

THE UNIVERSITY OF THE STATE OF NEW YORK

GRADE 8

INTERMEDIATE-LEVEL SCIENCE TEST

WRITTEN TEST

JUNE 4, 2018

Student Name _____

School Name _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

The questions on this test measure your knowledge and understanding of science. The test has two parts. Both parts are contained in this test booklet.

Part I consists of 45 multiple-choice questions. Record your answers to these questions on the separate answer sheet. Use only a No. 2 pencil on your answer sheet.

Part II consists of 40 open-ended questions. Write your answers to these questions in the spaces provided in this test booklet.

You may use a calculator to answer the questions on the test if needed.

You will have two hours to answer the questions on this test.

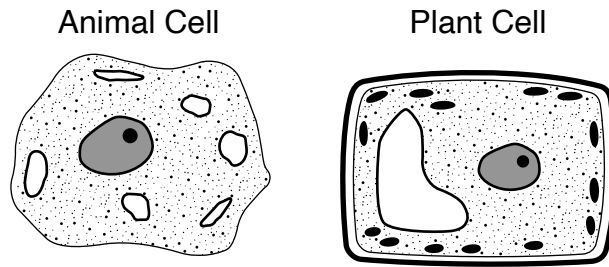
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THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
ALBANY, NEW YORK 12234

Part I

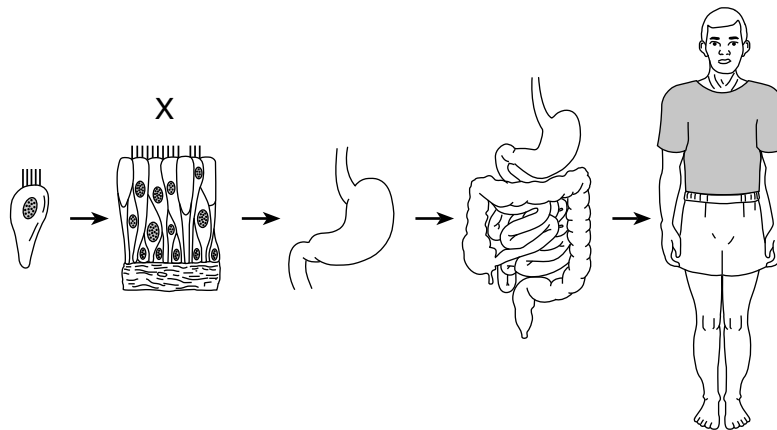
1 The diagrams below represent two types of cells, an animal cell and a plant cell.



Which type of cell uses energy to carry out life processes?

- (1) plant cell, only
- (2) animal cell, only
- (3) both a plant cell and an animal cell
- (4) neither a plant cell nor an animal cell

2 A diagram representing the levels of organization within an organism is shown below.

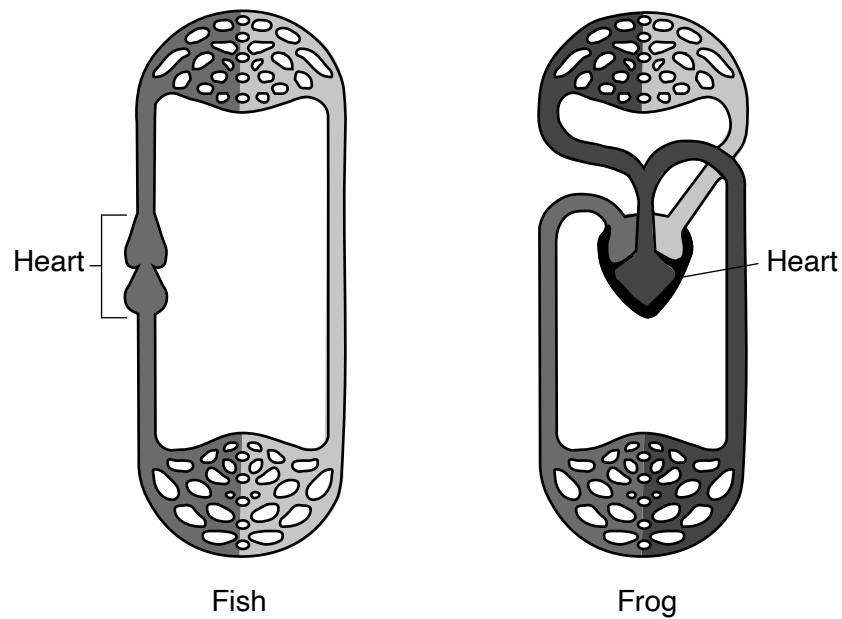


(Not drawn to scale)

Which level of organization is identified by X?

