

Student Name: _____

MISSISSIPPI

Science Test



Grade 8 Test Booklet

Practice Test 2

Mississippi Code 37-16-4 prohibits prior disclosure of the materials contained in this booklet to a student who will be taking this test. Mississippi Code also prohibits any person from releasing, causing to be released, reproducing or causing to be reproduced any secure materials in any form or medium. Violations of the statute may result in invalidation of test scores, suspensions of certificates to teach, and/or prosecution.

Mississippi Department of Education
Office of Student Assessment

RIVERSIDE PUBLISHING



HOUGHTON MIFFLIN HARCOURT

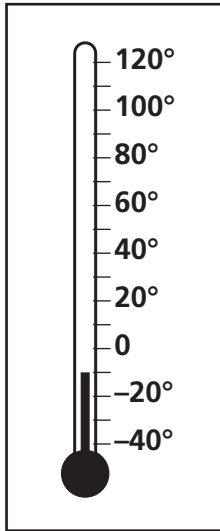
No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording or by any information storage or retrieval system without the prior written permission of The Riverside Publishing Company unless such copying is expressly permitted by federal copyright law. Address inquiries to Permissions, Riverside Publishing, 3800 Golf Rd., Suite 200, Rolling Meadows, IL 60008-4015.

Science

THIS PAGE WAS INTENTIONALLY
LEFT BLANK

Sample Items

1. Look at the following thermometer. The thermometer measures temperature in degrees Celsius ($^{\circ}\text{C}$).



What is the temperature shown on the thermometer?

- A. 10°C
- B. 0°C
- C. -5°C
- D. -10°C

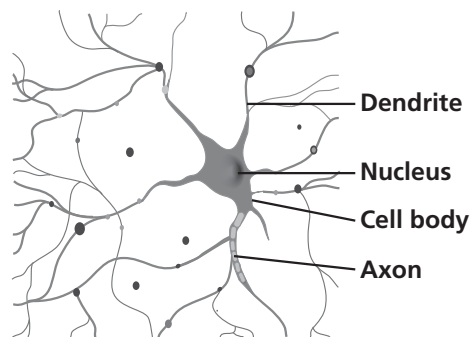
2. What type of tissue is attached to the skeletal system and helps bones move?

- F. Muscle tissue
- G. Cardiac tissue
- H. Adipose tissue
- J. Epithelial tissue



Mark your answers for questions 1–60 on your answer document. Mark only one answer for each question. You may write in your test booklet, but you must mark your answers on your answer document.

1. Chris viewed the following cell through a microscope lens.



Which type of cell is Chris observing?

- A. Nerve cell
- B. Bone cell
- C. Blood cell
- D. Muscle cell

2. A plant with smooth seeds is crossed with a plant with wrinkled seeds. All of the offspring have a smooth appearance.

Which statement explains why this occurred?

- F. The offspring only received the genes from the parent with the genotype for smoothness.
- G. The offspring only received the genes from the parent with the phenotype for smoothness.
- H. The offspring received the genes from both parents, but the genotype for smoothness dominates.
- J. The offspring received the genes from both parents, but the phenotype for smoothness dominates.

3. Malaria is a disease caused by a microscopic parasite that attacks blood cells. The parasite is spread to humans through the bite of a mosquito. Malaria causes headaches, muscle pain, coughing, fever, and vomiting.

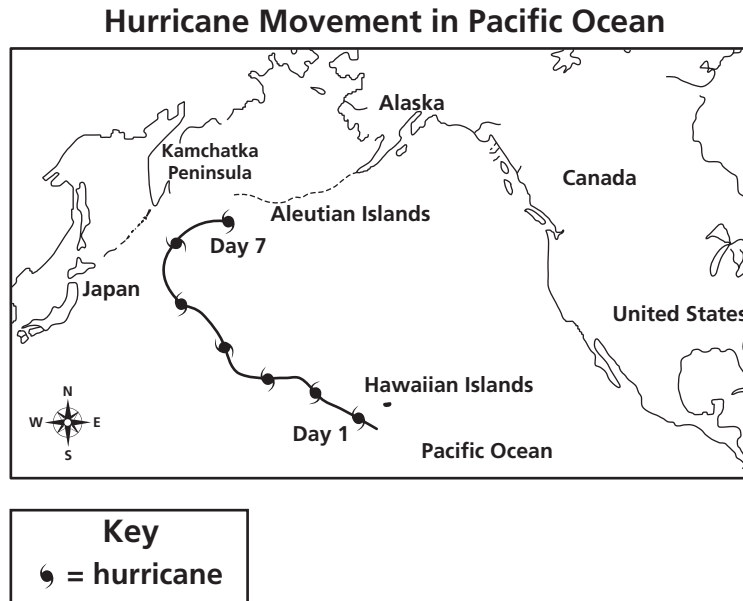
Why is malaria able to cause symptoms in so many parts of the body?

- A. Mosquitoes that carry the parasite can bite the skin on all parts of the body.
- B. The parasite enters the circulatory system, where it can travel to different parts of the body.
- C. The parasite attaches itself to nerves, controlling the messages sent to different parts of the body.
- D. Mosquitoes inject the parasites into skin, where they are able to move to different parts of the body.

4. Which of these describes a cause of lithospheric plate movement across the surface of Earth?

- F. The plates are driven by bubbles from the boiling liquid of the asthenosphere.
- G. The plates float on dense liquid material of the asthenosphere and are moved by tidal forces.
- H. The plates are driven across the surface by convection currents within the plastic rock of the asthenosphere.
- J. The plates move because they are attached to the solid rock of the asthenosphere and move with that rock.

5. The following map shows the movement of a hurricane in the Pacific Ocean.



Based on the hurricane's path, which of these describes the fate of this hurricane?

- A. It will make landfall on Alaska and weaken as it moves over the land.
- B. It will bounce off the Kamchatka Peninsula, spinning it down toward Japan.
- C. Cold arctic air around the Aleutian Islands will push the hurricane to move south toward the Hawaiian Islands.
- D. Cold arctic air around the Aleutian Islands will weaken the hurricane, and it will break apart before hitting landfall.

6. Jared investigated chemical reactions based on smell, color change, and release of bubbles.

What type of evidence would support any conclusion Jared makes?

- F. An observation
- G. An estimation
- H. A calculation
- J. A measurement

7. Astronomers often try to find the hottest stars in our galaxy.

Which wavelength of radiation do astronomers use to detect these hottest stars?

