



PASS on Paper

Grade 11 Student Worksheets

Science

October 2004

Louisiana Department of Education
Cecil J. Picard
State Superintendent of Education



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Lesson 1

1. Which of the following organisms is responsible for more than 70% of the photosynthesis on Earth?
 - A. algae
 - B. trees
 - C. grasses
 - D. fungi

2. Each of 25 students measures the length of the science lab room. Which of the following will be closest to the actual length?
 - A. the average of the ten largest results
 - B. the average of all 25 results
 - C. the average of the ten smallest results
 - D. the largest result

Lesson 2

1. A researcher selected several pairs of hamsters so that the hamsters in each pair were identical to each other in size, mass, general health, and age. The researcher then assigned one hamster from each pair to Group 1 and the other to Group 2. The two groups were put on different diets. The tables below show the data that were collected from the study.

Growth of Two Groups of Identical Hamsters on Different Diets

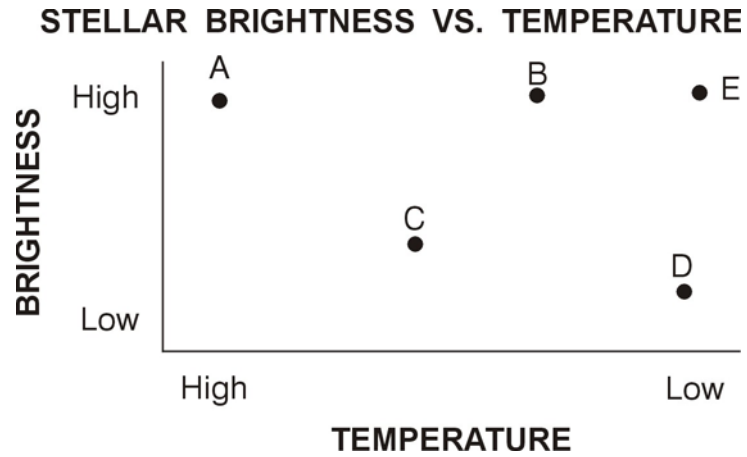
GROUP 1		GROUP 2	
Diet: water, carbohydrates		Diet: water, vitamins, protein	
<u>Week</u>	<u>Avg. Mass per Hamster</u>	<u>Week</u>	<u>Avg. Mass per Hamster</u>
1	113 g	1	113 g
2	170 g	2	142 g
3	227 g	3	156 g
4	255 g	4	170 g

What is the **best** conclusion the researcher can make based on these data?

- A. Mass gain in hamsters is related to diet.
- B. Heavier hamsters seem to prefer a carbohydrate diet over vitamins and protein.
- C. The carbohydrate diet produced slower mass gain in hamsters than the vitamin/protein diet.
- D. The hamsters in Group 1 were heavier than the hamsters in Group 2.

Lesson 2 (continued)

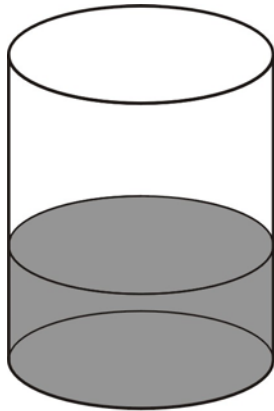
Use the graph below to answer question 2.



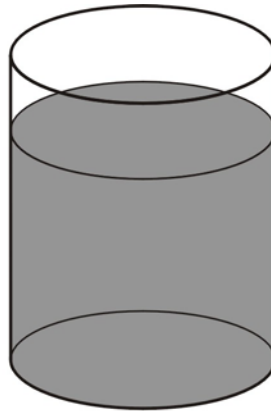
2. The star on the graph that has about the same temperature as star E is
- A. star A.
 - B. star B.
 - C. star C.
 - D. star D.

Lesson 3

Use the figures below to answer question 1.



Beaker I



Beaker II

1. Two identical beakers containing water at room temperature are shown above. Both are heated on the same hot plate for two minutes. At the end of the two minutes, how will the temperature of the water in each of them compare?
 - A. It will be higher in Beaker I than in Beaker II.
 - B. It will be higher in Beaker II than in Beaker I.
 - C. It will be the same in both beakers.
 - D. None of the above

2. Studies have shown that environmental factors, such as exposure to radiation, increased temperature, and exposure to certain chemicals, may cause spontaneous changes in DNA molecules. These spontaneous changes are called
 - A. birth defects.
 - B. hybridization.
 - C. mutations.
 - D. spontaneous generations.

Lesson 4

1. The process that converts a sodium atom (Na) to a sodium ion (Na⁺) involves
 - A. losing a proton.
 - B. losing an electron.
 - C. gaining a proton.
 - D. gaining an electron.

2. Which is the **best** evidence of the movement of Earth's crustal plates?
 - A. an increasing number of high tides
 - B. shifts in climate patterns
 - C. beach erosion
 - D. earthquakes

Lesson 5

1. Mitosis, the process by which the nucleus of a cell divides into two nuclei, each containing a complete set of the cell's chromosomes, is essential to life because it
 - A. contains four stages for gametes.
 - B. maintains genetic continuity from one generation to the next.
 - C. controls cell functions to ensure successful development.
 - D. provides energy for the cells.

Question 2 refers to the experiment described in the box below.

One hundred pea seeds were put in Petri dishes and covered with wet paper towels. The dishes were put inside black plastic sacks and carefully divided between two temperature-controlled incubators set to different temperatures.

2. After six days of incubation, 5 of 50 pea seeds had germinated at 10°C, whereas 41 of 50 pea seeds had germinated at 30°C. Which of the following conclusions can be correctly drawn on the **basis of these data**?
 - A. Pea seeds need light to germinate.
 - B. At 50°C almost all of the seeds would germinate.
 - C. Within a certain temperature range, more pea seeds will germinate in a warmer incubator.
 - D. In order for any germination to occur, moisture must be present.

Lesson 6

1. Suppose that evidence collected worldwide covering a hundred year period indicates that glaciers had increased in size, sea levels had become lower, and biomes had moved toward the equator. Which is the **best** possible explanation?
 - A. Earth moved closer to the Sun.
 - B. The Northern Hemisphere tilted away from the Sun.
 - C. Less total energy from the Sun reached Earth's surface.
 - D. The Moon came between the Sun and Earth.

2. In the late 1700s, most moths in England were light-colored. During the Industrial Revolution pollution from factories darkened tree trunks. By 1886, dark-colored moths were common and light-colored moths were rare. What caused this change in the moth population?
 - A. Dark-colored moths were attracted to the dark tree trunks.
 - B. Factory pollution killed the light-colored moths.
 - C. Dark-colored moths fed on the pollution.
 - D. Birds ate more light-colored moths because they were easy to see on dark trunks.

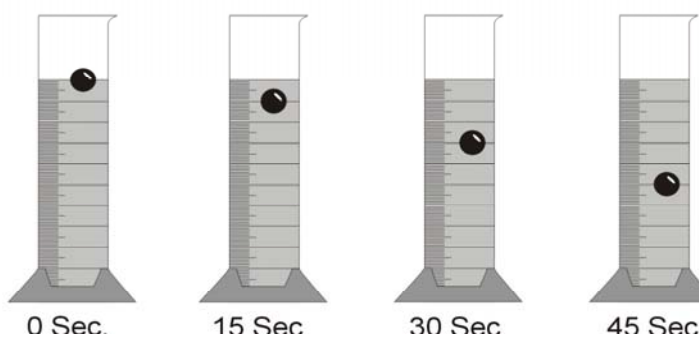
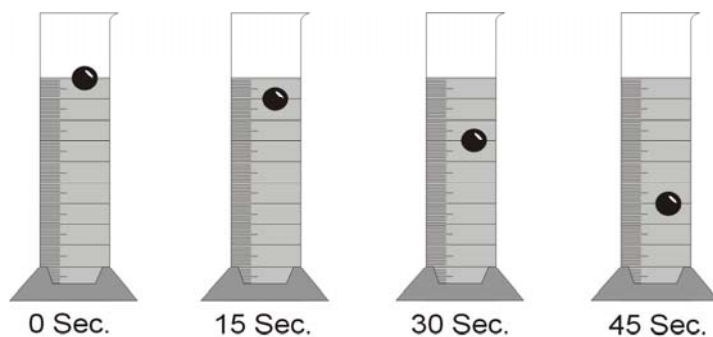
Lesson 7

Use the information below to answer question 1.

Species A	Species B	Species C	Species D
hair 4 legs lives on land has live offspring	scales no legs lives on land lays eggs on land	slimy skin 4 legs lives in water lays eggs in water	hair 2 legs, 2 wings flies in the air has live offspring

1. Which two species are **most closely** related?

2. A marble is placed into a graduated cylinder filled with heavy oil. The series of illustrations below shows the marble's motion. Which word **best** describes the change in the marble's motion during the time shown?



Task Description

Read the task description below, and then answer the related questions. Some questions have more than one part and require that you write the answers.

Your class must monitor two local lakes bi-weekly from August to May. The class is divided into 2 groups. Both groups must collect the same data, but one group will monitor Lake A, while the other group will monitor Lake B. Each student is required to record the measurements and personal observations throughout the year. To initiate this experiment, your teacher invited a local scientist to discuss with your class some general background information about the two lakes. You recorded the following information from the scientist's lecture:

LAKE A	LAKE B
1. Area of lake = 32.4 square kilometers	1. Area of lake B = 2.6 square kilometers
2. Greatest depth of lake = 65 meters	2. Greatest depth of lake B = 10 meters
3. It has a rocky bottom.	3. It has a sandy bottom
4. Located in wildlife reserve; popular area for recreational fishing	4. Located among farms and fields

At the first and third week of each month, the groups are shuttled by boat to the middle of the assigned lake for sampling. Each group is provided with the following equipment:

- oxygen meter
- thermometer
- pH meter
- microscope

A Secchi disk is a tool used to measure how deep an observer can see into the water, thus determining the water's transparency or clarity. It is a weighted circular disk 20 centimeters in diameter with four alternating black and white sections painted on the surface and attached to a marked, measured line. It is lowered into the lake by the measured line until the observer loses sight of it. The disk is then raised until it reappears. The depth of the water where the disk vanishes and reappears is the Secchi disk reading. An oxygen meter is simply a tool that can measure the water's dissolved oxygen content when the attached electrode is lowered into the water. Each group also collects one liter of lake water to take back to the classroom for microscopic observation and to measure the acidity of the lake water with the use of a pH meter.

