

8th Grade Science Baseline

January 28th, 2021

Directions for students:

1. Go to this link for your answer form:
<https://forms.gle/FzPkAuLiSwYEsrMdA>
2. From this document use:
 - Test questions
 - Reference sheet
 - Periodic Table
3. At home students: use your own calculator. In-person students: use school calculator
4. SKIP short/long response questions. Answer multiple choice questions only.
5. You must work until 10:00am. At 10am, if you are done, you may submit and read a book. **You are not allowed to leave the test session early.**
6. If you need more time, let your teacher know at 10:30am.

Science Reference Sheet

Equations

Acceleration (a)	=	$\frac{\text{change in velocity (m/s)}}{\text{time taken for this change (s)}}$	a	=	$\frac{v_f - v_i}{t_f - t_i}$
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Average speed (v)	=	$\frac{\text{distance}}{\text{time}}$	v	=	$\frac{d}{t}$
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Density (D)	=	$\frac{\text{mass (g)}}{\text{Volume (cm}^3\text{)}}$	D	=	$\frac{m}{V}$
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Percent Efficiency (e)	=	$\frac{\text{Work out (J)}}{\text{Work in (J)}} \times 100$	%e	=	$\frac{W_{\text{out}}}{W_{\text{in}}} \times 100$
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Force (F)	=	mass (kg) \times acceleration (m/s ²)	F	=	ma
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Frequency (f)	=	$\frac{\text{number of events (waves)}}{\text{time (s)}}$	f	=	$\frac{n \text{ of events}}{t}$
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Momentum (p)	=	mass (kg) \times velocity (m/s)	p	=	mv
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Wavelength (λ)	=	$\frac{\text{velocity (m/s)}}{\text{frequency (Hz)}}$	λ	=	$\frac{v}{f}$
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Work (W)	=	Force (N) \times distance (m)	W	=	Fd
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Units of Measure

m = meter	g = gram	s = second
cm = centimeter	kg = kilogram	Hz = hertz (waves per second)
J = joule (newton-meter)		
N = newton (kilogram-meter per second squared)		





Cut or tear carefully along this line.

Group

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- 1 While building a highway in the southeastern United States, a construction crew cut through a large hill. As they dug down through layers of rock, they found fossils of organisms that once lived in the area.

Fossils Found in Rock Layers

Epoch	Age of Rock Layer	Type of Fossil
Middle Miocene	15 million years	 oak tree
Early Miocene	23 million years	 horse
Late Eocene	34 million years	 clam
Middle Eocene	40 million years	 whale

According to the table, how did this region of the United States change over time?

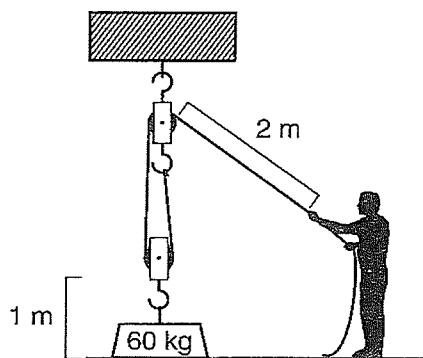
- A. from a desert to a forest
- B. from a forest to a grassland
- C. from a shallow freshwater lake to a grassland
- D. from a saltwater sea to a forest

- 2 Some stars are more than 300 times larger than the Sun. Why does the Sun appear much larger than any of the stars visible in the night sky?
- F. The Sun is closer to the Earth than is any other star.
 - G. The Sun gives off more light than does any other star.
 - H. The dark of night makes all stars appear smaller than they really are.
 - I. The gases burning in the Sun are different than the gases in other stars.

- 3 A column on the periodic table contains two elements that are solids, one element that is a liquid, and two elements that are gases at room temperature and pressure. Which column is this?
- A. 1A
 - B. 3B
 - C. 7A
 - D. 8A

- 4 Government wildlife officials believe the number of killer whales off the coast is declining. They ask an oceanographer to investigate. What would be the **most** helpful information for the oceanographer to seek first?
- F. the amount of food available to the killer whales
 - G. the average size of today's killer whales as compared to the average size of killer whales 50 years ago
 - H. the presence of disease among the killer whales
 - I. the number of killer whales today compared to the number of killer whales 50 years ago

- 5 Arnold is using a pulley to lift a 60 kilogram (kg) block. If he pulls the rope a distance of 2 meters (m), the block will rise a height of 1 m off the ground. He exerts 120 J of work on the pulley system. As a result, the amount of work done by the pulley system is 30 J.



