

Maryland School Assessment

Science

2007 Public Release

Grade 5

Acknowledgements:

Amusement Park Physics: Free Fall

“Free Fall” from *Amusement Park Physics* at www.learner.org, Annenberg Media, ©1997.

Greenhouse Effect

“The Greenhouse Effect.” Courtesy: United States Environmental Protection Agency.

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Session 4

51 The piping plover is a bird that builds its nest on sand dunes along the Atlantic Ocean.

Which of these actions most likely damages the nests of the piping plover?

- A people fishing from a boat
- B children playing in the ocean waves
- C children digging holes along the sand dunes
- D people walking on a sidewalk along the sand dunes

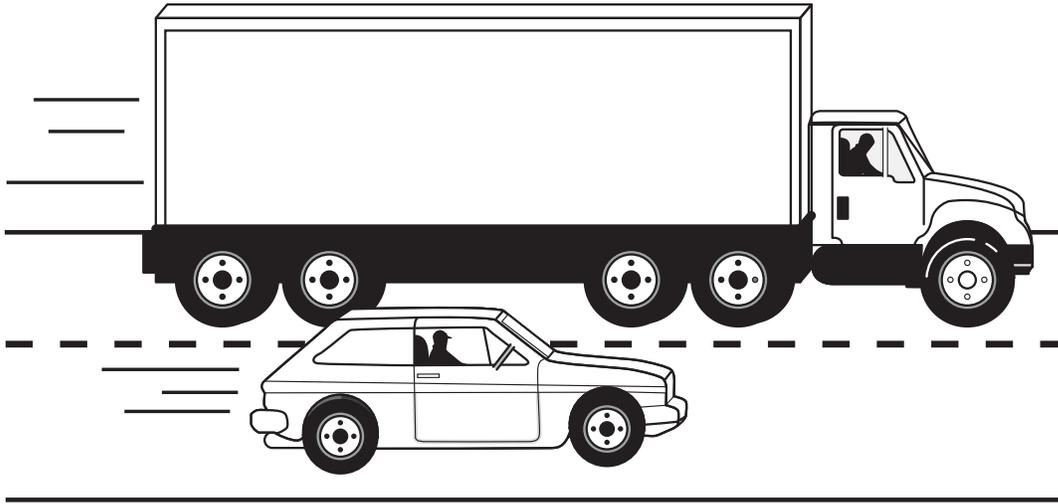
52 Plants and animals need food for growth.

What happens to most of the food that plants produce?

- A Food is released as gas.
- B Food is converted to water.
- C Food is stored for future use.
- D Food is used to absorb sunlight.

53

A car and a truck move on a road in the same direction at the same speed. Both vehicles slow down with the same stopping force.



Which statement best explains why the truck needs more distance to stop?

- A The truck is longer.
- B The truck has more mass.
- C The truck has larger wheels.
- D The truck has a larger engine.

Directions

Use the passage below to answer Numbers 54 through 56.

The Greenhouse Effect

The greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere (water vapor, carbon dioxide, nitrous oxide, and methane, for example) trap energy from the sun. Without these gases, heat would escape back into space and Earth's average temperature would be about 60°F colder. Because of how they warm our world, these gases are referred to as greenhouse gases.

Most greenhouses look like a small glass house. Greenhouses are used to grow plants, especially in the winter. Greenhouses work by trapping heat from the sun. The glass panels of the greenhouse let in light but keep heat from escaping. This causes the greenhouse to heat up, much like the inside of a car parked in sunlight, and keeps the plants warm enough to live in the winter.

Greenhouse gases in the atmosphere behave much like the glass panes in a greenhouse. Sunlight enters the Earth's atmosphere, passing through the blanket of greenhouse gases. As it reaches the Earth's surface, land, water, and biosphere absorb the sunlight's energy. Once absorbed, this energy is sent back into the atmosphere. Some of the energy passes back into space, but much of it remains trapped in the atmosphere by the greenhouse gases, causing our world to heat up.

Once, all climate changes occurred naturally. However, during the Industrial Revolution, we began altering our climate and environment through agricultural and industrial practices. The Industrial Revolution was a time when people began using machines to make life easier. It started more than 200 years ago and changed the way humans live. Before the Industrial Revolution, human activity released very few gases into the atmosphere, but now through population growth, fossil fuel burning, and deforestation, we are affecting the mixture of gases in the atmosphere.

Since the Industrial Revolution, the need for energy to run machines has steadily increased. Some energy, like the energy you need to do your homework, comes from the food you eat. But other energy, like the energy that makes cars run and much of the energy used to light and heat our homes, comes from fuels like coal and oil—fossil fuels. Burning these fuels releases greenhouse gases.