The averaged class results of the two-lake monitoring program are shown below.

LAKE A	LAKE B
1. Water transparency ranged 6–10 meters	1. Water transparency ranged 0–3 meters
2. pH range 7.5–8.2	2. pH range 8.7–9.6
3. High abundance of microscopic algae, but no algal mats forming on water.	3. Very high abundance of microscopic algae, large algal mats laying on water surface.

Lesson 8

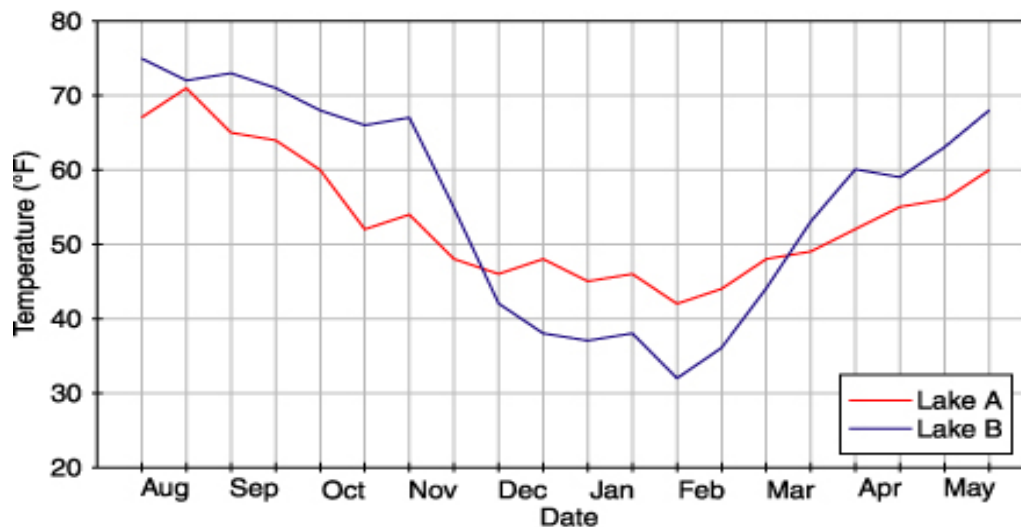
1. Eutrophication is the aging of a lake due to increased accumulation and cycling of nutrients, sediments, silt, and organic matter in the lake. From the class observations of the two lakes, which lake, Lake A or Lake B, could be considered eutrophic?
-

2. Lake B contained many microscopic organisms but did not contain as many fish as Lake A. This is mostly because the water in Lake B has less _____ than Lake A.

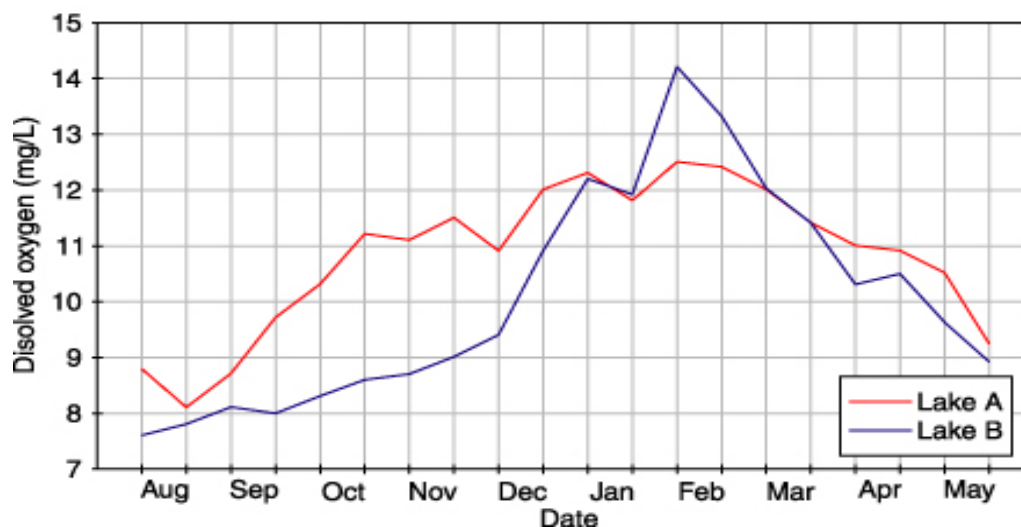
Lesson 9

Use the following charts to answer question 1.

Temperatures of two lakes from August to May



Dissolved oxygen content of two lakes from August to May



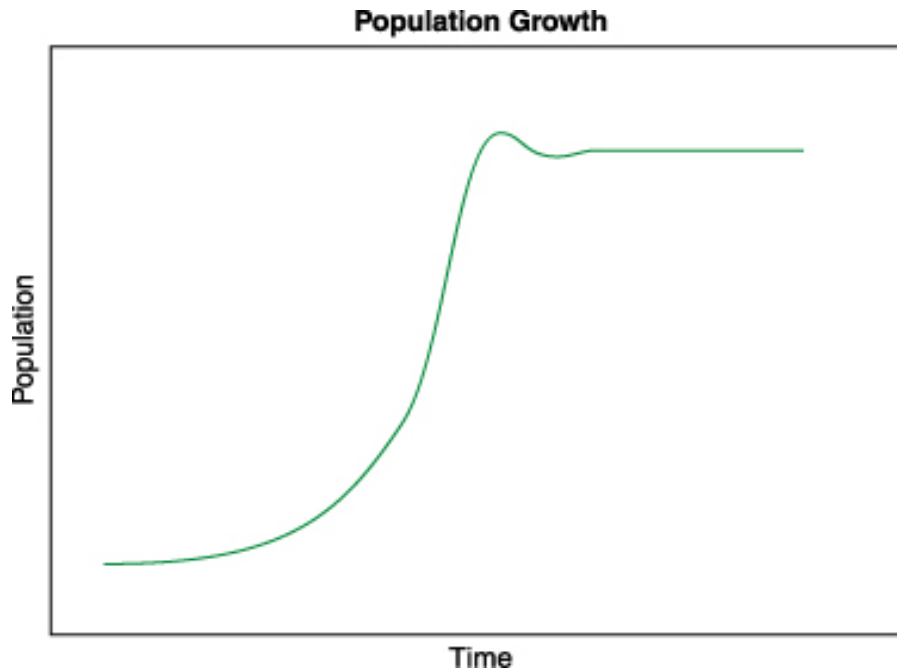
1. Which statement is the **best** hypothesis about the temperature of the lakes?
 - A. Due to its shallow depth, the temperature of Lake B remains constant throughout the year.
 - B. The temperature variability of Lake A is smaller than that of Lake B throughout the year.
 - C. There is no temperature difference between Lake A and Lake B.
 - D. Lake A reaches moderate temperatures during the winter months.

Lesson 9 (continued)

2. Upon viewing your water sample under the microscope, you observe numerous microscopic organisms moving about. Which is evidence that you are observing eukaryotic organisms rather than bacteria?
- A. The organisms are small and difficult to find.
 - B. The organisms contain DNA.
 - C. The organisms have flagella for motility.
 - D. The organisms have membrane-bound organelles.

Lesson 10

Use the graph below to answer question 1.



1. This graph represents a typical logistic growth curve of an aquatic microorganism or insect population. Which of the following most likely explains why the population decelerates after exponential growth?
 - A. There was a decrease in female-bearing organisms.
 - B. The environment's resources became limited.
 - C. Predation exceeded growth of the prey population.
 - D. There was an increase in population survivorship.

2. Which food chain is representative of a food chain in a lake?
 - A. zooplankton → phytoplankton → fish → turtles
 - B. bacteria → fish → turtles → birds
 - C. phytoplankton → zooplankton → fish → birds
 - D. birds → fish → phytoplankton → bacteria

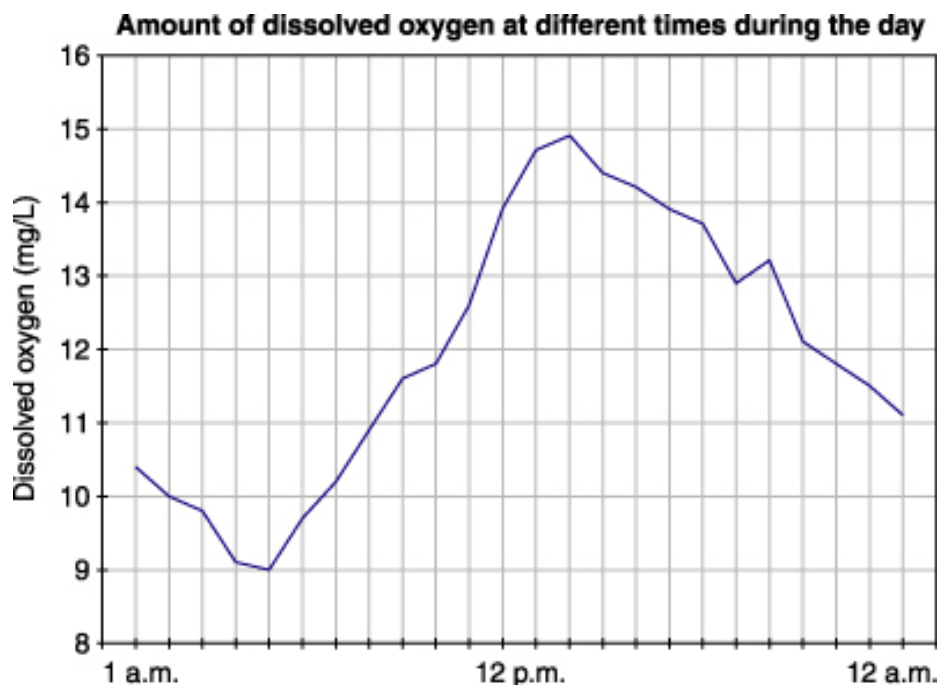
Lesson 11

1. In which way does a lake system contribute to the carbon cycle?
 - A. nitrification
 - B. atmospheric precipitation
 - C. aquatic animal excretion
 - D. algal photosynthesis

2. Your class recorded higher pH levels in Lake B; thus it was more basic than Lake A. Which of the following most likely caused the higher acidity in Lake A?
 - A. fertilizer from the fields surrounding the lake
 - B. the combustion of fossil fuels, which created acid rain
 - C. a higher abundance of algae in Lake B
 - D. the limited nutrient cycling in Lake B

Lesson 12

As a part of your project, your group had to monitor the lake for one full 24-hour period, taking dissolved oxygen readings every hour. A graph of the data you collected is shown below.