- A. Infrared
- B. Ultraviolet
- C. Visible
- D. X-ray

8. Meg investigated the ability of different plants to decrease soil erosion. She performed the following steps:

- 1) Planted five different species of plants, each in its own box
- 2) Set up the boxes in the same manner with one end of each box propped up at the same angle
- 3) Placed a collection device at the bottom of each box to catch soil runoff
- 4) Released water over each box in the same manner
- 5) Measured the amount of soil runoff and recorded the appearance of the water

The following table shows Meg's data.

Soil in Water After Erosion Tests

Sample	A	B	C	D	E
Amount of Soil in Water Runoff (grams)	22	7	13	5	20
Appearance of Water	Very cloudy	Mostly clear	Cloudy	Mostly clear	Very cloudy

Based on both quantitative and qualitative data, which is a logical inference for this investigation?

- F. The less able the plant was to prevent soil erosion, the clearer the water and the less soil that eroded.
- G. The cloudier the water, the more soil that eroded and the less able the plant was to prevent soil erosion.
- H. The clearer the water, the more soil that eroded and the better able the plant was to prevent soil erosion.
- J. The better able the plant was to prevent soil erosion, the cloudier the water and the more soil that eroded.

9. At a certain time of year, the Southern Hemisphere is tilted toward the sun.

Which of these describes how this tilt affects the Southern Hemisphere during this time of year?

- A. The days will be longer in the Southern Hemisphere during this time of year.
- B. The nights will be longer in the Southern Hemisphere during this time of year.
- C. The seasons will be longer in the Southern Hemisphere during this time of year.
- D. The sun will rise lower in the sky in the Southern Hemisphere during this time of year.

10. Soils contain chemical nutrients that help plants grow. Different plants require different amounts of nutrients. Scientists can test soil samples to determine how much of certain chemical nutrients are present. A manufacturer wants scientists to develop a soil in which any kind of plant could grow equally well.

Which statement explains whether the ability to make this type of soil is possible?

- F. Yes, most soils are those in which any kind of plant could grow.
- G. No, there is no way to tell what nutrients are needed by any kind of plant.
- H. Yes, a mixture of the soils that contained all the nutrients could nourish any plant.
- J. No, a soil in which certain kinds of plants grow well might not be as good for other types of plants.

11. Sean is studying the advantages of selective breeding in plants. He made the following list of possible advantages:

- 1) Can produce corn that attracts grasshoppers
- 2) Can develop grass that can grow with less water
- 3) Can develop wheat that can grow in different types of soil
- 4) Can produce oranges that are not affected by freezing temperatures

Which items on the list provide logical arguments in favor of selective breeding?

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

Directions: Use the information below to answer questions 12 through 14.

Oil-Eating Bacteria

Scientists wanted to know whether certain bacteria could break down oils they consume. A team of scientists investigated the amount of oil that three different kinds of bacteria could break down. They placed a colony of each type of bacteria in a separate container. The containers were kept under the same conditions and given the same amount of oil. The scientists measured how much oil remained in each colony of bacteria after certain periods. The following table shows their results.

Results of Investigation

Time (hours)	Amount of Oil (grams)		
	Container with Bacteria A	Container with Bacteria B	Container with Bacteria C
0	10.0	10.0	10.0
2	9.8	8.2	9.9
4	9.7	7.7	9.8
6	9.7	7.3	9.7
8	9.7	7.1	9.6

The scientists concluded that Bacteria B must make an enzyme that allows them to break apart oil particles.

12. Which of these explains how Bacteria B use the oil they consume?

- F. The oil is burned up by the bacteria.
- G. The oil becomes part of the bacterial cell's membrane.
- H. The oil is destroyed by the bacteria, leaving behind energy that they can use.
- J. The oil is chemically broken down by oxidation, releasing energy in the process.

13. One of the scientists wants to run the experiment a second time but provide different amounts of oil for each colony of bacteria.

How would this affect the validity of any conclusion for this experimental design?

- A. It would be valid because three different bacteria were tested.
- B. It would be valid because the experiment was conducted two times.
- C. It would not be valid because the amount of bacteria will still consume the oil.
- D. It would not be valid because the amount of oil provided is not being controlled.

14. A university biologist is skeptical of the scientists' conclusion. She suggests that the oil used could have broken down naturally and may not have been consumed by the bacteria.

How should the team of scientists address this concern?

- F. Run the experiment again, but change the amount of time for each trial.
- G. Run the experiment several times, but use oil that does not break down naturally.
- H. Run the experiment several times until the results match the biologist's concern.
- J. Run the experiment again in the same manner as the first trial to confirm the original data.

15. The earliest land plants did not have flowers. However, around 70 million years ago, flowering plants became the dominant plant type in many habitats.

Which type of organism would benefit directly from the increase in flowering plants?

- A. Aquatic mammals, which are able to use the plants for shelter
- B. Anaerobic bacteria, which can thrive in low oxygen environments
- C. Pollinating insects, which consume nectar and pollen as food sources
- D. Carnivorous reptiles, which are able to hunt for food among the plants

16. How can the wavelengths of light from a distant galaxy be used to determine the distance between Earth and the galaxy?

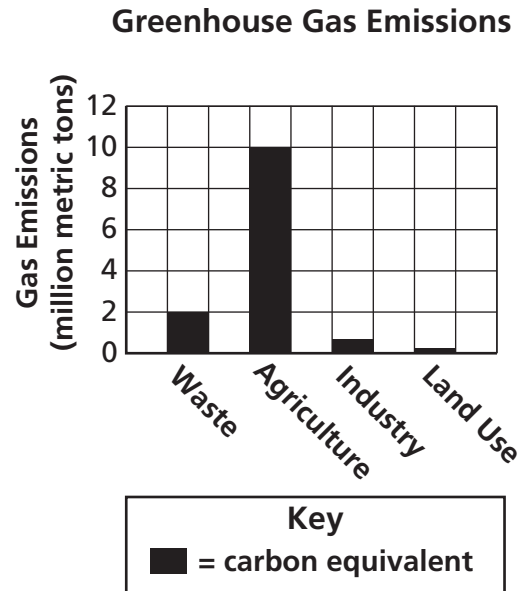
- F. The color of light from a galaxy indicates the age of the galaxy, and the most distant galaxies are the oldest.
- G. The light from distant galaxies shows a shift to longer wavelengths, and the shift increases as the distance increases.
- H. The light from a distant galaxy is scattered by dust in the space between Earth and the galaxy, and the amount of scattering indicates distance.
- J. The most distant galaxies emit the most light in the x-ray part of the spectrum, and the distance can be determined based on the strength of this light.