What is the percent efficiency of the pulley system?

- A. 15%
- B. 20%
- C. 25%
- D. 33%

- 6 On Earth, a day lasts about 24 hours. On Saturn, a day lasts about 10 hours. Why is a day on Saturn so much shorter than a day on Earth?
- F. The Earth rotates on its axis more slowly than Saturn does.
 - G. Saturn is much farther from the Sun than Earth is.
 - H. Saturn is much more massive than Earth.
 - I. Earth revolves around the Sun more slowly than does Saturn.
-
- 7 A company makes a chemical that destroys the chloroplasts of plants. What will **most likely** happen to a plant exposed to this chemical?
- A. The plant will die because it will not be able to conduct photosynthesis.
 - B. The plant will die because it will not be able to metabolize food.
 - C. The plant will survive because it does not need chloroplasts.
 - D. The plant will survive because it can use mitochondria for metabolism.

8 Florida's coastal beaches can lose large amounts of sand due to erosion. Which situation would lead to the **most** erosion of Florida's beaches?

- F. removing vegetation from the beaches
- G. placing large boulders along the beaches
- H. preventing people from building on the beaches
- I. planting more vegetation along the beaches

9



Go to your Answer Book to answer Number 9.

10

The Royal Society, founded in London in 1662, is the world's oldest scientific institution. It supports the study of all fields of science. The motto of the Royal Society is *nullius in verbia*. This literally translates to "on the word of no one." It is more loosely translated as "don't take anyone else's word for it."

What does the Royal Society's motto say about the scientific enterprise generally?

- A. A theory that has been around for centuries will never be disproved.
- B. Claims must be tested before they are accepted.
- C. Observations are generally unimportant in making scientific knowledge.
- D. Science derives its authority mostly from belief.

11 Astronomers use spectroscopes to study the radiant light from stars in the Milky Way galaxy. Spectroscopic analysis reveals the elements that those stars contain. What do such studies help astronomers to understand better in our own solar system?

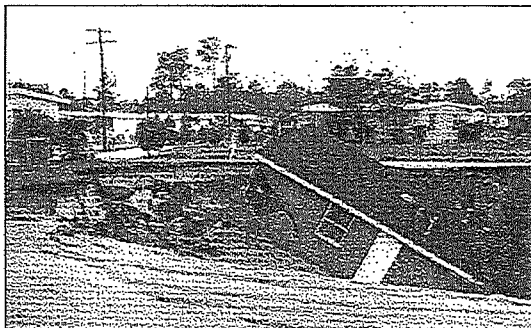
- F. the Sun
- G. asteroids
- H. comets
- I. moons

12 Emily tickled the foot of her son, Owen. The nerves in Owen's foot made an electrical impulse that traveled to Owen's brain. His brain sent back an electrical impulse that caused the leg muscles to pull on his leg bones and pull back his foot.

At which structural level in Owen's body did these events take place?

- A. cell
- B. organ
- C. tissue
- D. organ system

- 13 Parts of Florida are prone to sinkholes suddenly opening up. The one in the photo below opened up in Polk County, Florida, on May 22, 1967, and destroyed an entire house.



Which of the following processes **most likely** formed this sinkhole?

- F. plate subduction followed by trench formation
- G. earthquake activity followed by normal faulting
- H. permafrost thaw followed by soil subsidence
- I. chemical weathering followed by cavern collapse

14

READ
INQUIRE
EXPLAIN

Go to your Answer Book to answer Number 14.

- 15 Dr. Chekhov is investigating phase changes in oxygen (O_2). He cools 300 g of gaseous O_2 until it becomes a liquid. He then cools the liquid O_2 even more until it becomes a solid.

Which of the following is happening as Dr. Chekhov lowers the temperature of the O_2 ?

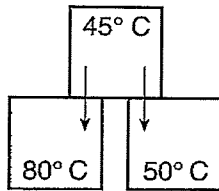
- A. The energy of motion of the O_2 molecules is decreasing.
- B. The number of O_2 molecules is decreasing.
- C. The total mass of the O_2 molecules is decreasing.
- D. The volume occupied by the O_2 molecules is increasing.

- 16 Maya walked her dog to a park 1 km from her home. Maya and her dog left home at the same time and arrived at the park at the same time. Maya walked in a straight line, but her dog took several side trips to chase rabbits.