- Which process caused the decrease in dissolved oxygen during nighttime?
 - photoreception
 - respiration
 - ionization
 - fermentation

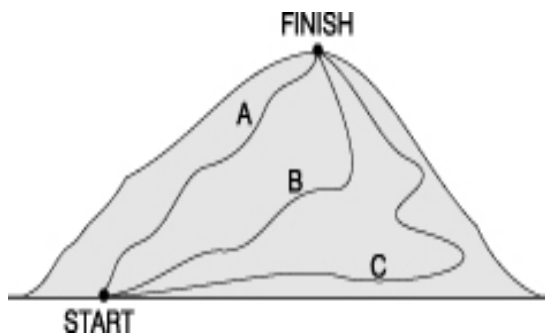
Use the food chain below to answer question 2.

phytoplankton → zooplankton → fish → birds

- In this lake food chain, which trophic level is considered the primary consumer?
-

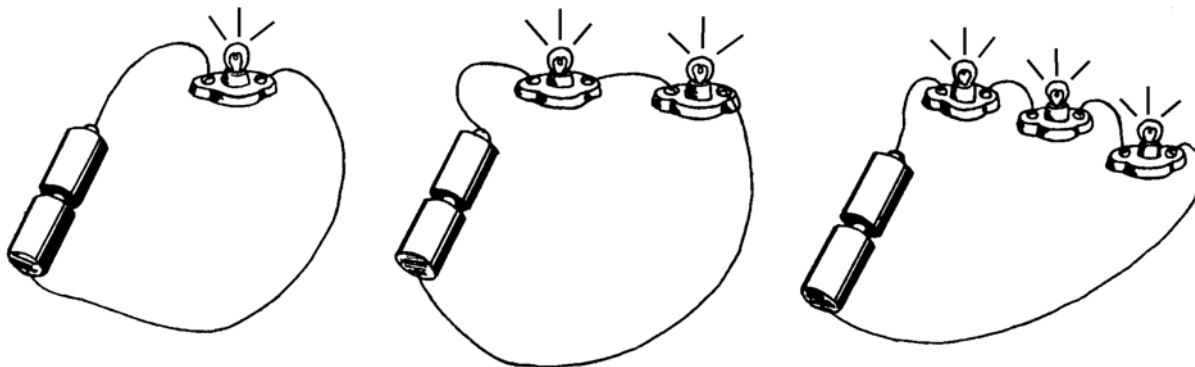
Lesson 14

Use the diagram below to answer question 1.



1. Three people of equal mass climb a mountain using paths A, B, and C. Along which path(s) does a person gain the greatest amount of gravitational potential energy by the time he or she finishes?
 - A. Path A only
 - B. Path B only
 - C. Path C only
 - D. The gain is the same for paths A, B, and C.

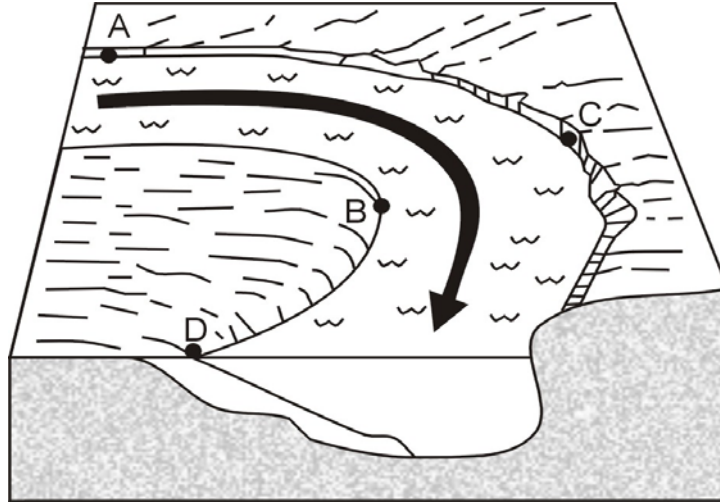
Use the diagrams below to answer question 2.



2. Sandy connected two batteries to a bulb (Figure A). Next she connected two batteries to two bulbs (Figure B). Finally, she connected two batteries to three bulbs (Figure C). Sandy used the same total length of wire for all the connections. Sandy's experiment was most likely designed to determine
 - A. whether adding more batteries would make the bulbs brighter.
 - B. how many batteries are needed to light a bulb.
 - C. whether the brightness of a bulb changes as more bulbs are connected.
 - D. how the length of the wires affects the brightness of the bulbs.

Lesson 15

1. The arrow in the diagram below represents the direction of a stream flowing around a bend.

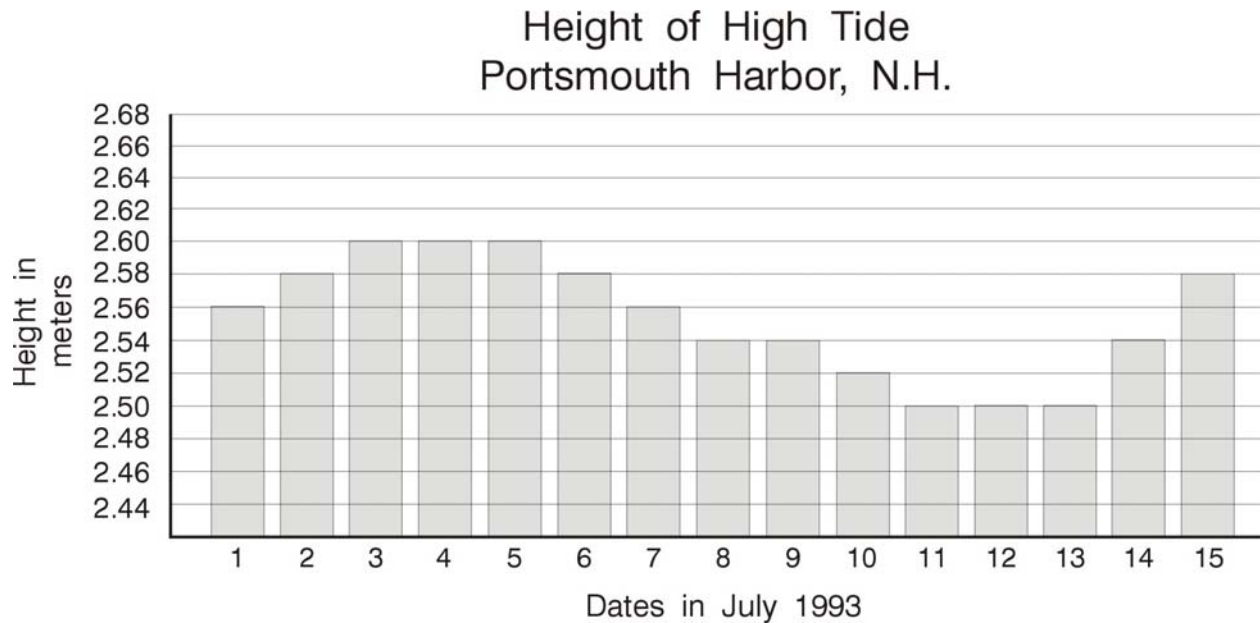


At which point does the greatest bank erosion occur?

- A. point A
- B. point B
- C. point C
- D. point D

Lesson 15 (continued)

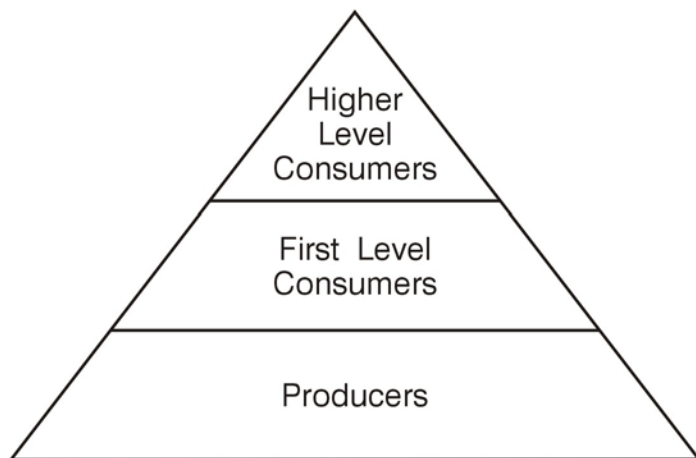
Use the graph below to answer question 2.



2. Which date on the graph above is **most likely** the date of the full moon?
- A. July 1
 - B. July 4
 - C. July 8
 - D. July 12

Lesson 16

Use the biomass pyramid below to answer question 1.

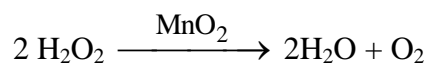
BIOMASS PYRAMID

1. More of the world's people could be fed with available food if people ate more organisms from the bottom of the food pyramid. Which best explains why this is correct?
 - A. Producers are more nutritious than consumers.
 - B. There is a loss of energy with each step up on the pyramid.
 - C. Agricultural pests would have less opportunity to destroy food.
 - D. There is less biomass at the lower levels.

2. When water is added to solid ammonium chloride (NH_4Cl), the temperature of the resulting solution decreases. Which of the following terms best describes this kind of change?
 - A. endothermic (gains heat)
 - B. decomposition
 - C. exothermic (loses heat)
 - D. nuclear

Lesson 17

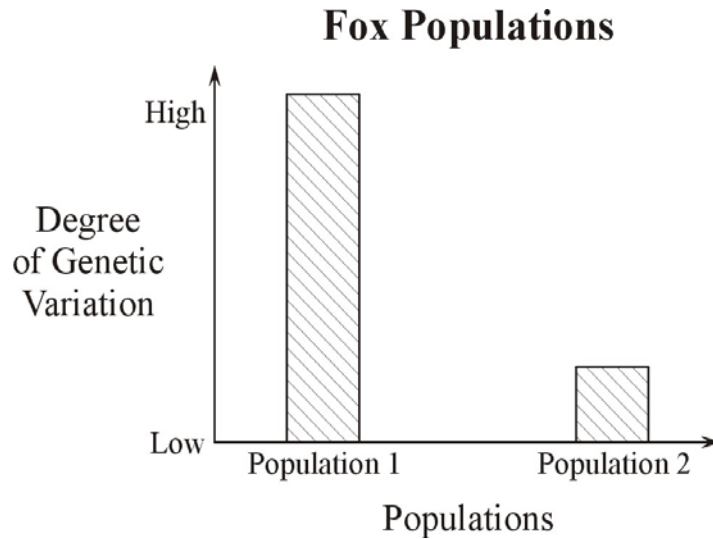
Use the chemical equation below to answer question 1.