17. Scientists want to create citrus trees that are tolerant of cold weather. Currently, if the fruit from a citrus tree has not been picked and a freeze occurs, the fruit is damaged and cannot be sold. The scientists are studying how to alter the tree's cells so that they are not damaged by the freezing temperatures.

Which of these is a logical reason for continuing this research?

- A. Plants that can tolerate the cold would be less likely to become infected by fungi.
- B. Plants that can tolerate the cold could allow citrus trees to grow in colder climates.
- C. The research could make it easier to preserve the picked fruit during storage and shipping.
- D. The research could help scientists alter human cells so that human skin is not damaged by frostbite.

18. A study of greenhouse gas emissions was conducted for Mississippi. The results of the study were divided by work category: waste, agriculture, industry, and land use. The following graph shows these data.

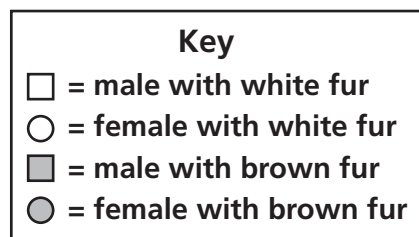
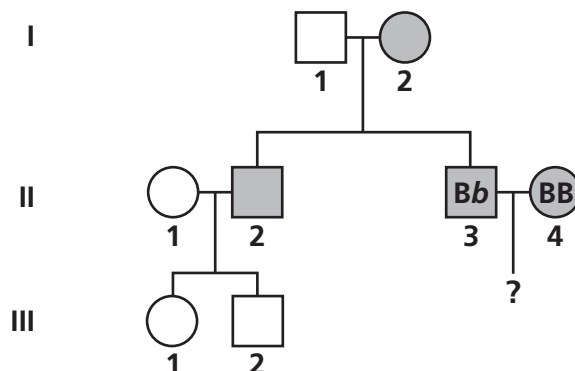


Which of these is a logical reason for using renewable resources in Mississippi?

- F. Using renewable resources for energy generation would improve the efficiency of land use.
- G. Using renewable resources for energy generation would eliminate all emissions of greenhouse gases.
- H. Using renewable resources for energy generation would be less expensive than the means currently used.
- J. Using renewable resources for energy generation would greatly reduce the total amount of greenhouse gas emissions.

19. The following diagram shows the dominant trait of brown fur in deer, B.

Pedigree of Brown Fur in Deer Family



Family members with two recessive genes will have white fur trait, *bb*.

Which of these is an accurate prediction for any offspring from Individuals 3 and 4 in Generation II?

- A. Their offspring will have brown fur with white patches.
- B. Their offspring have a fifty percent chance of having white fur.
- C. All of their offspring will have brown fur but will be carriers for the white fur trait.
- D. All of their offspring will have brown fur and might be carriers for the white fur trait.

20. *Tinea pedis* is a disease caused by a fungus. It affects mainly external body parts and not internal systems.

Which of these could be a symptom of *tinea pedis*?

- F. Difficulty breathing
- G. Pain in the intestines
- H. Headaches and dizziness
- J. Swollen and itching skin

21. Ospreys are a type of bird that nests near a body of water. These birds have adapted to hunt the fish living in the water of the environment.

Which adaptations have allowed ospreys to survive in their environment?

- A. • Short wings for gliding over water
• Long legs for reaching into the water
• Hollow, lightweight bones that allow for flying
- B. • Large eyes that provide keen vision
• Webbed feet for quick movement in water
• Pivotal head that allows for quick view in all directions
- C. • Thick, oily feathers for water resistance
• Strong feet and sharp claws for grasping fish
• Strong, muscular legs for carrying the fish back to land
- D. • Straight, sharply pointed beak for grasping prey
• Large ears for hearing movements of fish in water
• Long, sleek feathers that allow for diving into water
-
22. In one forest ecosystem, coyotes and bobcats are carnivores, while white-tailed deer and rabbits are herbivores.

Which of these describes the flow of energy in this ecosystem?

- F. From plants to deer, from deer to coyotes
- G. From rabbits to deer, from deer to coyotes
- H. From plants to rabbits, from rabbits to deer
- J. From bobcats to rabbits, from rabbits to plants

23.

Periodic Table of Elements

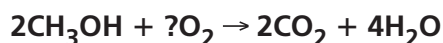
		Group 1										Group 2										Group 13										Group 14										Group 15										Group 16										Group 17										Group 18																																																																																																													
1		1										2										13										14										15										16										17										18																																																																																																													
		H										He																																																																																																																																																																									
		Hydrogen										Helium																																																																																																																																																																									
		1.01										4.00																																																																																																																																																																									
2		3										4										5										6										7										8										9										10																																																																																																													
		Li										Be										B										C										N										O										F										Ne																																																																																																													
		Lithium										Beryllium										Boron										Carbon										Nitrogen										Oxygen										Fluorine										Neon																																																																																																													
		6.94										9.01										10.81										12.01										14.01										16.00										19.00										20.18																																																																																																													
3		11										12										13										14										15										16										17										18																																																																																																													
		Na										Mg										Al										Si										P										S										Cl										Ar																																																																																																													
		Sodium										Magnesium										Aluminum										Silicon										Phosphorus										Sulfur										Chlorine										Argon																																																																																																													
		22.99										24.31										26.98										28.09										30.97										32.07										35.45										39.95																																																																																																													
4		19										20										21										22										23										24										25										26										27										28										29										30										31										32										33										34										35										36									
		K										Ca										Sc										Ti										V										Cr										Mn										Fe										Co										Ni										Cu										Zn										Ga										Ge										As										Se										Br										Kr									
		Potassium										Calcium										Scandium										Titanium										Vanadium										Chromium										Manganese										Iron										Cobalt										Nickel										Copper										Zinc										Gallium										Germanium										Arsenic										Selenium										Bromine										Krypton									
		39.10										40.08										44.96										47.88										50.94										52.00										54.94										55.85										58.93										58.69										63.55										65.39										69.72										72.61										74.92										78.96										79.90										83.80									
5		37										38										39										40										41										42										43										44										45										46										47										48										49										50										51										52										53										54									
		Rb										Sr										Y										Zr										Nb										Mo										Tc										Ru										Rh										Pd										Ag										Cd										In										Sn										Sb										Te										I										Xe									
		Rubidium										Strontium										Yttrium										Zirconium										Niobium										Molybdenum										Technetium										Ruthenium										Rhodium										Palladium										Silver										Cadmium										Indium										Tin										Antimony										Tellurium										Iodine										Xenon									
		85.47										87.62										88.91										91.22										92.91										95.94										98.00										101.07										102.91										106.42										107.87										112.41										114.82										118.71										121.76										127.60										126.91										131.29									
6		55										56										57										72										73										74										75										76										77										78										79										80										81										82										83										84										85										86									
		Cs										Ba										La										Hf										Ta										W										Re										Os										Ir										Pt										Au										Hg										Tl										Pb										Bi										Po										At										Rn									
		Cesium										Barium										Lanthanum										Hafnium										Tantalum										Tungsten										Rhenium										Osmium										Iridium										Platinum										Gold										Mercury										Thallium										Lead										Bismuth										Polonium										Astatine										Radon									
		132.91										137.33										138.91										178.49										180.95										183.85										186.21										190.20										192.22										195.08										196.97										200.59										204.38										207.20										208.96										208.98										210.00										222.00									
7		87										88										89										104										105										106										107										108										109																																																																																																			
		Fr										Ra										Ac										Rf										Db										Sg										Bh										Hs										Mt																																																																																																			
		Francium										Radium										Actinium										Rutherfordium										Dubnium										Seaborgium										Bohrium										Hassium										Meitnerium																																																																																																			
		223.00										226.00										227.03										(261)										(262)										(263)										(264)										(265)										(268)																																																																																																			