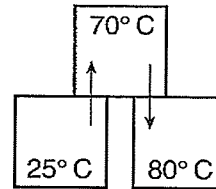
Which of the following statements about the average speed of Maya and her dog is correct?

- F. Maya's average speed was greater than her dog's.
- G. Maya's dog had a greater average speed than Maya did.
- H. Maya and her dog had the same average speed.
- I. It is impossible to compare their average speed without knowing the total time elapsed.

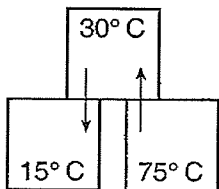
- 17 Dr. Cavendish studies how heat moves through metal. Which of the following correctly shows how heat would move through a set of three metal blocks that start at different temperatures?



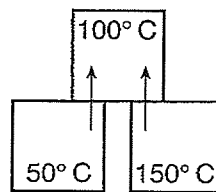
A.



C.



B.



D.

- 18 A woman has a rare disease. The woman's doctor asked her to participate in a study where she would be given a trial drug to treat the disease. What is one risk the woman and her family should consider before she agrees to participate in the study?

- F. The trial drug could cure her disease.
- G. The information gained from the study could help other people with the disease.
- H. The trial drug's side effects could be more harmful than the disease.
- I. The woman's medical records would be kept confidential.

19 A population of lizards lives in a geographic area. In a short time, their habitat becomes much hotter and drier. Which of the following explains how the lizard population might continue to survive in this area?

- A. Some members of the lizard population will choose to store extra water in the fat in their tails.
- B. Those lizards that can survive on the least water will survive and pass on that trait to their offspring.
- C. A few lizards will decide to change their sleeping and hunting habits and become nocturnal.
- D. The entire lizard population will migrate to a cooler and wetter habitat.

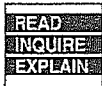
20 Astronomers have used telescopes of various sorts to study galaxies for more than 80 years. Which of the following gives the **best** account of the chemical composition of galaxies?

- F. Each galaxy has its own, unique set of chemicals.
- G. All galaxies seem to be made from the same chemicals.
- H. Other galaxies are made up of nonchemical substances such as gas.
- I. Astronomers haven't been able to discover what galaxies are made of.

21 A structural adaptation is a feature of an organism's body that helps it survive in its environment. A behavioral adaptation is something an organism does that helps it survive in its environment. Which of these is a behavioral adaptation?

- A. a whale's flippers
- B. a badger's sharp claws
- C. a bird's migration
- D. an owl's night vision

22



Go to your Answer Book to answer Number 22.

- 23 In the late 1600s, Sir Isaac Newton published a work which described his well-known laws of motion. However, in the 1840s it was pointed out that the motion of the planet Mercury was actually different than Newton's tables had predicted. It wasn't until a century later that Einstein's theory of relativity could explain this occurrence.

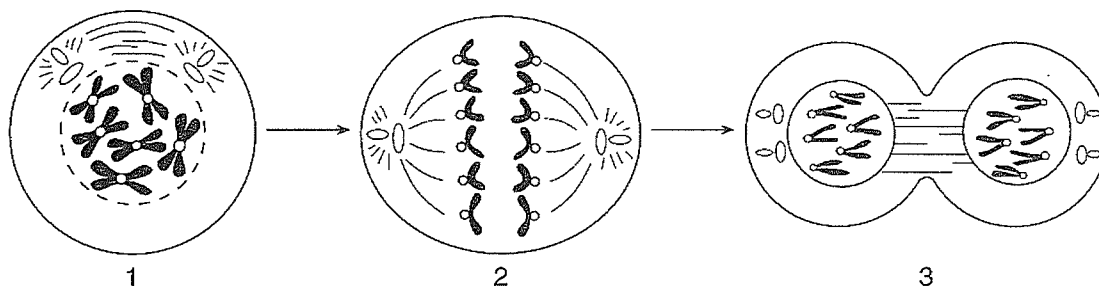
Which of the following statements is supported by this information?

- F. Scientific ideas are seldom accurate.
- G. Scientific progress requires a lot of hard work.
- H. Theories in science are modified by new evidence.
- I. The laws of motion do not apply in space.

- 24 Many years ago, scientists classified all living things as either plants or animals. Today, most scientists recognize at least six kingdoms of life: animal, archaebacteria, bacteria, fungus, plant, and protist. What caused this change in the number of kingdoms of life that scientists recognize?