1. In the above reaction, manganese dioxide (MnO_2) serves as a catalyst. Why isn't it listed as one of the reactants or products of the reaction?
 - A. It is consumed in the reaction.
 - B. It plays no role in the reaction.
 - C. It remains unchanged in the reaction.
 - D. It contributes oxygen to the reaction.

Lesson 17 (continued)

1. The graph below shows the relative amount of genetic variation in two populations of foxes. Which of the following statements about survival is correct?



- A. Population 1 is more likely to survive a change in the environment.
- B. Population 2 is more likely to survive a change in the environment.
- C. Both populations are equally likely to survive a change in the environment.
- D. Genetic variation does not affect survival in a changing environment.

Lesson 18

1. Which of the following provides the **best** evidence that light is a form of energy?
 - A. Light reflects from a smooth surface such as glass.
 - B. Light increases the temperature of an object on which it falls.
 - C. Light usually travels in straight lines.
 - D. Light diffracts when it passes through a narrow opening.

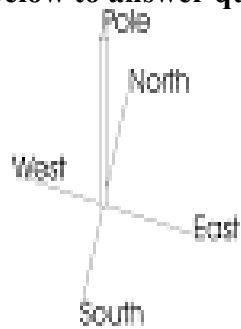
2. What is the major purpose of a contractile vacuole in the unicellular organism, the amoeba?
 - A. osmoregulation
 - B. excretion
 - C. mobility
 - D. phagocytosis

Lesson 19

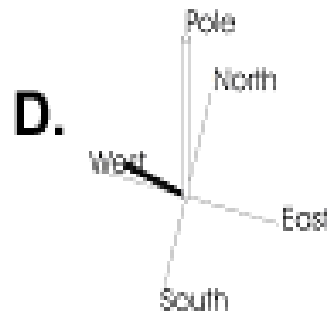
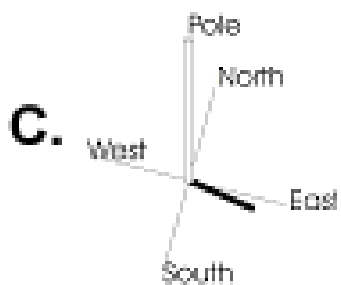
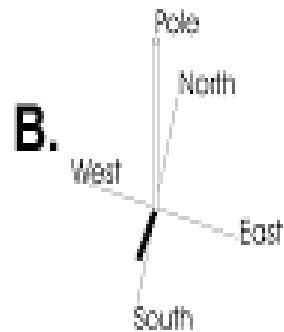
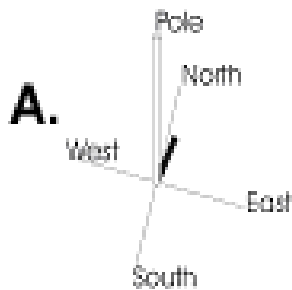
1. Beth wants to find out if the lake in her town contains pollutants. The best way for Beth to gather data related to her problem would be to collect
 - A. one surface sample near shore.
 - B. one surface sample and one deep sample from the middle of the lake.
 - C. several surface samples from different areas of the lake.
 - D. several samples from many different areas and depths of the lake.

Lesson 19 (continued)

Use the diagram below to answer question 2.



2. In the central United States at 8:00 A.M. on September 23, it is sunny and the vertical pole shown in the diagram above casts a shadow. Which picture below **best** approximates the position of the shadow?



Lesson 20

Use the food chain below to answer question 1.

Phytoplankton → zooplankton → fish → birds

1. In this lake food chain, which trophic level is considered the primary consumer?

2. What gas is released by a plant cell in the process of cellular respiration?

3. Name two tools that would be necessary to determine the speed of a ball rolling slowly across the floor.

Task Description

Use the information and graphics below to answer the following related questions in Lessons 21 through 26.

Amber and Trevor performed an investigation using the following equipment and materials:

- Plastic well plate
- Plastic disposable pipettes
- Wash bottle with distilled water
- 6.0 M hydrochloric acid (HCl)
- 6.0 M sulfuric acid (H₂SO₄)
- 0.6 M sulfuric acid (H₂SO₄)
- 6.0 M nitric acid (HNO₃)
- 4 small pieces of marble (CaCO₃)
- 4 small strips of zinc (Zn)
- 4 small strips of copper (Cu)
- 1 small paper clip cut into 4 pieces
- 4 small strips of aluminum (Al)
- egg white

Procedure:

First, they labeled the well plate as shown below.

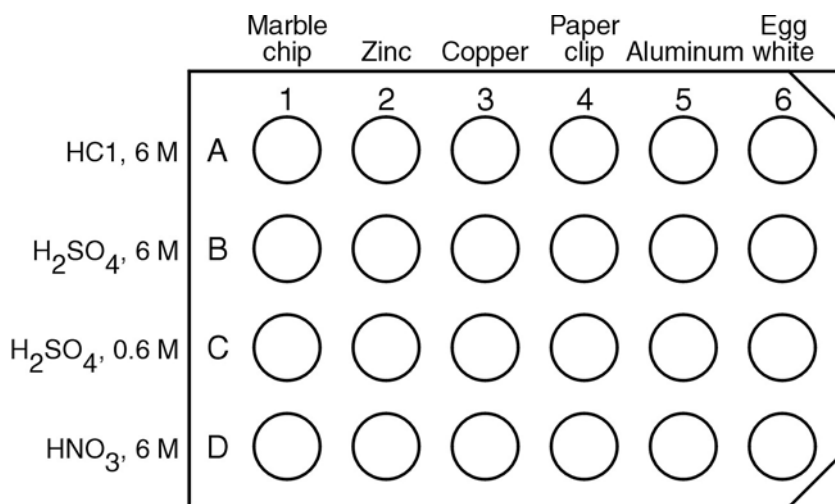


Diagram of the wellplate setup

Task Description (page 2, continued)

Then, they added 20 drops of each acid to the appropriate wells:

- 20 drops of 6.0 *M* HCl to each well in Row A
- 20 drops of 6.0 *M* H₂SO₄ to each well in Row B
- 20 drops of 0.6 *M* H₂SO₄ to each well in Row C
- 20 drops of 6.0 *M* HNO₃ to each well in Row D

Then they added samples to the appropriate wells and recorded their results:

- 1 piece of marble to each well in Column 1
- 1 piece of Zn to each well in Column 2
- 1 piece of Cu to each well in Column 3
- 1 piece of paper clip to each well in Column 4
- 1 piece of Al to each well in Column 5
- 5 drops of egg white to each well in Column 6

They recorded the results in the tables below:

Well	Acid	Observations with Marble
A-1	6.0 <i>M</i> HCl	Lots of bubbling; marble gets smaller
B-1	6.0 <i>M</i> H ₂ SO ₄	Lots of bubbling; marble gets smaller
C-1	0.6 <i>M</i> H ₂ SO ₄	Small amount of bubbling; marble gets smaller
D-1	6.0 <i>M</i> HNO ₃	Lots of bubbling; marble gets smaller

Well	Acid	Observations with Zinc
A-2	6.0 <i>M</i> HCl	Lots of bubbling; some smoke emitted
B-2	6.0 <i>M</i> H ₂ SO ₄	Lots of bubbling; some smoke emitted
C-2	0.6 <i>M</i> H ₂ SO ₄	Small amount of bubbling
D-2	6.0 <i>M</i> HNO ₃	Vigorous bubbling; brown gas emitted

Well	Acid	Observations with Copper
A-3	6.0 <i>M</i> HCl	No reaction
B-3	6.0 <i>M</i> H ₂ SO ₄	No reaction
C-3	0.6 <i>M</i> H ₂ SO ₄	No reaction
D-3	6.0 <i>M</i> HNO ₃	Some bubbling; solution turns blue; some smoke

Task Description (page 3, continued)

Well	Acid	Observations with Paper Clip
A-4	6.0 M HCl	Nothing at first; then bubbling; turns gray
B-4	6.0 M H ₂ SO ₄	Nothing at first; then bubbling
C-4	0.6 M H ₂ SO ₄	No reaction
D-4	6.0 M HNO ₃	No reaction

Well	Acid	Observations with Aluminum
A-5	6.0 M HCl	Nothing at first; then lots of bubbling; turns gray
B-5	6.0 M H ₂ SO ₄	Nothing at first; then some bubbling
C-5	0.6 M H ₂ SO ₄	No reaction
D-5	6.0 M HNO ₃	No reaction

Well	Acid	Observations with Egg White (Protein)
A-6	6.0 M HCl	Turns somewhat cloudy white
B-6	6.0 M H ₂ SO ₄	Turns cloudy white
C-6	0.6 M H ₂ SO ₄	Stays clear
D-6	6.0 M HNO ₃	Turns cloudy white

Lesson 21

1. When a secondary neutralization reaction takes place in well A-1, which substance is produced?
 - A. NaCl
 - B. NO₂
 - C. SO₂
 - D. H₂O

2. A comparison of Wells A-2 and D-2 shows which of the following?
 - A. the effect of different acids on the corrosion of zinc
 - B. the effect of the concentration of an acid on the corrosion of zinc
 - C. the effect of HCl on the corrosion of zinc versus copper
 - D. the effect of temperature on the corrosion of zinc

Lesson 22

1. What is the most likely identity of the gas produced in Well A-1?
 - A. CO_2
 - B. N_2
 - C. SO_2
 - D. Ca

2. To determine how the concentration of H_2SO_4 affects the degree to which marble (CaCO_3) is corroded, it would be best to compare the results of which two wells?
 - A. Well A-1 and Well D-1
 - B. Well B-1 and Well B-2
 - C. Well B-1 and Well C-1
 - D. Well C-1 and Well D-1

Lesson 23

1. Prior to adding egg white, which of the following wells had the highest pH?
 - A. A-6
 - B. B-6
 - C. C-6
 - D. D-6

2. NO_2 is a toxic gas that was produced in one of the wells containing zinc. In which well was it produced?
 - A. A-2
 - B. B-2
 - C. C-2
 - D. D-2

Lesson 24

1. Copper appears to have been oxidized in which of the following wells?
 - A. A-3
 - B. B-3
 - C. C-3
 - D. D-3

 2. At least one substance studied by Amber and Trevor contains an oxide coating that protects it from damage by acid. Once the coating has been decomposed, however, the substance reacts readily with most acids. Of the substances used in the well plate experiment, identify a substance with an oxide coating.
-

Lesson 25

1. If Trevor and Amber want to determine how the concentration of acid affects egg white, which wells should they compare?

