A** They are pure.
- B** They are solid.
- C** They are liquid.
- D** They are magnetic.

**30** On Earth, water can be a solid, a liquid, or a gas.

Which energy source has the greatest influence on the state of matter of water?

- A** the sun
- B** the wind
- C** ocean currents
- D** the metal core



# Part 3

- 31 The data table below compares four characteristics of the inner planets.

Characteristic	Planets			
	Mercury	Venus	Earth	Mars
Temperature	-184°C to 527°C	-450°C to 477°C	-89°C to 58°C	-143°C to 17°C
Mass (kilograms)	$3.30 \times 10^{23}$	$4.87 \times 10^{24}$	$5.97 \times 10^{24}$	$6.42 \times 10^{23}$
Diameter (kilometers)	4,854	12,112	12,751	6,788
Distance from sun (millions of kilometers)	58	108	150	228

Which of these statements best explains why Earth is the only inner planet that supports life?

- A The other planets have too much mass.
- B The other planets are too close to the sun.
- C The other planets are either too hot or too cold.
- D The other planets are either too big or too small.



## Directions

Use the passage and the picture below to answer Numbers 32 through 34.

### Glaciers and People

The frozen majesties of Greenland, Alaska, Switzerland and other areas of the world are popular tourist attractions. They're also important natural resources for drinking water, for irrigation of crops, and for generation of electricity.

#### Drinking Water

Glaciers contain 75 percent of the world's fresh water supply. Arapaho Glacier in the Rocky Mountains, a small glacier with a length and width of about  $\frac{3}{4}$  mile (1.2 km), supplies water for more than 75,000 people who live in the town of Boulder, Colorado. To survive during the dry spells that hit the region of La Paz, Bolivia, the people rely on fresh streams from a nearby mountain glacier.

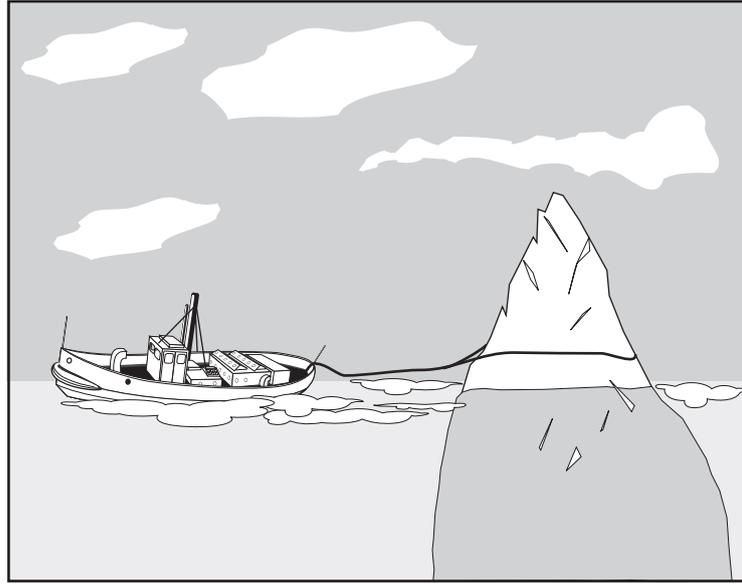
Scientists are studying ways to move icebergs from the cold northern Atlantic Ocean to coastal cities where the icebergs could be used for drinking water. Tugged by boats and helicopters, a berg could be wrapped in plastic to insulate it and prevent it from melting too quickly. Pipes connecting the iceberg to nearby land would allow the fresh water to get to people and crops.

#### Crops Irrigation

For hundreds of years, farmers in Switzerland's Rhône Valley have watered their crops with meltwater from glaciers.

#### Electricity Generation

In Norway, Canada, New Zealand, and the Alps, glaciologists and engineers have produced electrical power from melting glacial ice. By building a dam to control the meltwater, they harness the energy of the water as it moves over the dam and through turbines, to turn the energy into electricity.



**32** Why is plastic a good material to use to insulate icebergs?

- A** Plastic is expensive.
- B** Plastic conducts electricity well.
- C** Plastic does not conduct heat well.
- D** Plastic increases friction with the water.



# Part 3

**33** Increased temperatures from global warming affects the availability of drinking water on Earth by

- A** causing rain to become more acidic
- B** causing all surface water to evaporate
- C** melting frozen reservoirs of fresh water
- D** slowing the entire water cycling process

**34** Some researchers think using icebergs as a source of fresh water is not a good idea.

Why are these researchers most likely against moving the icebergs?

- A** Using boats to haul glaciers is a waste of fuel.
- B** The natural environment of glacier areas is changed.
- C** The water in glaciers is so old it would not taste good.
- D** People should not live in places where there is not enough water.



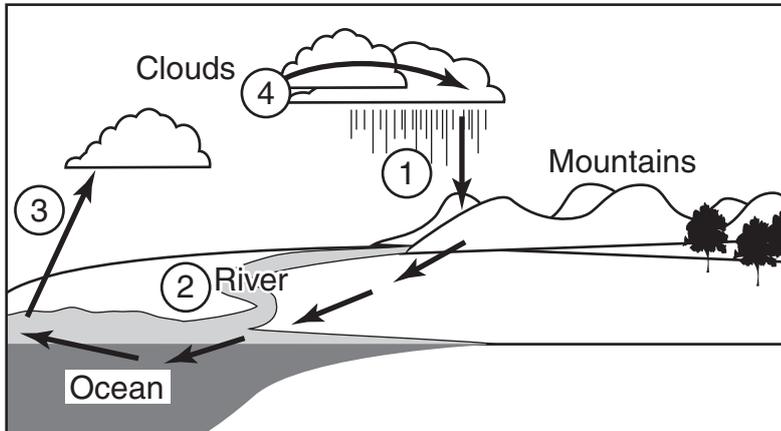
# Part 4



## Directions

Use the information below to answer Numbers 35 through 37.