- A. Bacteria, fungus, and protist forms of life appeared on the Earth after the classification system was first developed.
- B. Some primitive plants and animals interbred and produced new life-forms with wholly new characteristics.
- C. Scientists were able to travel to far-off locations and discover life-forms previously unknown to them.
- D. Scientists learned through observation that some life-forms were neither plant nor animal.

- 25 The diagram shows three steps in a type of cell division. Which of the following describes the function of this type of cell division in multicellular organisms?

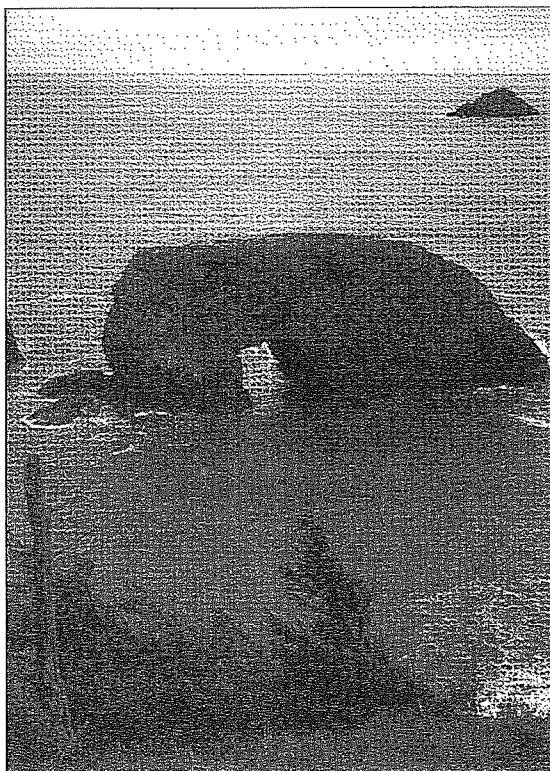


- E. the growth and repair of tissues
- G. the production and distribution of sex cells
- H. the promotion of inheritable genetic variations
- I. the removal of random genetic mutations

- 26 Maria and Carlos drove from Panama City to Tallahassee to visit their grandmother. Which statement describes what happened to the chemical energy that was in the gasoline they used for the trip?

- A. All of it was used to overcome the friction between the car and the road.
- B. It was all converted to the kinetic energy of the moving car.
- C. A huge portion of it was wasted as heat that served no useful purpose.
- D. Most of it was converted to a different form of chemical energy.

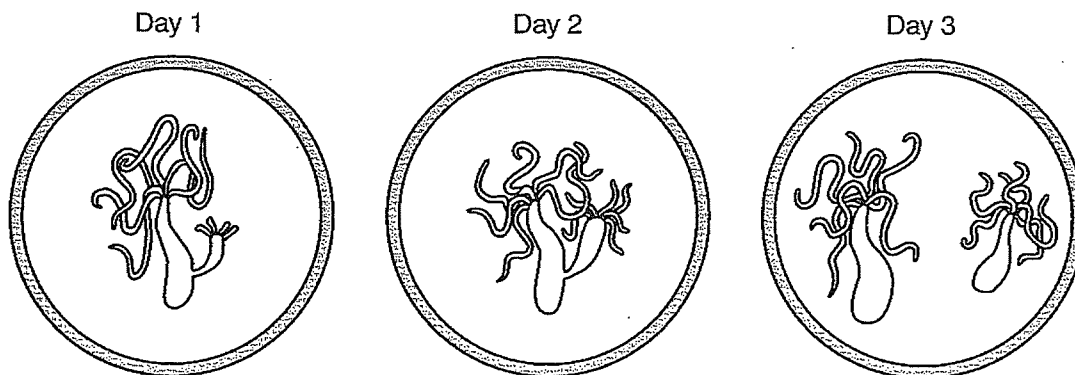
- 27 Sea arches develop along rocky coastlines. Weathered material from sea arches is transported and deposited to form beaches.



Which process is **most** responsible for the formation of a sea arch?

- F. mechanical weathering from dry sand blown by winds
- G. mechanical weathering from wave action
- H. chemical weathering from acidic ocean currents
- I. chemical weathering from lichens and mosses

- 28 Over three days, Raquel used a microscope to watch a hydra reproduce. The hydra is a multicellular organism that can reproduce through a process called budding. Budding requires a single parent.



What advantage is provided by the type of reproduction shown by the hydra?

- A. It ensures that the species will always survive, even when the environment changes swiftly.
- B. It gives individuals a chance to mate with other individuals with the greatest survival advantages.
- C. It produces small genetic variations in individuals that may benefit the species as a whole.
- D. It provides for genetic continuity that prevents harmful traits from spreading to the rest of the species.