2. One chemical element was present in all of the acids used in the experiment. What is the name of this element?

Lesson 26

Use the graphic below to answer the following question.

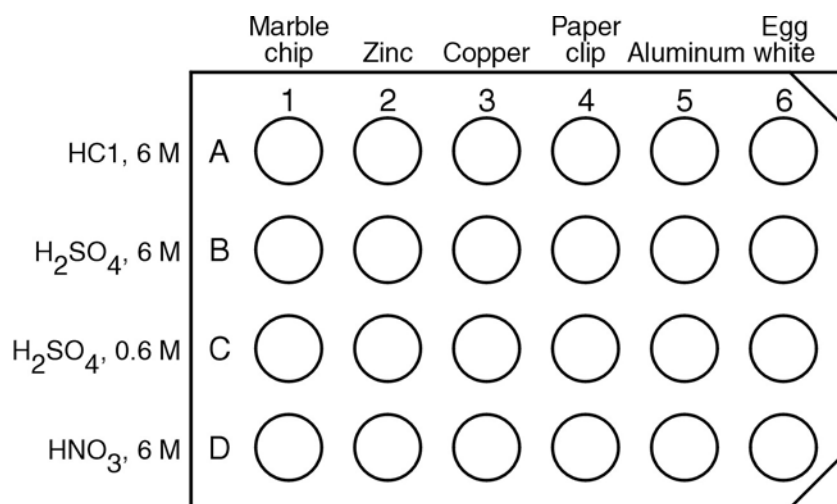


Diagram of the wellplate setup

- Write a balanced chemical equation for the reaction that takes place in Well A-1.

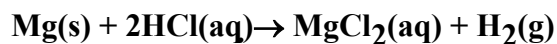
Lesson 27

1. The chemical properties of an element are determined by its
 - A. atomic mass.
 - B. proton number.
 - C. electron arrangement.
 - D. atomic size.

2. Some air was pumped out of a closed can, and the can collapsed. Which of the following **best** explains why this happened?
 - A. Air molecules inside the can condensed.
 - B. Pumping out the air molecules weakened the can.
 - C. Pumping air out of the can made the can hotter and caused it to collapse.
 - D. Pumping air out of the can created a large difference between the pressures inside and outside the can.

Lesson 28

1. Given the reaction:



The reaction occurs more rapidly when a 10-gram sample of Mg is powdered, rather than solid. This is because, compared to the solid piece, the powdered Mg has more

- A. surface area.
 - B. mass.
 - C. potential energy.
 - D. volume.
3. Which of the following events occurs in meiosis but **not** in mitosis?
- A. pairing up of homologous chromosomes
 - B. duplication of chromosomes before division
 - C. separation of chromosomes into two cells
 - D. separation of chromosomes into chromatids

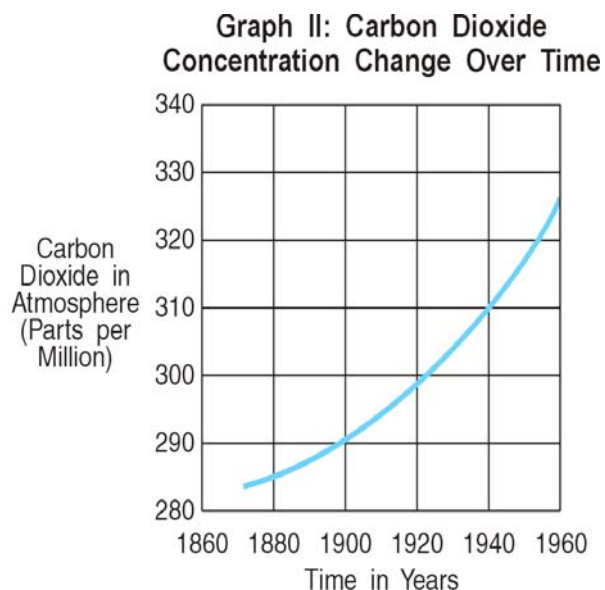
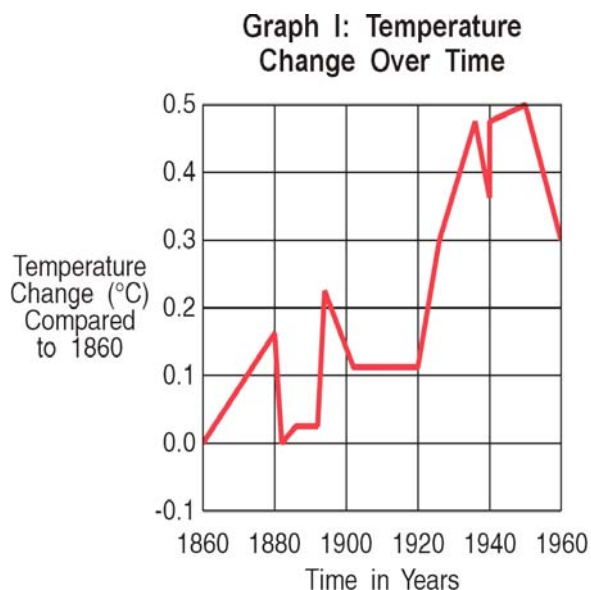
Lesson 29

1. It gets hotter in the summer and colder in the winter in the middle of a continent than it does near an ocean. Which statement **best** explains this observation?
 - A. It rains more in the middle of a continent.
 - B. Land warms up and cools off faster than water.
 - C. Land has hills, so it traps more air.
 - D. Water reflects more heat in the summer than in the winter.

2. A wetland area was drained for development. Over the next two years, the toad population slowly decreased. The **best** possible explanation for this change is that
 - A. the toads relied on the water for most of their food.
 - B. the toads moved into nearby woods or other isolated areas.
 - C. the toads died because they could not live long out of water.
 - D. the toads could not reproduce in the same numbers without nearby water.

Lesson 30

Use the graphs below to answer question 1.

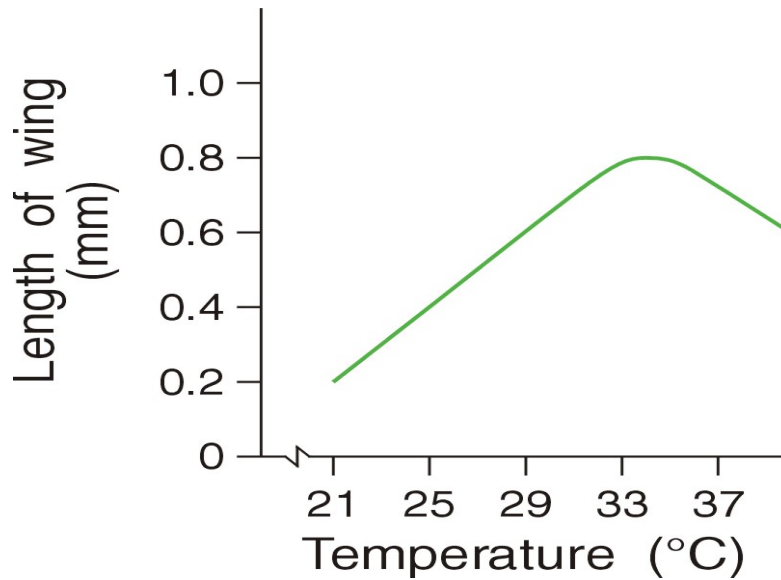


1. Which is the **best** interpretation that can be made from the graphs about the changes in temperature and carbon dioxide levels between 1870 and 1955?
 - A. The amount of carbon dioxide steadily increased, and the temperature showed an overall increase.
 - B. The amount of carbon dioxide steadily increased, and the temperature also steadily increased.
 - C. The amount of carbon dioxide steadily decreased, and the temperature showed an overall decrease.
 - D. The amount of carbon dioxide steadily increased, causing decreasing changes in temperature.

2. A yellowish, cloudy liquid is poured through a filter into a beaker. A yellow solid remains in the filter, and a clear, colorless liquid appears in the beaker. Which of the following conclusions is valid?
 - A. The yellowish, cloudy liquid was probably a compound.
 - B. The yellowish, cloudy liquid was probably a mixture.
 - C. The yellow solid and clear liquid are probably both elements.
 - D. Neither the yellow solid nor the clear liquid is a compound.

Lesson 31

1. The information in the graph below was collected from an experiment on fruit flies that were all homozygous recessive for shriveled wings. What is the best interpretation of the observed result?



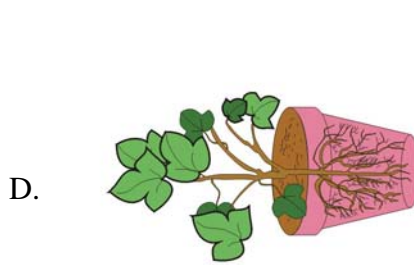
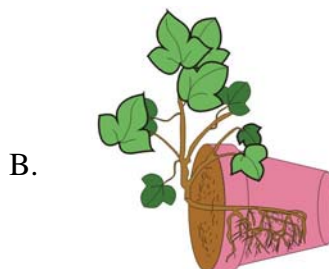
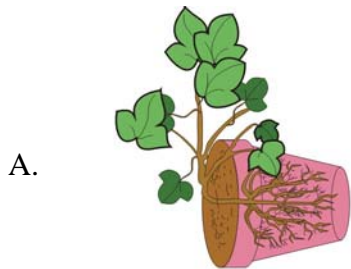
- A. Environmental factors affect gene expression.
- B. Longer wings are produced at higher temperatures.
- C. Longer wings are produced at lower temperatures.
- D. Environmental change always produces recessive genes.

Lesson 31 (continued)

Use the picture below to answer question 2.



2. If the plant pictured above were tipped on its side and left in place for a month, what would it look like?



Lesson 32

1. If all bacteria were to suddenly disappear from the surface of Earth, one consequence might be that
 - A. all diseases would disappear.
 - B. the number of viruses would increase.
 - C. organic waste would increase.
 - D. no major changes would be noted.