54 What is the main energy source that causes changes in the atmosphere of Earth?

- A the sun
- B the moon
- C fossil fuels
- D greenhouse gases

55 Greenhouse gases affect the water cycle by

- A increasing evaporation
- B increasing condensation
- C decreasing precipitation
- D decreasing deposition

56 How would Earth most likely change if the amount of greenhouse gases continued to increase?

- A Glacier size would increase.
- B Air pollution would decrease.
- C Ocean levels would decrease.
- D Global temperatures would increase.

57 A student is measuring the speed at which a ball rolls down a ramp.

Which unit of measurement is the student most likely using to describe the speed of the ball?

- A meter per liter
- B seconds per gram
- C milligrams per liter
- D centimeters per second

58 A student is investigating which type of soil is best for growing tomato plants from seeds. The student plants four tomato seeds in each of three different containers of soil.

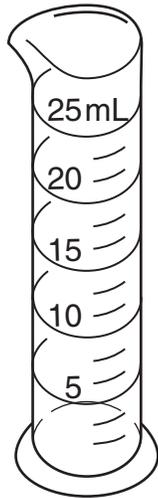
Which step of the procedure would help the student get the most reliable results?

- A Place one container in a dark room.
- B Use different types of tomato seeds.
- C Change only the soil type in each container.
- D Water each container with a different amount of water.

59 A student needs to measure the volume of some pond water.

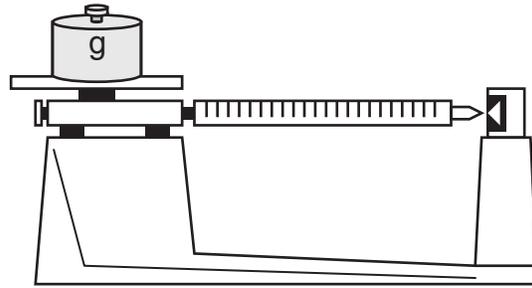
Which of these tools will best measure the volume of pond water?

A



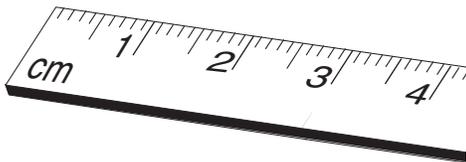
Graduated Cylinder

B



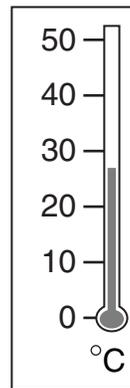
Balance

C



Metric Ruler

D



Thermometer

60

The Little Dipper is a group of stars. During the night, the Little Dipper appears to change positions in the sky.



Which of these statements best explains why the Little Dipper appears to change positions in the night sky?

- A Earth rotates on its axis.
- B Earth revolves around the stars.
- C The Little Dipper moves around the sun.
- D The stars in the Little Dipper move in the sky.

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Directions

Use the information below to answer Numbers 61 through 63.

Science students observed the physical properties of different materials. They recorded their observations in the data table below.

| Material | State of Matter | Observations |
|---------------|-----------------|--------------------------|
| Salt | Solid | White grains |
| Sand | Solid | Brown and white grains |
| Vinegar | Liquid | Clear liquid |
| Baking Soda | Solid | White, powdery |
| Glass marbles | Solid | Many colors; hard, round |
| Steel marbles | Solid | Shiny metal, round, hard |

The students then combined baking soda with some of the materials. Their observations are in the data table below.

| Material | State of Matter | Observations When Materials Were Mixed |
|-----------------------|-----------------|--|
| Baking soda + salt | Solid | White, powdery |
| Baking soda + sand | Solid | White, powdery; brown grains |
| Baking soda + vinegar | Liquid and gas | Bubbles and foam; clear liquid |

61 Students measured the mass of a 100-milliliter beaker filled with sand and the mass of a 100-milliliter beaker filled with glass marbles. The beaker of sand had more mass than the beaker of glass marbles.

Why did the beaker of sand have more mass than the beaker of glass marbles?

- A** The sand is harder than the glass marbles.
- B** The sand has more matter than the glass marbles.
- C** The glass marbles are smooth, and the sand is rough.
- D** The glass marbles are round, and the sand has different shapes.

62 What happened to the properties of the baking soda and the salt after the two materials were mixed together?

- A** The properties of the baking soda and salt changed.
- B** The properties of the baking soda and salt did not change.
- C** The properties of the baking soda changed, but the properties of the salt did not change.
- D** The properties of the baking soda did not change, but the properties of salt changed.