Leroy combines magnesium (Mg) and fluorine (F).

Based on the periodic table, which statement describes the interaction of these two elements?

- A. Mg is a metal and F is a nonmetal that forms an ionic bond.
- B. Mg is a nonmetal and F is a metal that forms an ionic bond.
- C. Mg is a metal and F is a metal that forms a covalent bond.
- D. Mg is a metalloid and F is a nonmetal that forms a covalent bond.

24. The following chemical equation shows the incomplete formula for burning methanol. The question mark represents the unknown number of oxygen (O_2) molecules.



How many molecules of O_2 are needed to balance this chemical equation?

- F. 1
- G. 3
- H. 5
- J. 6

25. Nerve cells and red blood cells have very different shapes.

How do the shapes of these cells suit their functions?

- A. Nerve cells are long and branched for transmitting information, while red blood cells are small and round for traveling through capillaries to deliver oxygen.
- B. Nerve cells are short and branched for providing support for skeletal muscles, while red blood cells are round with long extending arms for sending materials to body cells.
- C. Nerve cells are large and round for carrying impulses to the brain, while red blood cells are small and round for carrying materials to body cells.
- D. Nerve cells are long and branched so that they can be easily replaced, while blood cells are small and round so that they can last a lifetime.

26. A light-colored insect lives on trees in a forest. The bark of the trees appeared white because of light-colored lichen that also lived on the tree. Disease destroyed the lichen. The tree bark is now dark-colored.

How will this environmental change affect the number of light-colored insects?

- F. The number of insects will decrease because, with the lichen gone, the insects will have no other source of food.
- G. The number of insects will decrease because predators will see the light-colored insects on the dark bark more easily.
- H. The number of insects will increase because, with the lichen gone, the insects will no longer have to compete with the lichen for space.
- J. The number of insects will increase because the insect predators that also eat the diseased lichen will become ill and decrease in number.

27. A customer on a grid system installed a wind turbine.

What is the effect of this wind turbine on the entire power grid?

- A. The addition of the turbine affects the customer but not the rest of the grid.
- B. The excess power would flow in the wrong direction in the grid, reducing the total available power.
- C. The unused electric power can be added to the grid, increasing the power available to other customers.
- D. The added power would overload the power grid and trip circuit breakers at the nearest power substation.

28. A bacterium, *Bacillus thuringiensis* (*Bt*), makes a toxin that destroys the larvae of insects that threaten corn crops. Scientists engineered corn plants, known as *Bt*-corn. *Bt*-corn can make a toxin to destroy the larvae that eat the corn.

Which of these supports the argument to stop production of genetically engineered *Bt*-corn?

- F. *Bt*-corn pollen may harm helpful insects that pollinate the corn, such as bees.
- G. *Bt*-corn kernels may attract unwanted animals that can damage the crop, such as crows.
- H. *Bt*-corn plants use much less pesticide than unmodified corn plants.
- J. *Bt*-corn seed is more expensive than unmodified corn seed.

29. Scientists at a research center are studying plants that have a natural resistance to insects.

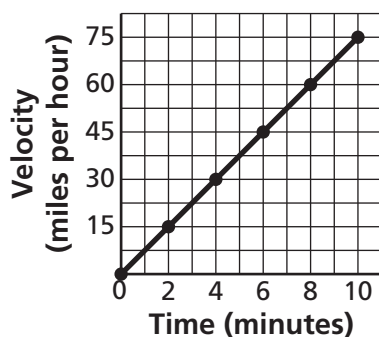
Which of these is a logical justification for continuing this research?

- A. Insect-resistant plants grow faster than plants that are not insect resistant, making larger-producing crops.
- B. Studying the genes of insect-resistant plants could help in the development of crops resistant to insects.
- C. Finding these genes could help lead to finding the genes that allow a plant to survive with little water.
- D. The research could lead to development of new kinds of food crops with different nutrients.

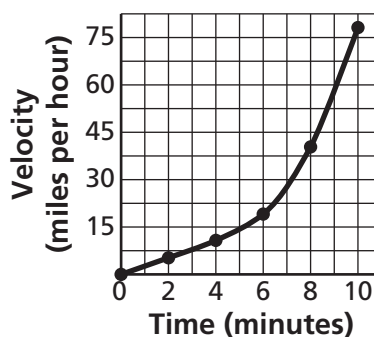
30. A technician wants to predict the velocity of a car that is accelerating at a constant rate.

Which graph will help the technician with his prediction?