2. After a new species of fish is released in a lake, which would be **least likely** to disrupt the ecological balance in the lake environment?
 - A. the new fish eating other species of fish in the lake
 - B. the new fish become a popular food for other fish in the lake
 - C. the new fish competing for food eaten by the other species of fish in the lake
 - D. the new fish dying in the strange environment and then decaying

Lesson 33

1. Lemons and vinegar have a sour taste. This taste is characteristic of what kind of chemical substances?

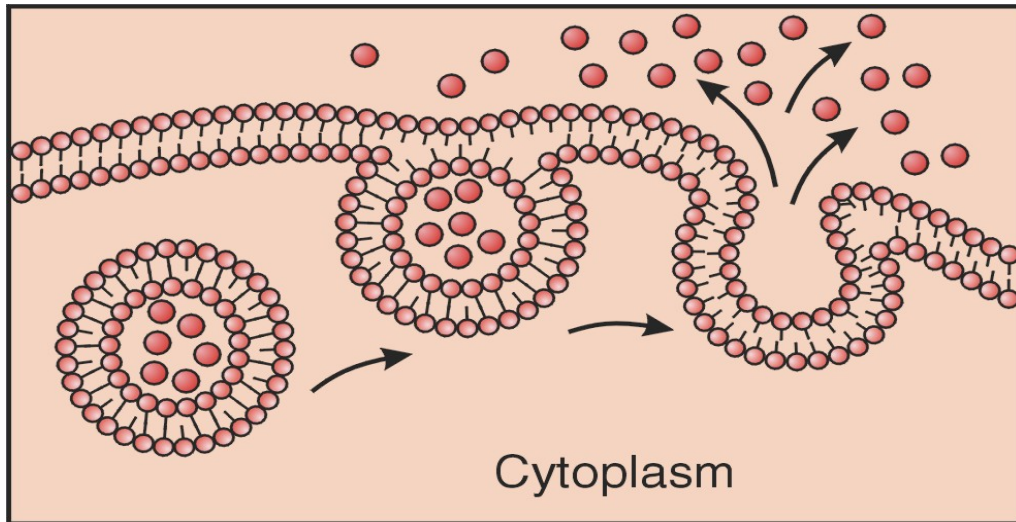
2. An aquatic organism has these characteristics:

- single cell
- chloroplasts
- ability to move
- a nucleus

This organism should be classified in which kingdom?

Lesson 34

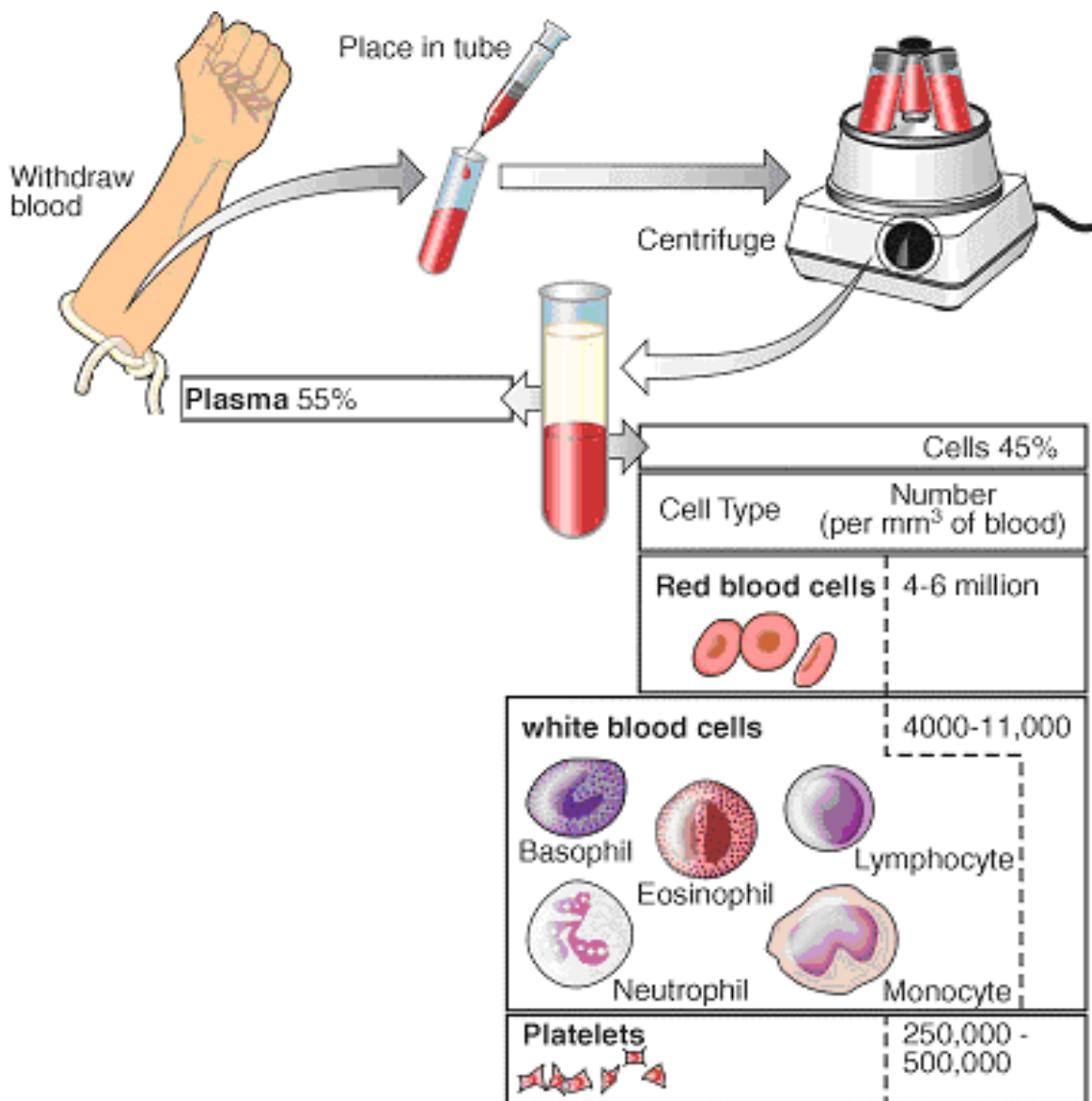
Use the diagram below to answer question 1.



1. The diagram above shows how
 - A. cells divide.
 - B. mRNA is made.
 - C. proteins are released.
 - D. DNA is replicated.

Lesson 34 (continued)

Use the picture below to answer question 2.



2. The blood sample shown above is from a healthy patient. How would a blood sample from a person with an infection differ from the sample?
- There would be less plasma.
 - There would be more platelets.
 - The number of red blood cells would decrease.
 - The number of white blood cells would increase.

Lesson 35

Use the table below to answer question 1.

	Range of Vital Signs		
	Normal	Serious	Critical
Blood Pressure (<i>systolic is the top number, diastolic is the bottom number</i>)	110/70–140/90	90–100 (systolic)	< 90 (systolic)
Heart Rate (<i>beats per minute</i>)	60–100	<60 or >100	<50 or >120
Temperature	98.6°F	102.2-104°F	>104°F
Breathing Rate (<i>respirations per minute</i>)	10–20	<10 or >20	<10 or >30

1. Four patients (Bobby, Irene, Antoinette, and Juan) are in the emergency room of the hospital. The nurse collected information from each of them. Study the symptoms described below and decide which patient is the **most** critical.

Patient	Vital Signs			
	Blood Pressure	Heart Rate (<i>beats per minute</i>)	Temperature	Breathing Rate (<i>respirations per minute</i>)
Bobby	110/70	80	104°F	21
Irene	87/50	150	102.8°F	20
Antoinette	95/65	105	98.6°F	22
Juan	85/50	45	104.9°F	10

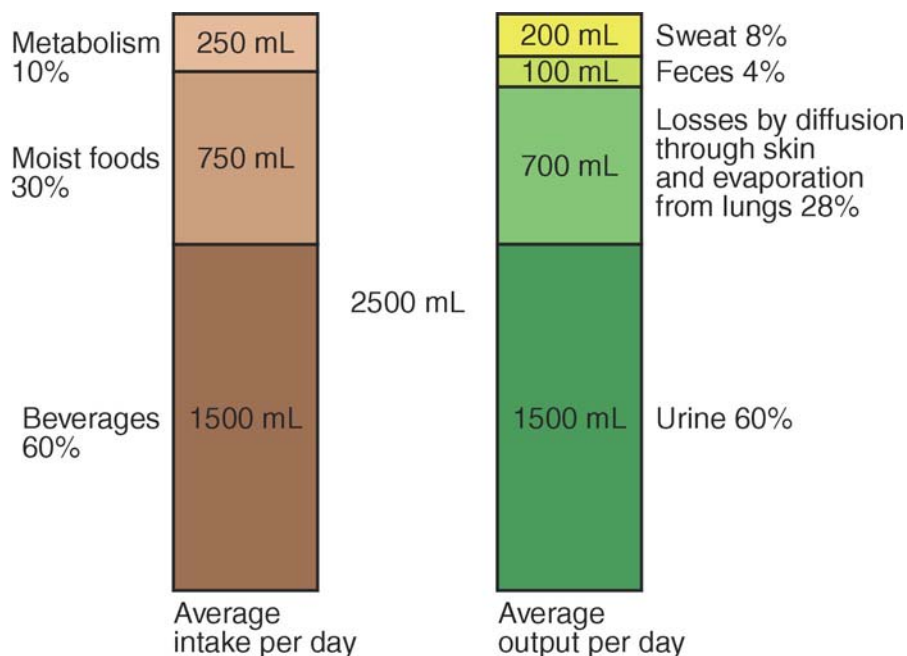
- A. Bobby
- B. Irene
- C. Antoinette
- D. Juan
2. Many people suffer from a chronic condition where blood pressure is always high. Which factor **contributes** to high blood pressure?
- A. a diet low in sodium
- B. consumption of small amounts of alcohol
- C. exposure to nicotine through smoking
- D. repetitive motions for long periods of time

Lesson 36

1. Which of the following helps reduce blood pressure for people with high blood pressure?
 - A. regular exercise and loss of excess weight
 - B. large amounts of Vitamin C and Vitamin E
 - C. daily calcium supplements
 - D. drinking more caffeinated beverages

Lesson 36 (continued)

The diagram below shows the major sources of water intake and major routes of water loss from the human body. A healthy person has a balance between water intake and output. Use this information to answer question 2.



2. Which organ system is **most likely** being monitored when a doctor uses the information in the chart?
- A. excretory system
 - B. digestive system
 - C. nervous system
 - D. cardiopulmonary system

Lesson 37

Use the diagrams below to answer question 1.