- (1) cell
- (2) tissue
- (3) organ
- (4) organ system

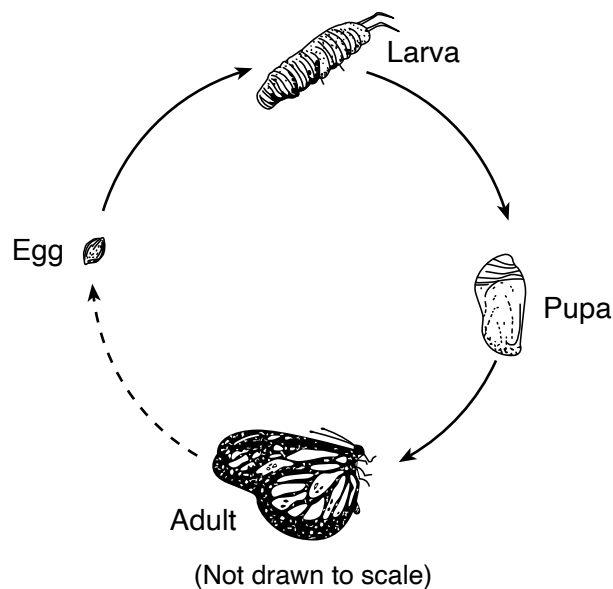
3 The diagrams below show models of the circulatory systems of a fish and frog.



A student compared these diagrams. The student found that each of these organisms had a heart to pump blood. Which statement is supported by the student's findings?

- (1) Some organisms are composed of one cell, while others are multicellular.
- (2) Many multicellular animals have similar organs and specialized systems.
- (3) The circulatory system in most organisms removes solid wastes from their bodies.
- (4) All animals have identical circulatory systems.

4 The diagram below represents the life cycle of a butterfly.



This life cycle represents the process of

- (1) separation from parent
- (2) asexual reproduction
- (3) metamorphosis
- (4) extinction

5 Water and carbon dioxide are waste products released as a direct result of

- (1) asexual reproduction
- (2) mechanical digestion
- (3) natural selection
- (4) cellular respiration

6 The primary function of a plant's roots is to

- (1) absorb water
- (2) perform photosynthesis
- (3) produce seeds
- (4) exchange gases

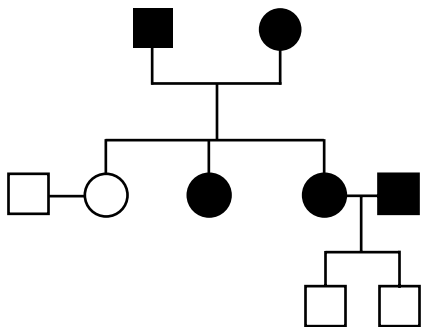
7 Genes are a part of a

- (1) cell wall
- (2) chromosome
- (3) hormone
- (4) vitamin

8 Compared to the amount of genetic information contained in a normal human body cell, the amount contained in a normal human sperm cell is

- (1) the same
- (2) twice as much
- (3) one-half as much
- (4) one-fourth as much

9 The diagram below represents a pedigree chart.



Which type of information is organized by this chart?

- (1) energy flow in an ecosystem
- (2) population growth for pea plants
- (3) the number of chromosomes in an organism
- (4) the passing of a trait from one generation to another

10 A change in an animal's DNA, leading to a variation in a species, is called

- (1) a mutation
- (2) an infection
- (3) selective breeding
- (4) sexual reproduction

11 Which set of terms describes natural fertilization and development in humans before birth?

- (1) external fertilization, external development
- (2) external fertilization, internal development
- (3) internal fertilization, external development
- (4) internal fertilization, internal development

12 A plant growing toward a light source is an example of an organism

- (1) attracting a mate
- (2) destroying infectious germs
- (3) responding to external stimuli
- (4) obtaining moisture from the air

13 A cactus plant, a snake, and a hawk can be members of the same

- (1) community
- (2) kingdom
- (3) population
- (4) species

14 Which substance in green plants needs to absorb sunlight during photosynthesis?

- (1) chlorophyll
- (2) cytoplasm
- (3) oxygen
- (4) water

15 In 1865, a pond was surrounded by open fields. Today, the same area is swampy and surrounded by a forest. Which process is responsible for this change?