63 The students were given a mixture of salt, sand, glass marbles, and steel marbles.

Which material in the mixture would be attracted by a magnet?

- A** salt
- B** sand
- C** glass marbles
- D** steel marbles

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Directions

Use the information below to answer Numbers 64 through 66.

Large populations of sea nettles have been observed during the summer in parts of the Chesapeake Bay. The Chesapeake Bay is a mixture of salt water and fresh water. During the summer, the bay has a moderately high salt content. The amount of salt in the water, the salinity, depends on the amount of fresh water that flows into the bay. Additionally, some studies suggest that human activities have caused an increase in the sea nettle population.

SEA NETTLE SIGHTINGS IN THE CHESAPEAKE BAY



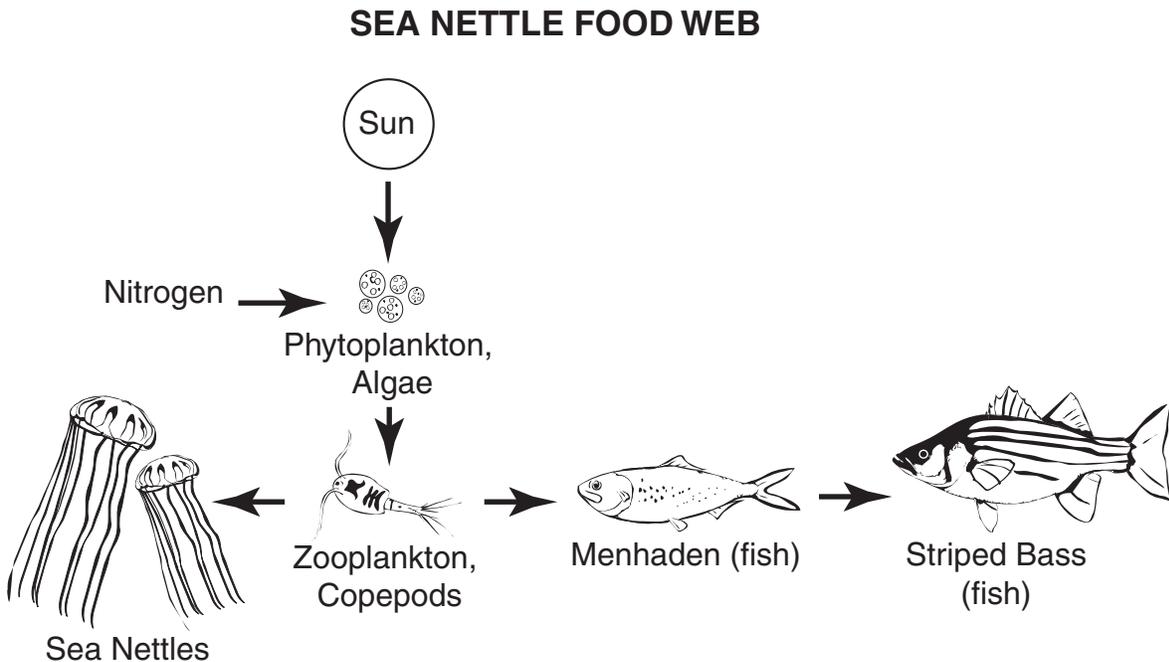
| KEY |
|--------------------------|
| ● = Sea nettle sightings |

64 The salinity level of the bay is changed when pollutants enter the bay. Salinity is also affected by extreme temperatures, drought conditions, and floods.

Which of these events would have the most negative effect on the sea nettle population in the bay?

- A** fossil fuel burning cars drive across the bay on a bridge
- B** farmland fertilizers enter a river that flows into a nearby bay
- C** a thunderstorm dumps rain along a shoreline of a nearby bay
- D** overflow from a waste water treatment plant empties directly into the bay

- 65 Sea nettles need small amounts of nutrients to survive and reproduce. Sea nettle populations increase quickly when excess nitrogen pollutes the water in which the sea nettles live. A sea nettle reproduces by laying thousands of eggs.



How would excess nitrogen most likely affect the other organisms in this food web?

- A The striped bass (fish) population would increase immediately.
- B The menhaden (fish) population would decrease slowly.
- C The copepod population would increase quickly.
- D The algae population would decrease slowly.

66

Scientists have recorded the temperature and salinity data of the Chesapeake Bay every day for many years.

Using these data, scientists will most likely be able to predict

- A the depth of the water in the bay
- B the exact number of sea nettles in the bay
- C the number of fish in the bay that eat sea nettles
- D the weather patterns in the bay that affect sea nettles