29

James has a fish tank. In the last month, he has put in two new species of fish, installed a new filtration system, and tried out a new type of fish food. Before making these changes, the water in the fish tank had a pH of 7. Now it has a pH of 8. James performs an investigation to determine what variables are affecting the pH of his fish tank.

In the first trial, he removes all of the new fish in the tank. He leaves the filtration system in place and continues to use the new fish food. After one week, he tests the pH of the water, and it is still at 8. How many variables is James manipulating in this first trial?

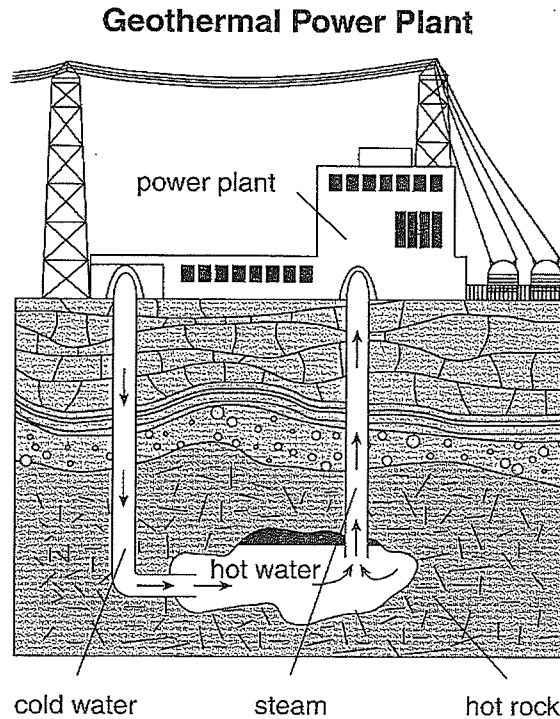
30

Carlos made a table showing some characteristics of three planets in our solar system. Based on the table, which relationship is **true**?

Planet	Average Distance from Sun (millions of km)	Time for One Rotation on Axis	Time for One Revolution Around Sun	Average Density (g/cm ³)
Venus	108	243 days	224.7 days	5.2
Saturn	1,427	10.66 hours	29.46 years	0.69
Neptune	4,498	16.11 hours	164.79 years	1.64

- F. The closer a planet is to the Sun, the swifter is its revolution around the Sun.
- G. The longer it takes for a planet to rotate, the less time it takes the planet to revolve around the Sun.
- H. The farther a planet is from the Sun, the greater is its average density.
- I. The greater the density of the planet, the faster is its rotational speed.

- 31 A geothermal plant produces electricity by pumping water into a layer of hot rock. The rock heats the water and turns it into steam. The steam then rises back into the plant, moves a turbine, and produces electricity.



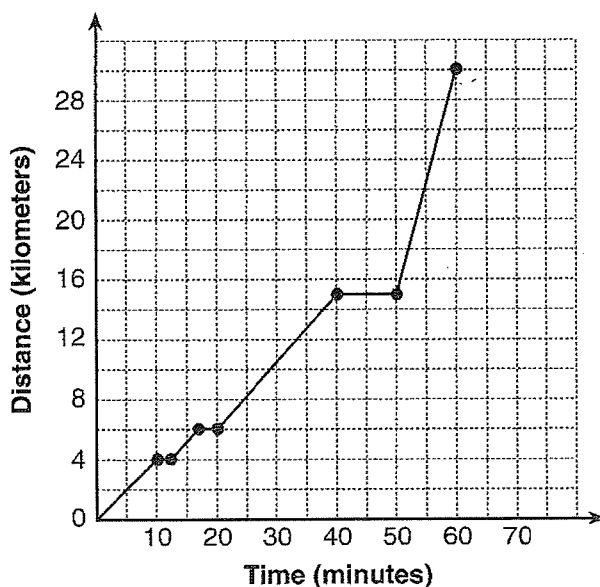
What is **most likely** the greatest barrier to communities throughout the United States building this technology?

- A. Geothermal plants produce much more pollution than coal, oil, or nuclear plants.
- B. The layer of rock that heats the water can change temperature rapidly.
- C. Not all communities live above a layer of hot rock that is near the Earth's surface.
- D. Most citizens object to their water sources being used to generate electricity.