- (1) metamorphosis
- (2) conservation
- (3) ecological succession
- (4) crustal plate movement

Base your answers to questions 16 and 17 on the food label below and on your knowledge of science. The food label lists nutritional facts about a serving of cereal alone and cereal with a $\frac{1}{2}$ cup of fat-free milk.

Nutrition Facts		
Serving Size	51 Biscuits (55g/1.9 oz.)	
Servings Per Container	About 8	
	Cereal	Cereal with 1/2 Cup Fat-free Milk
Amount Per Serving		
Calories	190	230
Calories from Fat	10	10
	% Daily Value	
Total Fat 1g	2%	2%
Saturated Fat 0g	0%	0%
Trans Fat 0g		
Polyunsaturated Fat 0.5g		
Monounsaturated Fat 0g		
Cholesterol 0mg	0%	0%
Sodium 0mg	0%	3%
Potassium 200mg	6%	11%
Total Carbohydrate 46g	15%	17%
Dietary Fiber 6g	23%	23%
Sugars 12g		
Other Carbohydrate 28g		
Protein 5g		
Vitamin A	0%	4%
Vitamin C	0%	0%
Calcium	0%	15%
Iron	90%	90%
Thiamin	25%	30%
Riboflavin	25%	35%
Niacin	25%	25%
Vitamin B ₆	25%	25%
Folic Acid	25%	25%
Vitamin B ₁₂	25%	35%
Phosphorus	15%	25%
Magnesium	10%	15%
Zinc	10%	15%

16 How much total energy is contained in a single serving of this cereal with a $\frac{1}{2}$ cup of fat-free milk?

- | | |
|-----------------|------------------|
| (1) 10 Calories | (3) 190 Calories |
| (2) 40 Calories | (4) 230 Calories |

17 One nutrient that is obtained only when milk is added to the cereal is

- | | |
|-----------------|----------------|
| (1) niacin | (3) sodium |
| (2) cholesterol | (4) phosphorus |
-

18 The fur on an arctic polar bear appears white all year. The color of the fur is an example of

- (1) an adaptation helping an organism to survive
- (2) an organism exchanging materials with its environment
- (3) an organism responding to internal stimuli
- (4) metabolism regulating an organism's activities

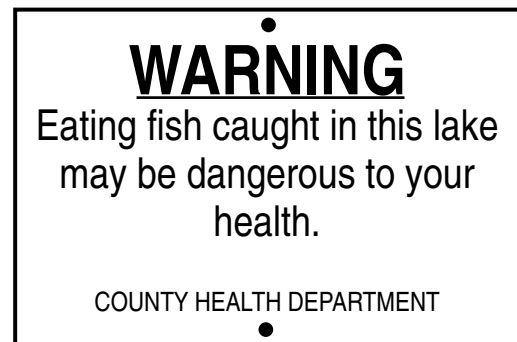
19 Urban growth and uncontrolled waste disposal by humans most likely results in

- (1) conservation of fossil fuels
- (2) environmental degradation
- (3) improved soil composition
- (4) a balanced ecosystem

20 Cell division occurs as part of which process?

- (1) Energy in food is released.
- (2) A cut on a person's finger heals.
- (3) A disinfectant destroys microbes.
- (4) The body eliminates wastes.

21 The sign below was posted near a lake.



Which environmental problem is most likely indicated by the sign?

- | | |
|--------------------|------------------------|
| (1) toxic waste | (3) ozone depletion |
| (2) global warming | (4) species extinction |

22 Which human activity would help reduce the amount of carbon dioxide in the atmosphere?

- (1) decrease the burning of fossil fuels
- (2) decrease the number of recycling programs
- (3) increase the human population
- (4) increase the number of cars being driven

23 The data table below shows data for four planets in our solar system.

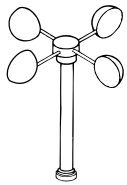
Data Table

Planet	Distance from Sun (millions of km)	Period of Revolution (in Earth time)	Period of Rotation (in Earth time)
Mercury	57.9	88 days	59 days
Venus	108.2	225 days	243 days
Earth	149.6	365 days	24 hours
Mars	227.9	687 days	25 hours

For which planet is the length of the planet's day longer than the planet's year?