This is a cross section of a normal artery.



This is a cross section of an artery that is partially “blocked”.

1. The substance that is blocking the artery on the right is known as
 - A. cholesterol.
 - B. fatty tissue.
 - C. nicotine.
 - D. plaque.

2. Blocked blood vessels can result in a disease known as arteriosclerosis (ar-tee-ree-oh-SKLA-row-sis). Gradually the smooth muscle of the blood vessels is replaced by scar tissue that does not stretch. Name one common result of this disease.

Lesson 38

Use the diagram below to answer question 1.

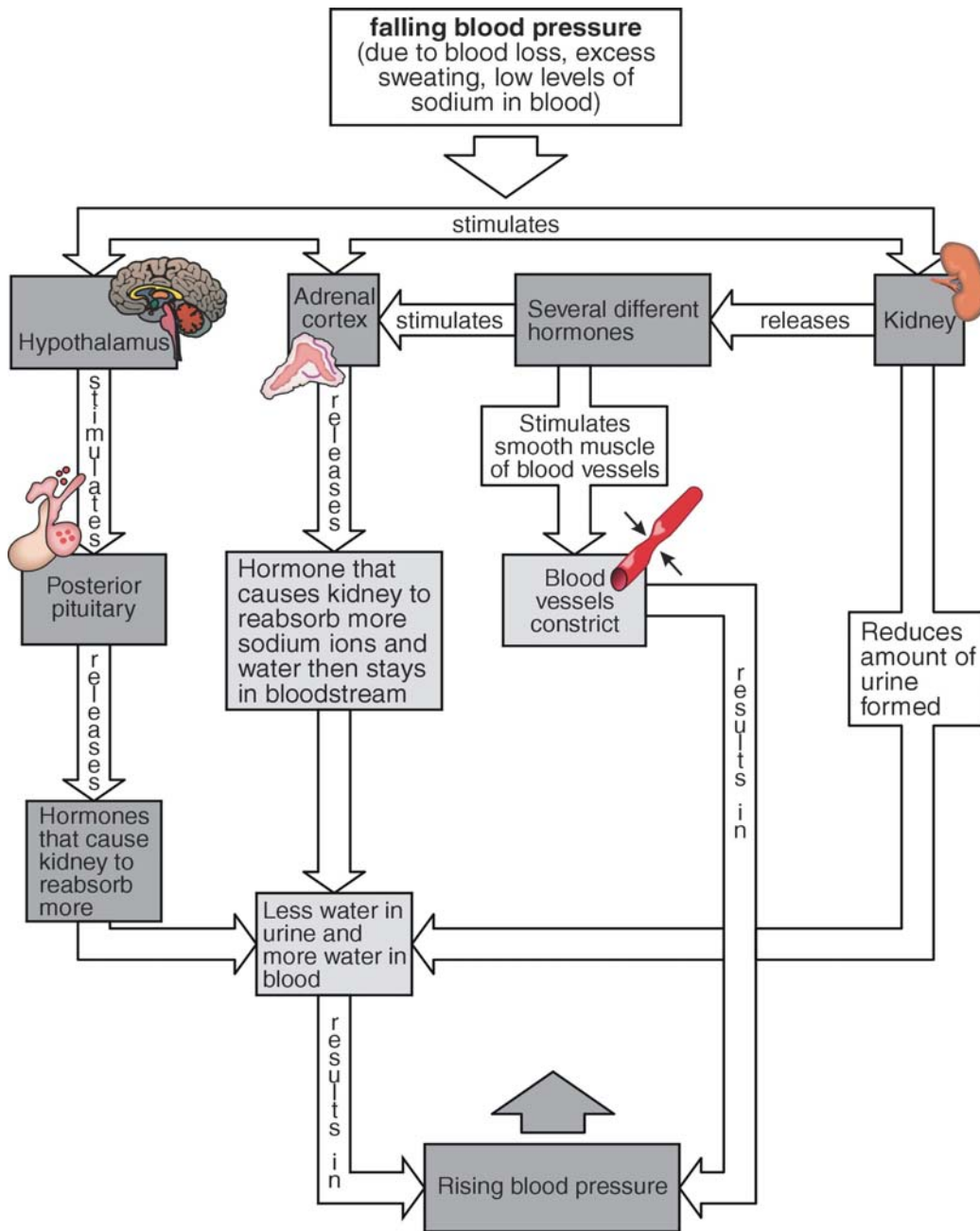


1. Name an organ in the human body that is made mostly of this type of cell.

2. Bacteria, virus, fungi, and parasites can all cause infection in the human body. An antibiotic will only work against an infection caused by _____.

Lesson 39

Use the diagram below to answer 1.



1. Explain one way the body attempts to correct low blood pressure. (You may write on back.)

Lesson 40

1. Phytoplankton are found in lakes and ponds. In the morning, some types rise slowly to the surface and remain there until nightfall when they sink to the bottom. This movement is directly related to the rate at which phytoplankton produce
 - A. energy.
 - B. oxygen.
 - C. chlorophyll.
 - D. sugars.

2. Which of the following is **not** a reflex action?
 - A. quickly closing your eyelid when something is about to hit your eye
 - B. jerking your leg when the doctor taps your knee
 - C. pulling away your hand when you accidentally touch a hot iron
 - D. falling over or tripping on a stone

Lesson 41

1. Organisms react to their environment. Which of the following pairs is **not** an example of an external stimulus causing an internal response?
 - A. cold → shivering
 - B. hunger → eating
 - C. frightening experience → increased heart rate
 - D. heat → sweating

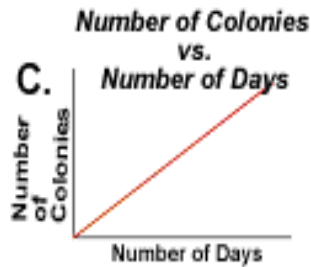
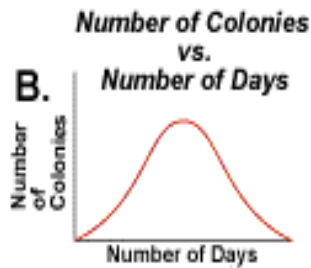
2. Which statement most accurately describes Earth's atmosphere?
 - A. The atmosphere is layered, with each layer having certain characteristics.
 - B. The atmosphere is a uniform shell of gases surrounding most of Earth.
 - C. The atmosphere's height is less than the depth of the ocean.
 - D. The atmosphere gets denser farther away from Earth.

Lesson 42

Use the table below to answer question 1.

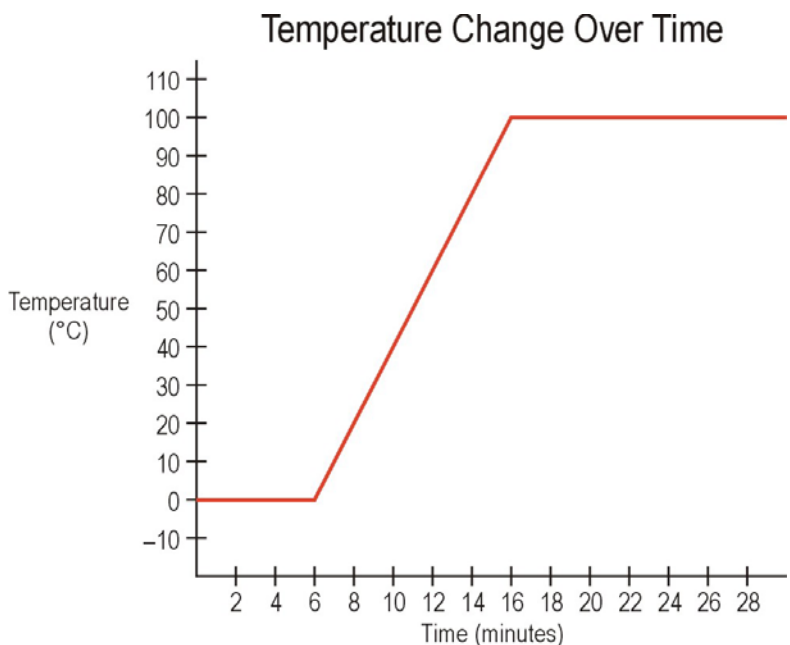
Day	Number of Bacteria Colonies
1	4
2	16
3	64
4	256

1. Which graph **best** shows the results of the data collected?



Lesson 42 (continued)

Use the graph below to answer question 2.



2. A beaker containing crushed ice and liquid water was heated. As shown in the graph, the temperature remained constant from 0 to 6 minutes and again after 16 minutes. During these two time periods, the heat energy was used to
- A. change the state of matter of the substance in the beaker.
 - B. heat the sides of the beaker.
 - C. decrease the distance between the molecules of water.
 - D. remove air molecules from the water.

Lesson 43

1. Equal amounts of Salt A and Salt B were dissolved separately in beakers containing equal volumes of water. The water temperatures were measured and recorded in the table below.

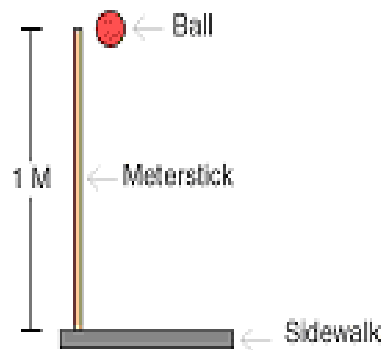
	<u>Salt A</u>	<u>Salt B</u>
Initial water temperature:	25.1°C	25.1°C
Final water temperature:	30.2°C	20.0°C

Which statement is a correct interpretation of these data?