32 What are the two elements that astronomers have learned make up most of the mass of most stars?

- F. hydrogen and oxygen
- G. hydrogen and helium
- H. oxygen and carbon
- I. helium and oxygen


33 The morning harbor-to-downtown train travels in a straight line and stops at the mall and the park along the way. When it gets downtown, it stays in the station for a while before heading back to the harbor as a nonstop express train.



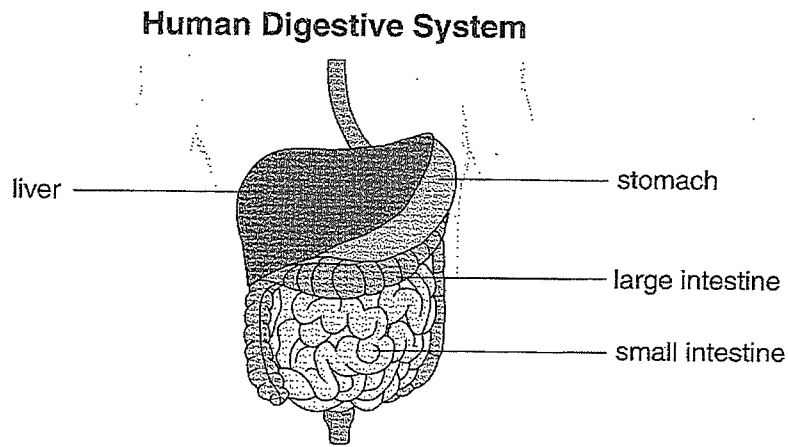
What was the average speed of the train during the nonstop express run, the last leg of the trip, in kilometers per hour, km/hr?

- 34 Engineers are trying to design cars that use less gasoline. Which of these is a social constraint on designing this new technology?
- A. New materials will need to be designed for the engine.
 - B. It is difficult to make the engine and transmission work together.
 - C. Making the materials for the engine will produce dangerous pollutants.
 - D. The body of the car must be redesigned to fit the new engine.
- 35 In the early twentieth century, people brought nutria to the southern United States to raise for fur. Some of them escaped into the wild. Now, nutria are destroying the plants that grow in marshlands. What happens when the plants are destroyed?
- F. The marshlands become too hot to support life.
 - G. The soil in the marshlands is washed away.
 - H. The soil in the marshlands becomes hard and compacted.
 - I. New, harmful plants begin to grow in the marshland.

- 36 In July, the Earth is about 5 million km farther from the Sun than in December. If the Earth is farther from the Sun in July than in December, why is the United States warmer in July than in December?
- A. The Northern Hemisphere leans toward the Sun during the summer.
 - B. The Sun produces more energy in the summer months than in the winter months.
 - C. The Gulf of Mexico releases far more heat energy during the summer months than in the winter months.
 - D. Green plants absorb more of the Sun's heat in the summer than in the winter.

- 37  Go to your Answer Book to answer Number 37.

- 38 The digestive system in the human body has several components. Some of them are identified in the diagram below.



What is the relationship between the stomach and the small intestine?

- F. They work together to circulate food nutrients to body cells.
- G. They work independently with specialized functions.
- H. They work together to break large molecules into smaller parts.
- I. They store chemical energy that can be released for later use.

- 39 A plant scientist is testing whether a new plant food will make tomato plants grow faster. He puts the tomato plants receiving the new food in Greenhouse A, and he puts the tomato plants not receiving the new food in Greenhouse B.

What mistake is the plant scientist making?

- A. The experiment has no hypothesis.
- B. The experiment has too many independent variables.
- C. The experiment has no control group.
- D. The experiment has too many dependent variables.

- 40 London, England, and Moscow, Russia, are about the same distance from the equator. What causes London's climate to be so much warmer?
- F. Warm air from the European continent travels to the west.
 - G. London does not receive the cold air from the North Pole that Moscow does.
 - H. Warm water from the Gulf Stream warms London's climate.
 - I. Dust particles in the atmosphere near Moscow block the Sun's rays.

- 41 This is a diagram of a genetic cross. Which of the following can be concluded about the genes for each parent?

		Mother's Genes	
		?	r
Father's Genes	R		Rr
	?	rr	

- A. One parent is heterozygous and one parent is homozygous dominant.
- B. One parent is heterozygous and one parent is homozygous recessive.
- C. Both parents are homozygous dominant.
- D. Both parents are homozygous recessive.

42 An ecologist studied a lake in which the algae population experienced sudden and rapid growth. Which of the following could have caused this change to the lake's algae population?