- (1) Mercury (3) Earth
(2) Venus (4) Mars

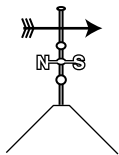
24 Which weather instrument is used to measure wind speed?



Anemometer
(1)



Barometer
(2)



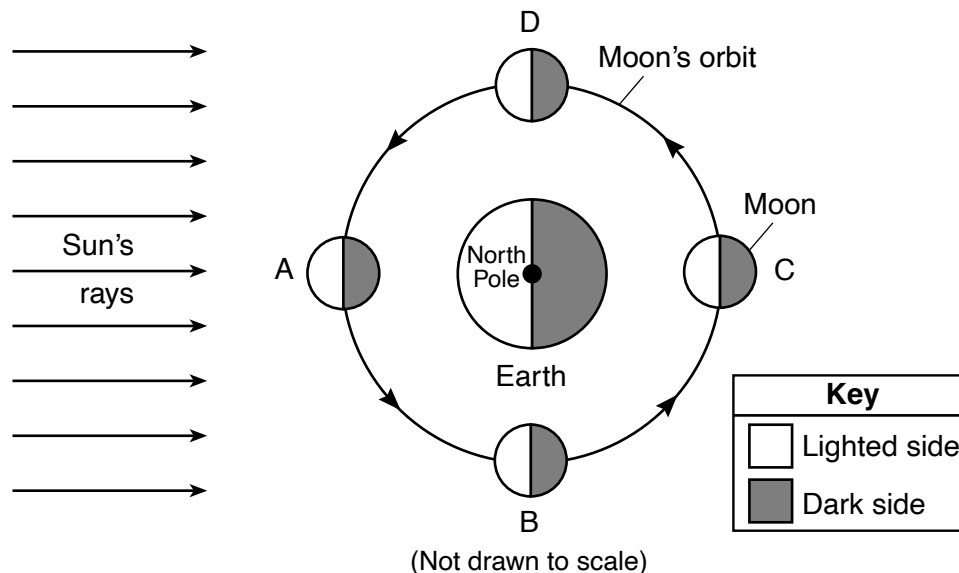
Weather vane
(3)



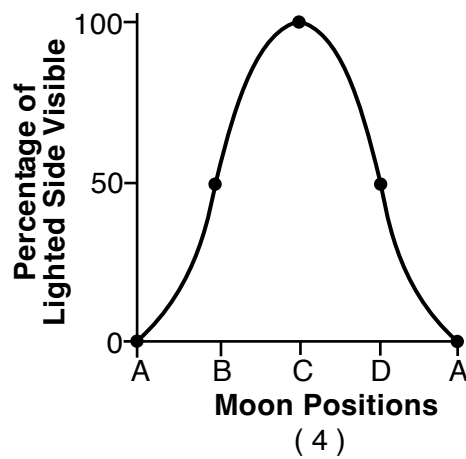
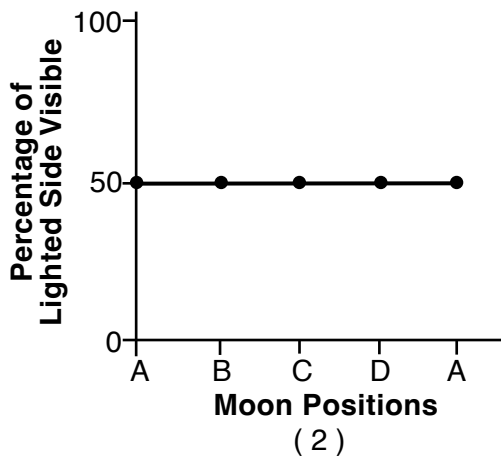
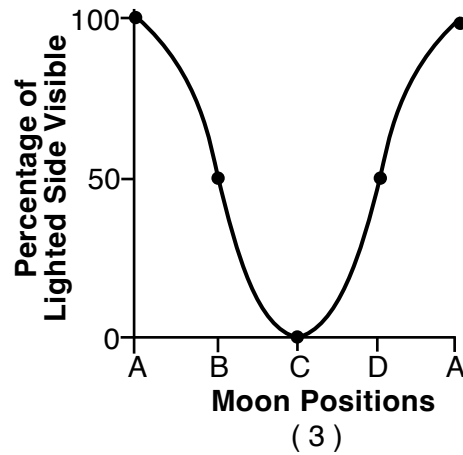
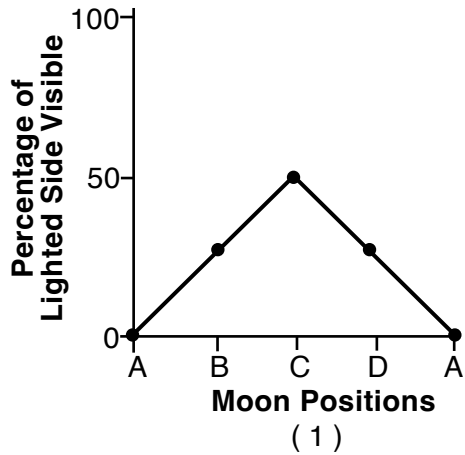
Rain gauge
(4)