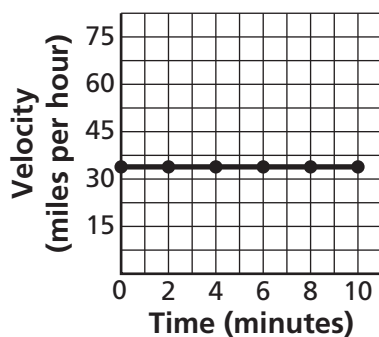
F. Acceleration
of a Car



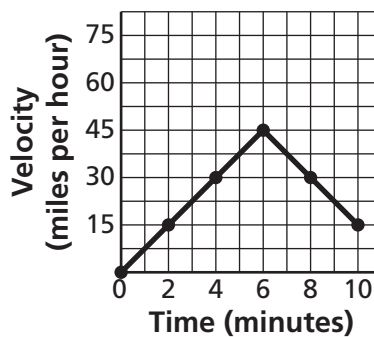
H. Acceleration
of a Car



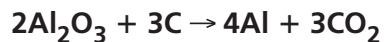
G. Acceleration
of a Car



J. Acceleration
of a Car



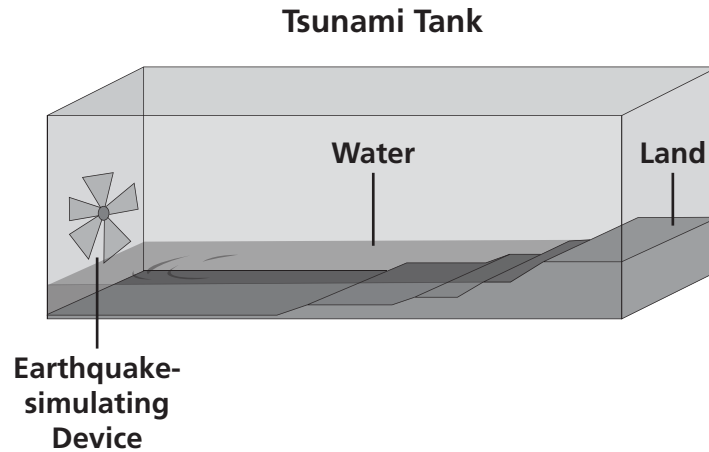
31. The following equation represents a balanced chemical reaction.



According to the law of conservation of mass, how many aluminum atoms will be produced if 1,000 molecules of aluminum oxide are used in the reaction?

- A. 500
- B. 1,000
- C. 2,000
- D. 4,000

32. A tsunami is a powerful ocean wave caused by an earthquake. A tsunami rises greatly in height as it nears land. Max used a tank of water to simulate the action of a tsunami. The following diagram shows his device.



Max concluded that a tsunami rises higher as it nears land because the water becomes shallower closer to land.

Which statement provides a logical defense for Max's conclusion?

- F. The simulated wave was made to be as powerful as possible.
 - G. The tank was shallow enough to simulate the ocean near the shore.
 - H. The tank had enough water in it to accurately simulate ocean waves.
 - J. The bottom of the tank sloped upward at one end just like the bottom of the ocean near the shore.
-
33. The following diagram shows an incomplete equation for cellular respiration.



What information will complete this equation?

- A. Food
- B. Wastes
- C. Energy
- D. Chlorophyll

34. Hailey studied a salt marsh ecosystem. She made the following list of some of the organisms that live in a salt marsh:

- Hawks: top predators
- Sparrows: insectivores
- Grasshoppers: herbivores
- Cordgrass: primary producer

Which food chain shows a probable path of energy in this ecosystem?

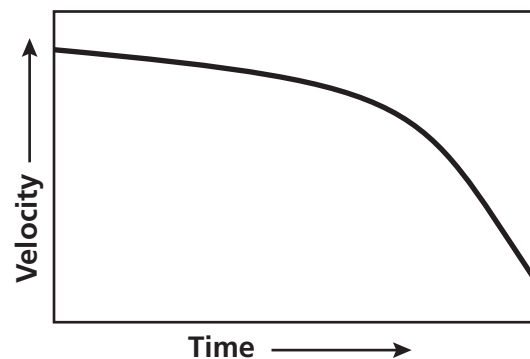
- F. Cordgrass → Grasshopper → Sparrow → Hawk
 G. Cordgrass → Hawk → Grasshopper → Sparrow
 H. Hawk → Cordgrass → Grasshopper → Sparrow
 J. Hawk → Sparrow → Grasshopper → Cordgrass

35. Jorge is studying the digestive system. He found research indicating that more bacteria live in the large intestine than there are cells in the human body.

Based upon this research, which of these can Jorge logically conclude?

- A. Bacteria are necessary for digestion to occur.
 B. Bacteria are produced by the human body.
 C. The large intestine is made of bacteria.
 D. The large intestine is diseased.

36. The following graph represents an object's velocity over a period of time.



Which of these describes the object's motion after the time shown on the graph?

- F. Its velocity will increase.
 G. Its acceleration will increase.
 H. It will slow down and eventually stop moving.
 J. It will continue to move at a constant rate in a straight line.

37. Christy is studying sodium in the following periodic table of elements.

**Sodium in the
Periodic Table of Elements**

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period 1	11 Na Sodium 22.99																	
Period 2																		
Period 3																		
Period 4																		
Period 5																		
Period 6																		
Period 7																		

She makes the following list of possible properties for sodium:

- Symbol is Na
- Is a transition metal
- Atomic number is 11
- Has one valence electron

Which of these should Christy remove from this list?

- A. Symbol is Na
- B. Is a transition metal
- C. Atomic number is 11
- D. Has one valence electron

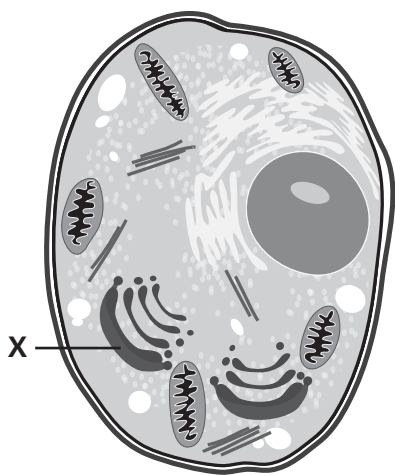
38. Ella is learning about different types of electromagnetic radiation. She makes the following list about one frequency of radiation:

- Can damage cells of living things
- Blocked by Earth's ozone layer

Which type of radiation does Ella's list describe?

- F. Infrared
- G. Microwave
- H. Ultraviolet
- J. Visible

39. The following diagram shows an animal cell.



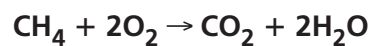
What is structure X?