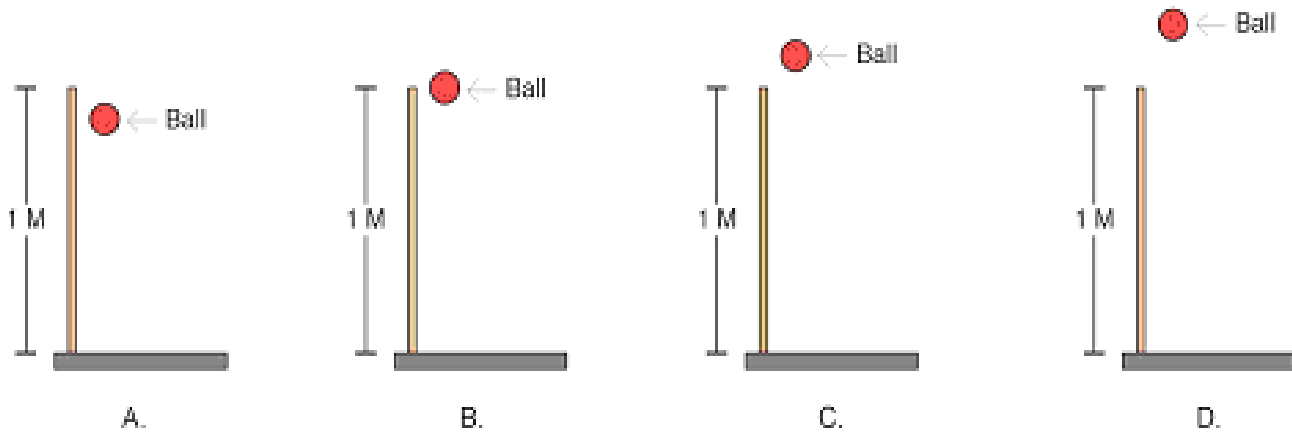
- A. The salt dissolving cannot be responsible for the temperature change. Another reason is more likely.
- B. The dissolving of Salt A and the dissolving of Salt B released energy to the water.
- C. The dissolving of Salt A absorbed energy from the water and the dissolving of Salt B released energy to the water.
- D. The dissolving of Salt A released energy to the water and the dissolving of Salt B absorbed energy from the water.
2. Assume that a 55 kg ice-skater is on a nearly frictionless surface. What force would be needed to accelerate the skater at 4 m/sec^2 ? (Force equals mass times acceleration: $F = ma$)
- A. 55 newtons
- B. 110 newtons
- C. 220 newtons
- D. 440 newtons

Lesson 44

Use the diagram below to answer question 1.



1. As the diagram above shows, a ball is dropped on a sidewalk from a height of one meter. Which of the following diagrams shows how high the ball would most likely rebound?



2. A sweater appears red because it
- absorbs most colors and reflects red light.
 - reflects red light.
 - absorbs red light and reflects most colors.
 - absorbs red light.

E.

Lesson 45

1. Mitochondria are used to produce energy for cells. Which type of cell would contain the **most** mitochondria?
 - A. fat cells
 - B. bone cells
 - C. red blood cells
 - D. muscle cells

2. Which of the following statements supports the theory of evolution?
 - A. Variations in organisms provide the basis for natural selection.
 - B. Carbon dating indicates that Earth is 4.5 billion years old.
 - C. Traits acquired during an organism's life will be passed on to the next generation.
 - D. Environmental factors are responsible for the formation of a new species.

Lesson 46

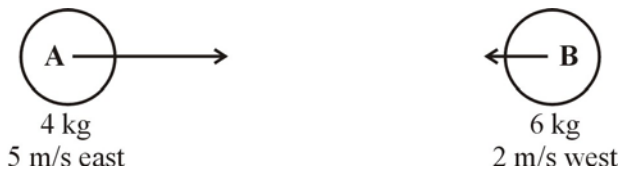
1. In watermelon plants, the allele for solid green fruit (G) is dominant over the allele for striped fruit (g). Pollen from a flower of a homozygous green watermelon plant is used to pollinate a flower from a heterozygous green watermelon plant. What percent of the offspring of this cross will produce striped watermelons?

Use the information and figure below to answer question 2.

Momentum = mass x velocity

or

$$\mathbf{p = mv}$$



2. If objects A and B collide, how much momentum will A and B have if they stick together after the collision?

Lesson 47

1. What is the theory that Earth's crust is divided into sections that interact with each other over time called?

2. Name one type of chemical bond that forms between atoms.

Task Description

The questions in this task refer to the newspaper article below. Read the article, and then answer the related questions. You may refer back to the article as often as you wish.

Air Pollution Linked to Drought

Air pollution may be one reason for the Sahel drought in Africa, says an Australian researcher, Dr. Leon Rotstayn. Sulfate particles in the atmosphere may contribute to a global climate shift. The majority of sulfate aerosol comes from burning of fossil fuels and metal smelting. Smaller amounts come from burning vegetation in the tropics and natural sources, such as marine plankton.

Dr. Rotstayn explained that the sulfate particles make cloud droplets smaller. This makes the clouds brighter, last longer, and reflect more sunlight into space, which cools Earth's surface.

Sulfate concentrations and surface cooling are greater in the Northern Hemisphere. This imbalance affects the tropical rain belt. The main impact of the weaker rain belt is in the Sahel, the region of northern Africa bordering the fringe of the Sahara.

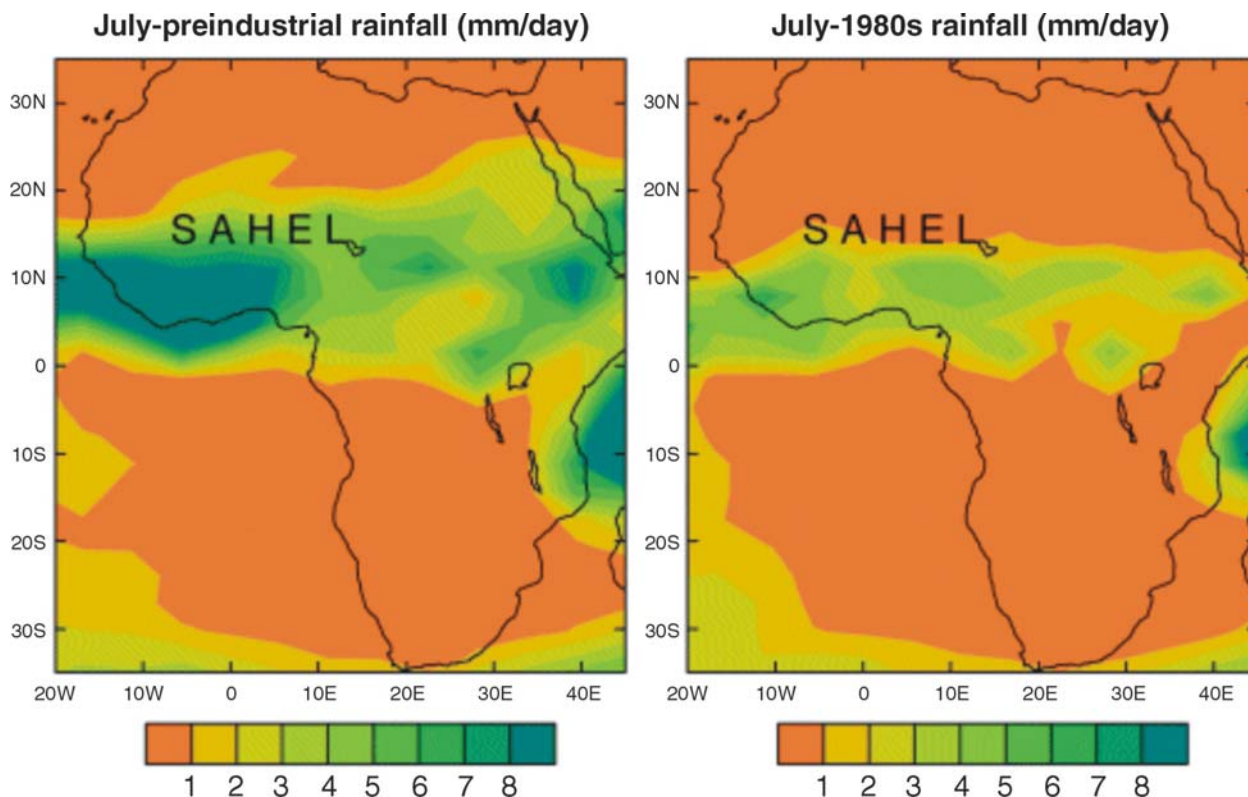
Since the 1960s, rainfall in the Sahel was twenty to forty-nine percent lower than in the first half of the 20th century. This caused a serious drought, widespread famine, and many deaths.

Dr. Rotstayn has investigated the importance of sulfate aerosols by using a supercomputer to run sophisticated global climate simulations. When the computer ran the simulation without any aerosol pollution, there was no drought in the Sahel. But when aerosols were added, the computer simulation showed a drop in rainfall similar to what happened over northern Africa.

During the 1990s, Europe and North America put stricter controls on sulfate emissions. Atmospheric aerosol concentration decreased, and the drought in the Sahel has been less severe during the past decade. Dr. Rotstayn believes this additional evidence supports his theory.

Lesson 48

Use the maps below to answer question 1.



1. What additional map would provide the most convincing evidence that a link exists between sulfate aerosols and the Sahel drought?
 - A. a map that shows more kinds of air pollution
 - B. a map that shows which countries produce the most sulfates
 - C. a map that shows the actual rainfall over Africa after the 1990's
 - D. a map that shows cloud cover in the Northern and Southern Hemispheres

2. Marine plankton play a major role in the biogeochemical cycling of which elements?
 - A. carbon and oxygen
 - B. sulfur and nitrogen
 - C. hydrogen and oxygen
 - D. nitrogen and phosphorus

Lesson 49

1. The news article mentions four sources of atmospheric sulfate particles: burning of fossil fuels, smelting of metals, burning vegetation, and marine plankton. Which of the following is another source of atmospheric sulfate particles?
 - A. lightning strikes
 - B. volcanic eruptions
 - C. bacteria on legume roots
 - D. termites and cows

2. In addition to affecting droplet formation within clouds, sulfates in the atmosphere also contribute to the problem of
 - A. El Niño.
 - B. acid rain.
 - C. ozone depletion.
 - D. ground ozone.

Lesson 50

1. Soil studies have shown that the Sahel region of Africa has had milder droughts in the 1680s, the 1750s, the mid-1800s and the early 20th century. This information supports the argument that
 - A. periodic droughts occur in this region.
 - B. sulfate air pollution has been present for a long time.
 - C. overgrazing by animals probably causes the Sahel droughts.
 - D. El Niño, the periodic warming of the oceans, causes the droughts.

2. Which chemical reaction describes the entry of the sun's energy into the food chain?

Lesson 51

1. A major damage to the ecosystem that occurs during periods of extended drought is the
 - A. increase in severe storms after the drought.
 - B. change in economic development patterns.
 - C. change in migration routes of animals.
 - D. loss of soil through wind erosion.

 2. Identify one factor that influences the global movement of rain clouds between the Northern and Southern Hemispheres.
-

Lesson 52

1. What is the major source of energy that drives the formation of clouds in the water cycle?

2. What non-renewable fossil fuel is a major source of high sulfur emissions?