(Not drawn to scale)

Base your answers to questions 25 and 26 on the diagram below and on your knowledge of science. The diagram represents the Moon at positions A, B, C, and D, in its orbit around Earth.



25 Which graph best represents the percentage of the lighted side of the Moon that can be seen by an observer in the northern hemisphere when the Moon is at the positions shown?



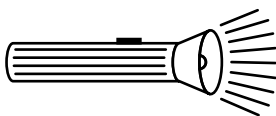
26 Approximately how long does it take for an observer on Earth to view a complete cycle of Moon phases?

- (1) 12 hours
- (2) 24 hours
- (3) 1 month
- (4) 1 year

- 27 The motions of comets and asteroids in our solar system are predictable because they are
- (1) smaller than planets
 - (2) nearly spherical in shape
 - (3) in orbit around the Sun
 - (4) controlled by Earth's gravity

- 28 Which two gases, when released into the atmosphere, are believed to contribute most to global warming?
- (1) nitrogen and oxygen
 - (2) nitrogen and carbon dioxide
 - (3) methane and oxygen
 - (4) methane and carbon dioxide

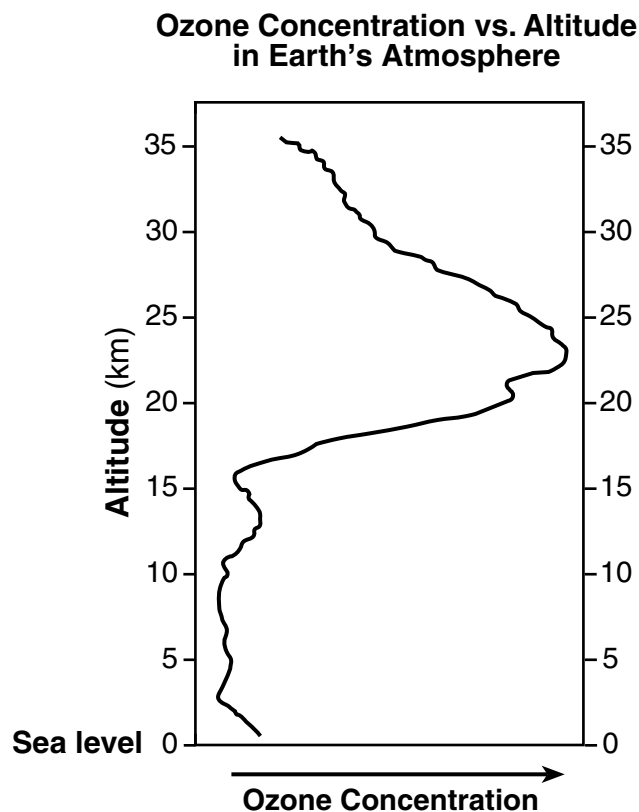
- 29 The diagram below represents a flashlight that has been turned on.



Which form of energy is being converted to electrical energy by the batteries in the flashlight?

- (1) chemical
 - (2) nuclear
 - (3) solar
 - (4) sound
- 30 Which set of Earth components is arranged in order from solid to liquid to gas?
- (1) hydrosphere, atmosphere, lithosphere
 - (2) hydrosphere, lithosphere, atmosphere
 - (3) lithosphere, atmosphere, hydrosphere
 - (4) lithosphere, hydrosphere, atmosphere

- 31 The graph below shows the change in ozone concentration with altitude in Earth's atmosphere. The data table below shows the average height range above sea level, in kilometers (km), for the different layers of Earth's atmosphere.