- F. lowered pH levels caused by acid rain
- G. reduced levels of dissolved oxygen through eutrophication
- H. raised carbon dioxide levels from the decay of organic matter
- I. increased concentrations of nitrate compounds in runoff from lawns

43 The Earth is 1 AU (astronomical unit) from the Sun, and it takes sunlight about 8 minutes to reach the Earth. If a planet was 5.5 AU distant from the Sun, about how long would it take sunlight to reach that planet?



- 44 A company that makes goldfish food claims that it will make goldfish grow faster. A pet store owner puts this claim to the test. She puts 10 goldfish in a 20-gallon tank and feeds them the new food. In a second 20-gallon tank, she feeds 10 goldfish the food that she normally uses. She observes the growth of both sets of goldfish for two months. In this experiment, what is the purpose of the second 20-gallon tank?
- A. It lets the pet store owner compare the growth of goldfish eating the new food with the growth of those that don't.
 - B. It provides a group of goldfish that the pet store owner can continue to sell during her experiment.
 - C. It offers the pet store owner the chance to test another new type of goldfish food in case one comes along.
 - D. It gives the pet store owner a backup supply of goldfish in case the fish in the first tank become sick.

- 45 Which of the following elements in the chart has a positive charge?

	Lithium (Li)	Calcium (Ca)	Carbon (C)	Fluorine (F)
Protons	3	20	6	9
Neutrons	3	21	7	9
Electrons	2	20	6	10

- F. calcium (Ca)
- G. carbon (C)
- H. fluorine (F)
- I. lithium (Li)

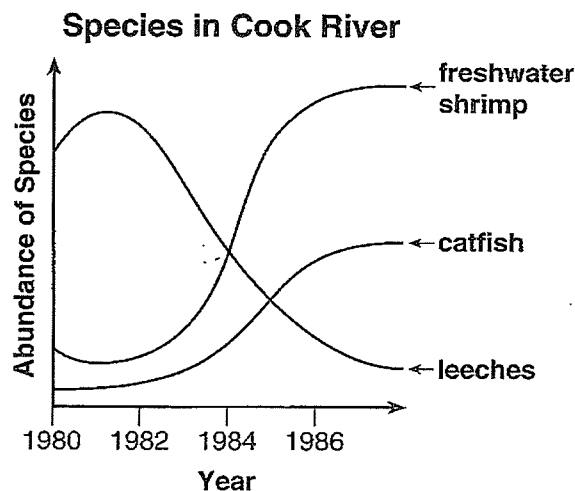
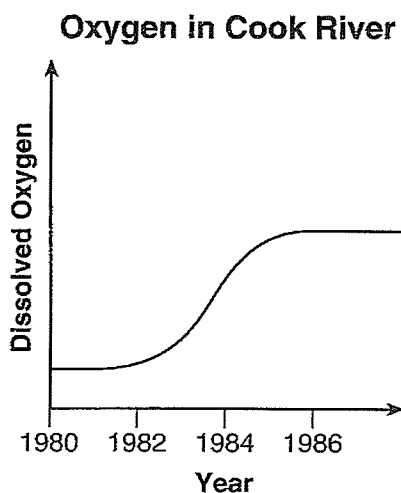
46

READ
INQUIRE
EXPLAIN

Go to your Answer Book to answer Number 46.

47

In a river ecosystem, there is a relationship between the amount of dissolved oxygen in the water and the community of organisms. The graphs depict changes in one section of Cook River over time. A large farm that grows fields of corn is upstream of this section of the Cook River. The farm uses water from the river to irrigate its fields. Some of the water runs off from the fields and returns to the river.



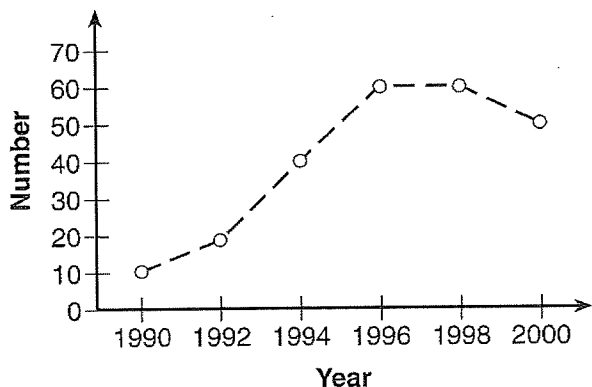
What relationship can be inferred from the graphs?