- A. Nucleus
B. Chloroplast
C. Cell membrane
D. Golgi apparatus

40. Which situation is explained by Newton's first law of motion?

- F. A basketball bounces upward when it is dropped on the floor.
G. You can lift more mass with the same force using a longer lever.
H. Even though you stop pedaling your bicycle, you keep moving forward.
J. More fuel is required to accelerate a large truck than is required to accelerate a small car.

41. The following equation shows the chemical reaction that occurs during the combustion of methane.



What is the chemical formula of methane?

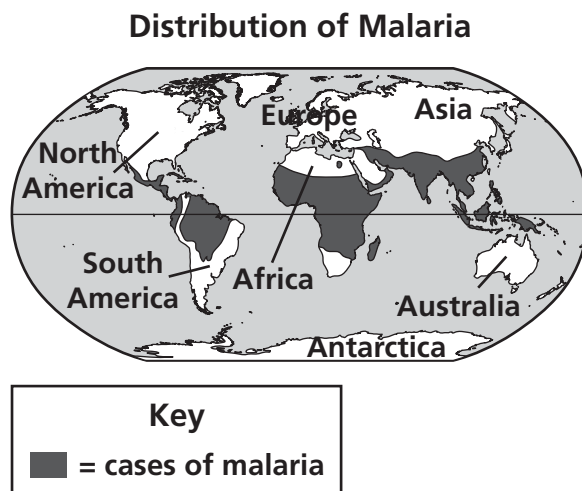
- A. CH_4
B. O_2
C. CO_2
D. H_2O

Directions: Use the information below to answer questions 42 through 44.

The Sickle Cell Mutation and Malaria

Sickle cell anemia is a hereditary disorder caused by a mutation in the shape of red blood cells. Red blood cells are normally disk-shaped. Sickle red blood cells are shaped like a crescent moon, or sickle. The sickle-shaped cells cannot travel easily through the blood vessels of the circulatory system. Therefore, people with sickle cell anemia have problems with oxygen circulation.

Malaria is a disease caused by a parasite. The parasite is transmitted to humans through mosquito bites. Malaria is common in the warm, wet, tropical and subtropical regions shown in the following map.



Doctors found that patients with sickle cell anemia seemed to be immune to malaria. Research found that the sickle cell mutation disabled the effects of the parasite. People with one sickle cell gene did not develop sickle cell anemia and often survived exposure to malaria. People with two sickle cell genes had very high rates of surviving malaria, but these people developed sickle cell anemia.

42. Scientists are working to genetically change sickle-shaped cells into normal-shaped cells.

Which of these is a logical argument in favor of this procedure?

- F. It would cure patients of malaria by changing the shape of their hemoglobin.
- G. It would cure patients of sickle cell anemia by changing the shape of their red blood cells.
- H. It would eliminate the mutation and decrease the chances that a patient's existing offspring would develop malaria.
- J. It would eliminate the mutation and decrease the chances that a patient's existing offspring would develop sickle cell anemia.

43. Which of these is a logical inference based on qualitative observations from the map?

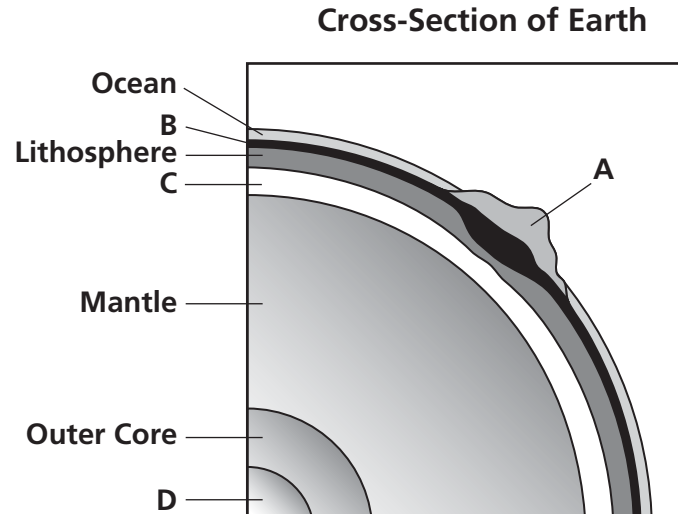
- A. The mosquitoes that carry malaria live near the equator.
- B. Immunity to malaria is less prevalent in locations closer to the equator.
- C. Immunity to malaria is more prevalent in locations farther away from the equator.
- D. The sickle cell mutation occurs in greatest numbers in people who live near the equator.

44. Some mutations eventually disappear from a population.

Why does the sickle cell gene continue to exist in people living near the equator?

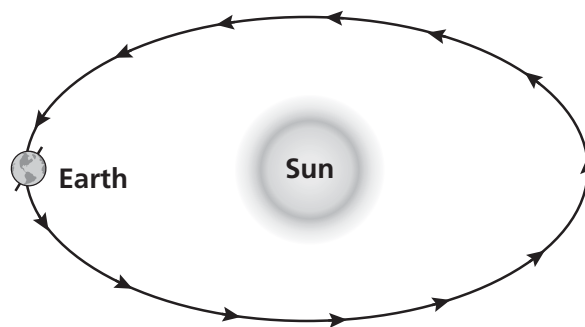
- F. People who carry the mutated gene are more likely to survive malaria and pass the mutation on to their offspring.
- G. People with the mutation tend to develop other beneficial mutations that are passed from generation to generation.
- H. People with sickle cell anemia are the only people to survive malaria and, therefore, are the only people to have offspring.
- J. People with the mutation have disk-shaped red blood cells, which are disease resistant and easily transmitted from generation to generation.

45. The following diagram shows a cross-section of Earth.



Which letter represents the location of the asthenosphere?

- A. A
 - B. B
 - C. C
 - D. D
-
46. The following diagram shows the relative positions of Earth and the sun during June's summer solstice.



On this day, how does the angle of Earth's axis affect the number of daylight hours?

- F. All places on Earth experience the maximum number of daylight hours.
- G. Only places near the poles experience the maximum number of daylight hours.
- H. Only places in the Northern Hemisphere experience the fewest number of daylight hours.
- J. All places in the Northern Hemisphere experience the maximum number of daylight hours.

47. The following diagrams show the axis of Earth at its present 23° angle and at a perpendicular axis of 0° .



Earth with Axis
at 23° Angle



Earth with Axis
at 0° Angle

How would seasons be affected if Earth's axis were at a 0° angle?