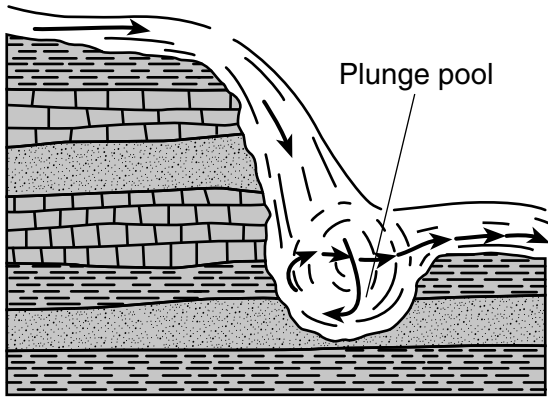
Data Table

Layer of Earth's Atmosphere	Range in Altitude Above Sea Level (km)
middle stratosphere	21 to 35
lower stratosphere	8 to 20
upper troposphere	4 to 7
lower troposphere	0 to 3

Which layer of Earth's atmosphere contains the highest concentration of ozone?

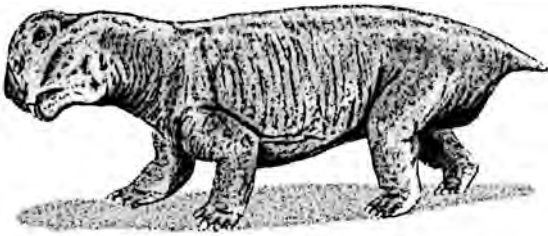
- (1) middle stratosphere
- (2) lower stratosphere
- (3) upper troposphere
- (4) lower troposphere

- 32 The cross section below represents a plunge pool that formed at the bottom of a waterfall.



The plunge pool at the bottom of the waterfall was formed mainly by

- (1) deposition (3) precipitation
(2) evaporation (4) erosion
- 33 What is the main source of energy for the water cycle?
(1) the Moon (3) winds
(2) the Sun (4) oceans
- 34 The diagram below represents a *Lystrosaurus*. *Lystrosaurus* was an herbivore that lived on land about 250 million years ago. Fossils of this dinosaur have been discovered on the widely separated continents of Africa and South America.



Which statement best explains why *Lystrosaurus* fossils are found on these two continents?

- (1) This dinosaur could fly to distant locations.
(2) Both continents were once joined together.
(3) Predators transported the remains of this dinosaur between continents.
(4) Glaciers transported the fossils to the two continents.

- 35 A student correctly determined the density of two rocks. If the volumes of the two rocks are equal, the rock with the greater density has a
(1) rounder shape (3) greater mass
(2) smoother surface (4) smaller size

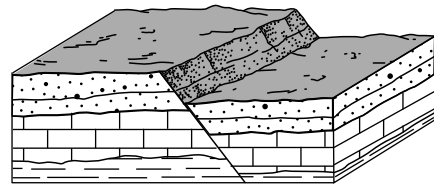
- 36 Which terms best describe the properties of a gas?

- (1) definite volume and a definite shape
(2) definite volume and no definite shape
(3) no definite volume and a definite shape
(4) no definite volume and no definite shape

- 37 Low-pressure systems generally move across the United States from

- (1) north to south (3) west to east
(2) east to west (4) south to north

- 38 The block diagram below represents a displaced rock structure.



Which process was responsible for the displacement of the horizontal rock layers?

- (1) folding (3) tilting
(2) faulting (4) weathering

- 39 Which event is an example of a physical change?

- (1) iron rusting (3) eggs cooking
(2) fireworks exploding (4) ice melting

Note that question 40 has only three choices.

40 The diagram below represents a portion of the Periodic Table of the Elements.

Portion of the Periodic Table of the Elements

KEY

1	approximate atomic mass
H	symbol
Hydrogen	name
1	atomic number

Groups

18

4	He
	Helium

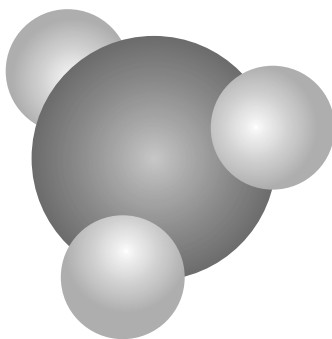
		13	14	15	16	17	
		11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
11	12	27 Al Aluminum 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35 Cl Chlorine 17	40 Ar Argon 18
64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54



Based on its position in the Periodic Table, at room temperature, cadmium is most likely a

- [illegible]

41 The model below represents a molecule of ammonia gas.

Model of a Molecule of Ammonia Gas

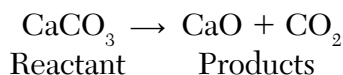


Key	
Nitrogen atom	
Hydrogen atom	

Ammonia gas would be classified as

- (1) a compound (3) an element
(2) a mixture (4) an atom

- 42 When calcium carbonate (CaCO_3) is heated, it decomposes to form calcium oxide (CaO) and carbon dioxide (CO_2). The equation below shows this reaction.