- A. Leeches require more dissolved oxygen in the water than do catfish.
- B. Freshwater shrimp are more tolerant than leeches of low-oxygen conditions.
- C. Altering a river's oxygen content will change the abundance of some species.
- D. If catfish are introduced to a river, then the oxygen content will increase.

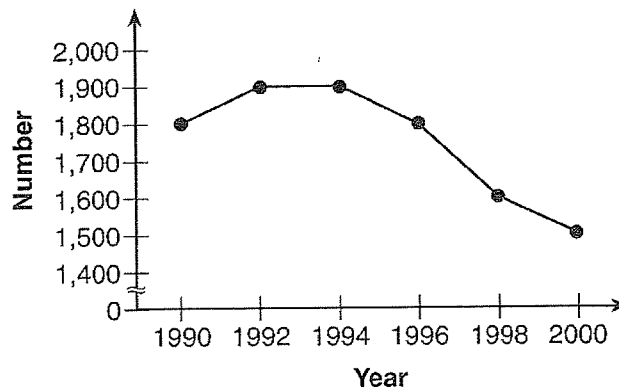
- 48 In 1990, federal authorities decided to reintroduce gray wolves into a national park. Ecologists recorded population data for deer and wolves for the next 11 years.



Wolf Population



Deer Population



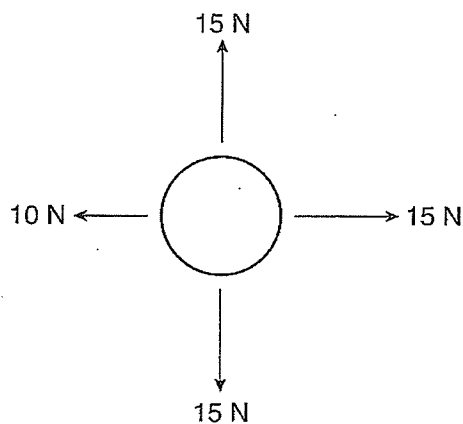
By how much did the deer population decline during the time that the wolf population increased from 40 to 60?

49



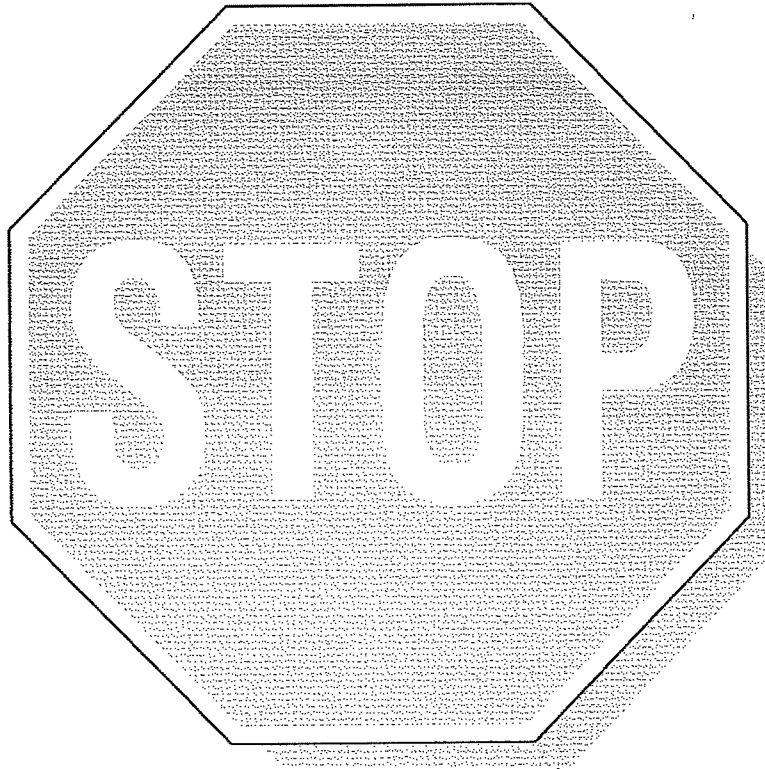
Go to your Answer Book to answer Number 49.

- 50 The following force diagram shows four forces acting on a single object.



If the object has a mass of 10 kg, what is the magnitude of the object's acceleration, in meters per second per second, m/s^2 ?

- F. 50
- G. 15
- H. 2
- I. 0.5



This is the end of the Florida Science Practice Test.
Until time is called, go back and check your work or answer questions you did not complete. When you have finished, close your Test Book.