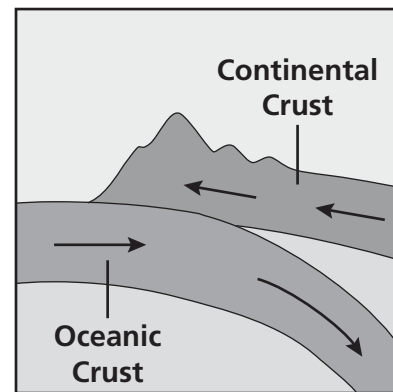
- A. Earth would have no seasons.
- B. Seasonal variation would decrease at the poles.
- C. Seasonal variation would increase at the equator.
- D. Earth would have two seasons instead of four seasons.

48. Scientists working in agricultural technology are researching naturally occurring chemicals that attract insects.

Which of these describes a commercially beneficial use for this research?

- F. To get insects to consume excess agricultural products
- G. To find ways to lure agricultural pests away from crops
- H. To trap certain kinds of insects so that they can be studied
- J. To ensure that birds in various areas have enough insects to eat

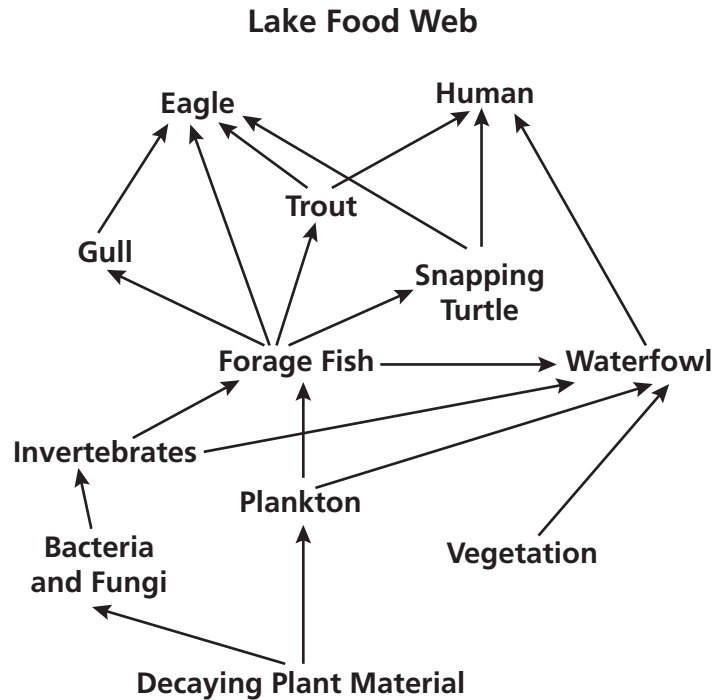
49. The following diagram shows the motion of two plates.



Which of these explains the feature that can form at the boundary of these two plates?

- A. A broad canyon-like valley because the two colliding plates act like a plow, digging out any soil in the plates' paths
- B. Volcanic mountain range because one oceanic plate melts underneath the continental plate, forming composite volcanoes on the continent
- C. Island arc because one oceanic plate melts underneath the continental plate, forming volcanic mountains that eventually become islands
- D. Folded mountain range because the two colliding plates have equal composition and density, causing both to fold and form wide, thick mountains

50. The following diagram shows a food web for a large lake.

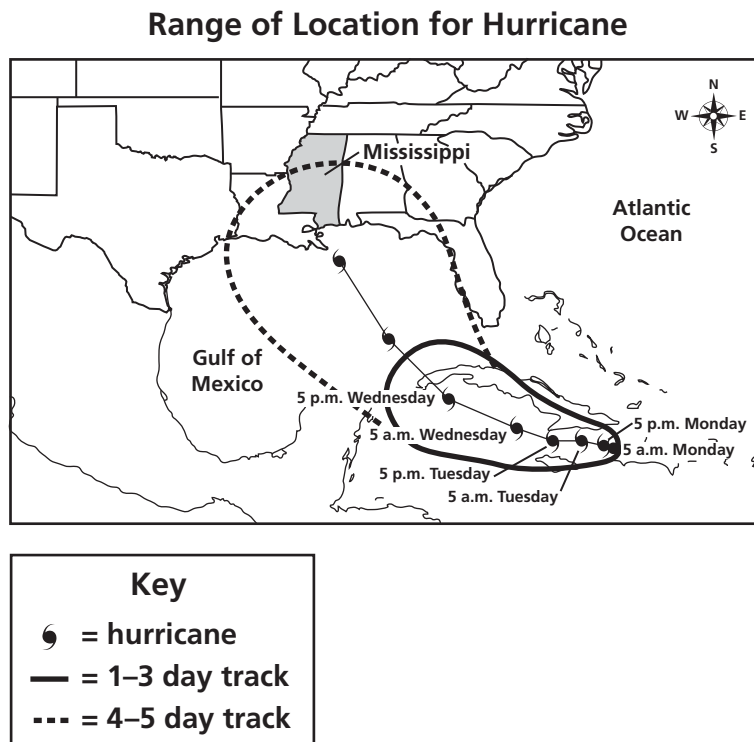


The number of trout in the lake decreased due to overfishing by humans.

Which statement describes the impact of this change on the other organisms in the food web?

- F. The number of forage fish will decrease since they will have fewer trout upon which to prey.
- G. The number of plankton will increase since fewer organisms will be getting energy from them.
- H. The eagles will lose a source of energy and need to get energy from gulls, forage fish, and snapping turtles.
- J. The snapping turtles will lose a source of energy and will need to get energy from gulls, eagles, and waterfowl.