In this reaction, the mass of CaCO_3

- (1) is less than the mass of CaO plus the mass of CO_2
- (2) is greater than the mass of CaO plus the mass of CO_2
- (3) equals the mass of CaO plus the mass of CO_2
- (4) equals the mass of CaO minus the mass of CO_2

- 43 The chart below shows the wind-chill temperatures caused by wind speeds at different surface air temperatures.

Wind Chill Chart																			
		Surface Air Temperature (°F)																	
		40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind Speed (mph)	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98
		Wind-chill Temperatures (°F)																	

What is the wind-chill temperature when the surface air temperature is 10°F and the wind speed is 20 mph?

- (1) -41°F
- (2) -9°F
- (3) 9°F
- (4) 4°F

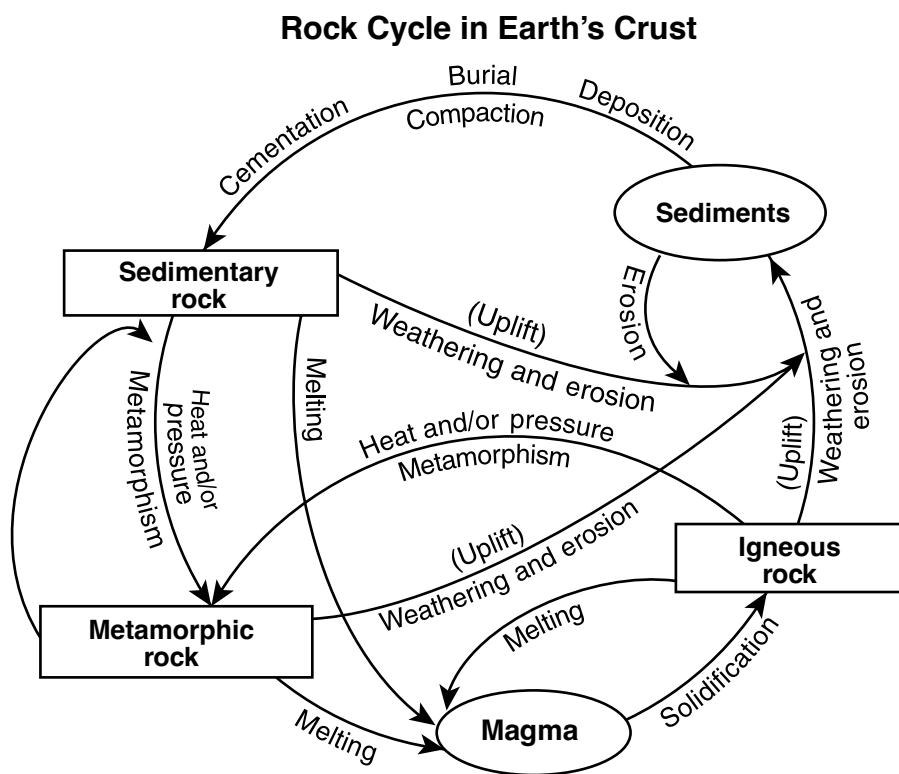
44 The diagram below represents a person using a wheelbarrow to move a heavy load of soil.



Which two simple machines are parts of the wheelbarrow?