The diagram below shows water moving through the environment.



35 Which of these statements best describes the purpose of the arrows in the diagram?

- A The arrows show how clouds form.
- B The arrows show how erosion occurs.
- C The arrows show the processes of the water cycle.
- D The arrows show the movement of water to the ocean.

**36** Which number in the diagram represents condensation?

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

**37** Which of these statements describes a change to the surface of Earth that is caused by water moving through the environment?

- A Water transports soil.
- B Dew forms on grass.
- C Ocean tides follow a pattern.
- D Tropical storms remain over the ocean.



**38** The snowshoe hare was once common in Maryland. In 1986, researchers in the state noted that the snowshoe hare was no longer found in Maryland.

Which statement best explains why the snowshoe hare is no longer found in Maryland?

- A** Water quality has improved.
- B** There are too many trees.
- C** The temperature is too cold.
- D** Housing developments have replaced fields.

**39** The building of houses in Maryland uses many different materials.

Which building material is made of a renewable natural resource?

- A** copper wire
- B** steel beams
- C** wood boards
- D** plastic siding

**Directions**

Use the information below to answer Numbers 40 through 42.

A student is investigating changes in the states of matter. The student fills a graduated cylinder with 50 milliliters of packed snow. The graduated cylinder has a mass of 50 grams when empty and 95 grams when filled with the snow.

- 40** The packed snow changes to liquid water when the snow is put in a warm room.

Which statement best describes this process?

- A** Cooling causes the snow to melt.
- B** Cooling causes the snow to freeze.
- C** Heating causes the snow to freeze.
- D** Heating causes the snow to melt.

- 41** During which process in the water cycle does snow fall to the ground?

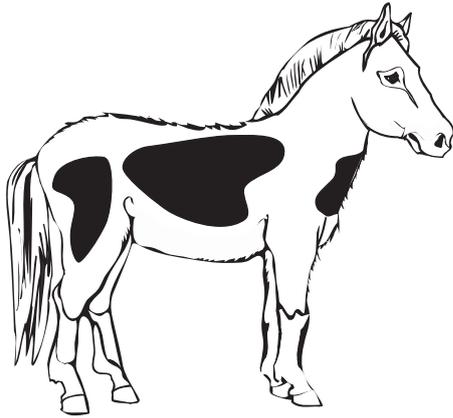
- A** classification
- B** condensation
- C** evaporation
- D** precipitation



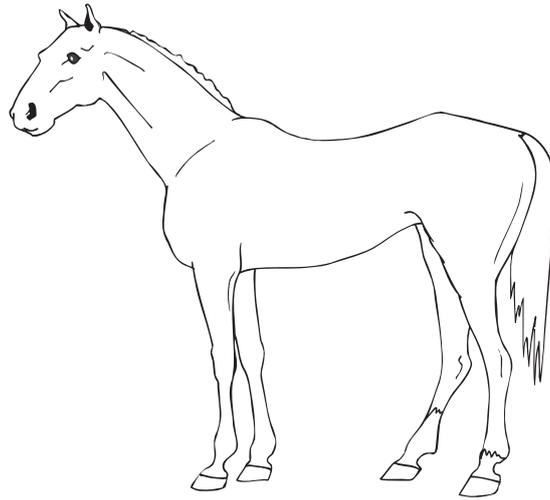
## Directions

Use the information and pictures below to answer Numbers 43 through 45.

Wild ponies have lived on Assateague Island for about 300 years. The ponies have become well adapted to the harsh environment, including extreme temperatures in summer and winter. The ponies mainly eat salty marsh grasses and grow thick fur in winter. Domestic horses are larger than the ponies. An Assateague pony drinks twice as much fresh water as a domestic horse does. Other organisms on the island include rodents, birds, small foxes, marsh grasses, mussels, and deer.



Assateague Pony



Domestic Horse

- 43** The ponies drink so much more fresh water than domestic horses in other habitats that the ponies appear fat.

What is the most likely reason the ponies drink so much fresh water?

- A** Their thin fur makes them lose water.
- B** They have many predators on the island.
- C** Their food contains a large amount of salt.
- D** They have small bodies that lose water quickly.

- 44** During the summer, flies and ticks bite the ponies. The cattle egret is a bird that sometimes eats the flies and ticks from the ponies.

This relationship between the pony and the egret helps

- A** only the pony
- B** the flies and ticks
- C** only the cattle egret
- D** the pony and the cattle egret

- 45** Why have the ponies developed a coat of thick fur?

- A** to stay warm
- B** to help them swim
- C** to prepare them to find mates
- D** to protect them from predators



## Acknowledgements

“Hazy Summer Days and Air Pollution” by Sarah Ives, National Geographic Kids News. July 27, 2004 ([http://news.nationalgeographic.com/kids/2004/07/Hazy summer.html](http://news.nationalgeographic.com/kids/2004/07/Hazy%20summer.html))

“Glaciers and People” by Spencer Christian and Antonia Felix. From WHAT MAKES THE GRAND CANYON GRAND? THE WORLD'S MOST AWE-INSPIRING NATURAL WONDERS by Spencer Christian and Antonia Felix. Copyright © 1998 by Spencer Christian and Antonia Felix. Reprinted with permission of John Wiley & Sons, Inc.