51. The following map shows the predicted range of location of a hurricane over a 3-day period and a 5-day period.



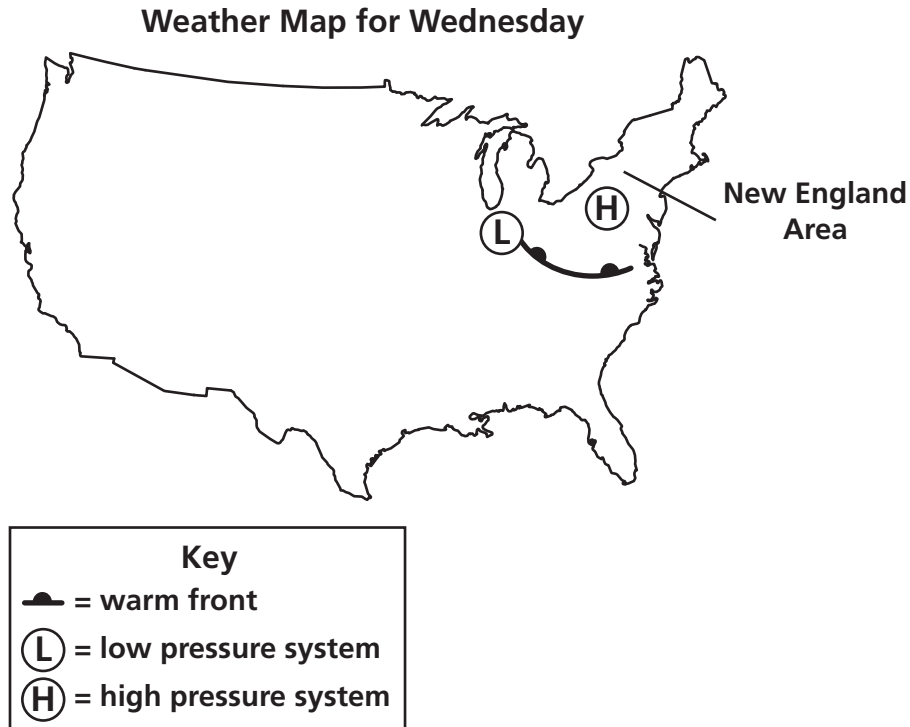
What is likely to happen with the hurricane during the 4–5 day track?

- A. Hurricane force winds will hit Mississippi sometime Friday morning.
 - B. Hurricane force winds will hit Mississippi sometime Wednesday evening.
 - C. The hurricane will make landfall on Wednesday evening, losing energy as it moves north across Mississippi.
 - D. The hurricane will become wider as it moves across Mississippi, so that by Friday it will cover the entire state.
-
52. A certain virus causes people to catch colds and other infections more easily.

Which body system does the virus affect?

- F. Circulatory
- G. Digestive
- H. Immune
- J. Nervous

53. The following map shows the location of a warm front on Wednesday during the summer.



The air around the warm front is moist and is moving toward the New England area.

What type of weather should the New England area expect on Thursday and Friday?

- A. Several days of light rain followed by warm, humid weather
- B. Several days of strong thunderstorms followed by hot, dry weather
- C. Fast-moving, strong thunderstorms followed by warm, humid weather
- D. No precipitation but a sudden change from cool weather to warm weather

54. Which of these is one of Newton's laws of motion?

- F. An object's momentum is the product of its mass and velocity.
- G. A moving object will continue moving until a force acts upon it.
- H. The force of gravity is proportional to the inverse square of the distance.
- J. The rate at which an object falls depends on the height from which it is dropped.

55. Dr. Jordan wanted to know if the concentration of a solution affects that solution's reaction rate. He set up the following investigation:

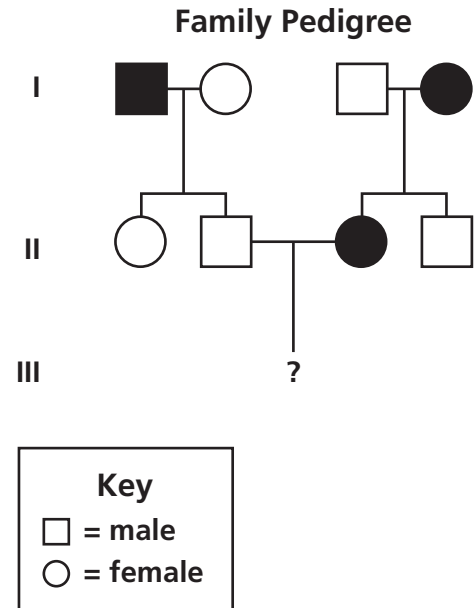
- 1) Set up ten beakers of the same size and shape
- 2) Poured different concentrations of the same solution into each beaker
- 3) Measured the reaction rates of the solutions

Based upon the data, Dr. Jordan concluded that increasing the concentration of the solution shortens reaction time. Dr. Jordan presented his findings to his coworkers. A coworker indicated that the reaction time might be affected by temperature, not concentration of the solution.

How should Dr. Jordan respond to this scientist's alternative conclusion?

- A. Dr. Jordan should revise his conclusion based on the coworker's suggestion.
- B. Dr. Jordan should carry out the tests again in the exact same way he did before.
- C. Dr. Jordan should reanalyze the results to take into consideration his coworker's suggestion.
- D. Dr. Jordan should dismiss the suggestion because the coworker did not help with the investigation.

56. The following pedigree shows the inheritance of a trait in two generations of a family.



Which statement describes Generation III in this family?

- F. All the children will display the trait because it is dominant, and one parent in the second generation displays the trait.
- G. None of the children will display the trait because it is recessive, and one parent in the second generation displays the trait.
- H. The pedigree does not indicate whether the trait is dominant or recessive; therefore, an accurate prediction cannot be made.
- J. The children have a fifty percent chance of displaying the trait because it is dominant, and one parent in the second generation displays the trait.

57. A sewer system operator would like to use electromagnetic radiation to destroy bacteria and other organisms in filtered wastewater before it is released into the environment.

Which type of electromagnetic radiation is capable of treating the wastewater?

- A. Ultraviolet
- B. Infrared
- C. Visible
- D. Radio

58. Early in the afternoon, a weather station outside the school shows that the barometric pressure and temperature are both dropping rapidly.

What type of weather do these readings indicate?

- F. Several days of clear, sunny weather
- G. Cool, cloudy weather with little chance of rain
- H. Thunderstorms later in the afternoon or evening
- J. Clearing weather today with rain likely tomorrow

59. About 30 miles into Earth, the speed of seismic waves increases.

What does this change in speed indicate about the material through which the seismic waves are traveling?

- A. The waves travel from rock into metal material.
- B. The waves travel from cool material into hot material.
- C. The waves travel from solid material into liquid material.
- D. The waves travel from a less dense material into a more dense material.

60. Which of these is a renewable energy resource that does not produce carbon dioxide?

- F. Coal
- G. Wind
- H. Biomass
- J. Fossil fuel

BE SURE YOU HAVE MARKED ALL YOUR ANSWERS
ON THE ANSWER DOCUMENT.