- (1) a lever and a pulley
- (2) a lever and a wheel and axle
- (3) an inclined plane and a pulley
- (4) an inclined plane and a wheel and axle

45 The diagram below represents the rock cycle.



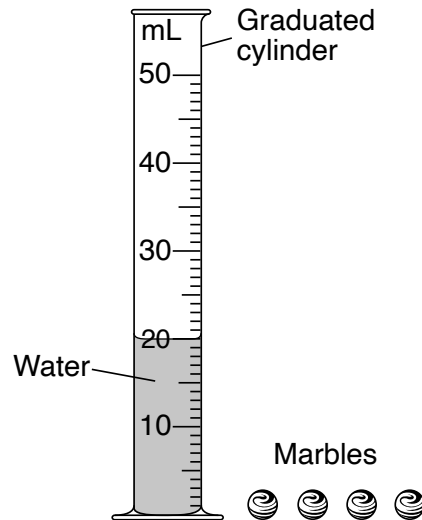
According to this diagram, metamorphic rock is formed by

- (1) melting and solidification
- (2) burial and compaction
- (3) weathering and erosion
- (4) heat and/or pressure

Part II

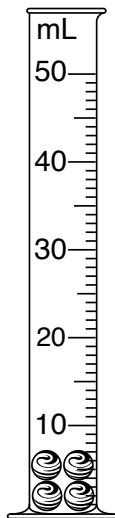
Directions (46–85): Record your answers in the spaces provided below each question.

- 46 The diagram below represents a graduated cylinder containing 20 mL of water. Four identical marbles are next to the cylinder.

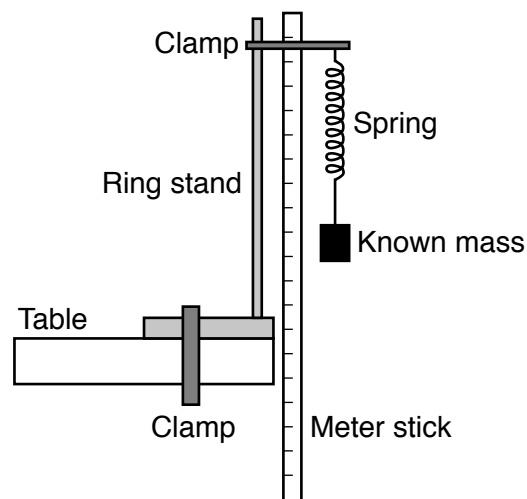


After two of the marbles are added to the cylinder, the water level reads 24 mL.

Shade in the graduated cylinder below to show what the water level would be after the *other* two marbles are added. [1]



Base your answers to questions 47 through 50 on the diagram and data table below and on your knowledge of science. The diagram shows a laboratory set-up used to investigate the relationship between the force on the spring and the length it will stretch. Increasing masses were attached to the spring. The length the spring stretched for each mass was measured using a meter stick. The data table shows the results of the investigation.

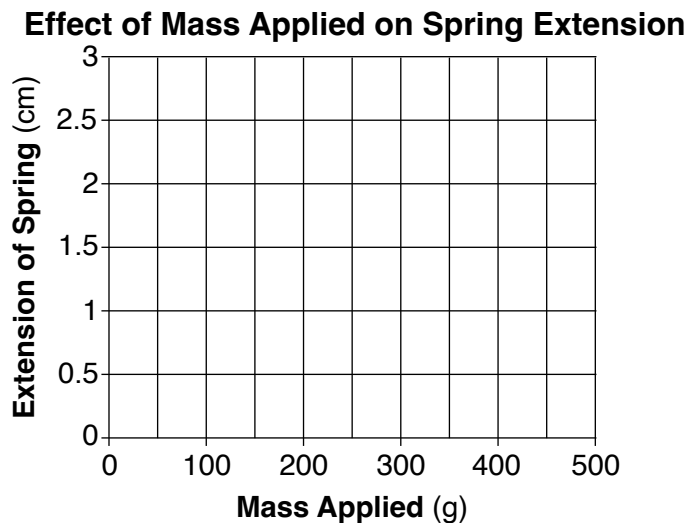


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Data Table

Mass (g)	Extension of Spring (cm)
0	0
100	0.5
200	0.6
300	0.8
400	1.5
500	2.5

- 47 On the graph below, use an **X** to plot the extension of the spring for each mass shown in the data table. Connect the centers of the **Xs** with a line. [1]



- 48 Describe the general relationship between the mass applied and the extension on the spring. [1]

- 49 Based on the data, estimate the extension of the spring when a 250-gram mass is applied. [1]

_____ **cm**

- 50 Identify the force acting on the mass that causes the spring to extend. [1]

Base your answers to questions 51 and 52 on the data table below and on your knowledge of science. The data table shows the numbers of two samples of bacteria, *A* and *B*, growing in a laboratory over a five-hour period.

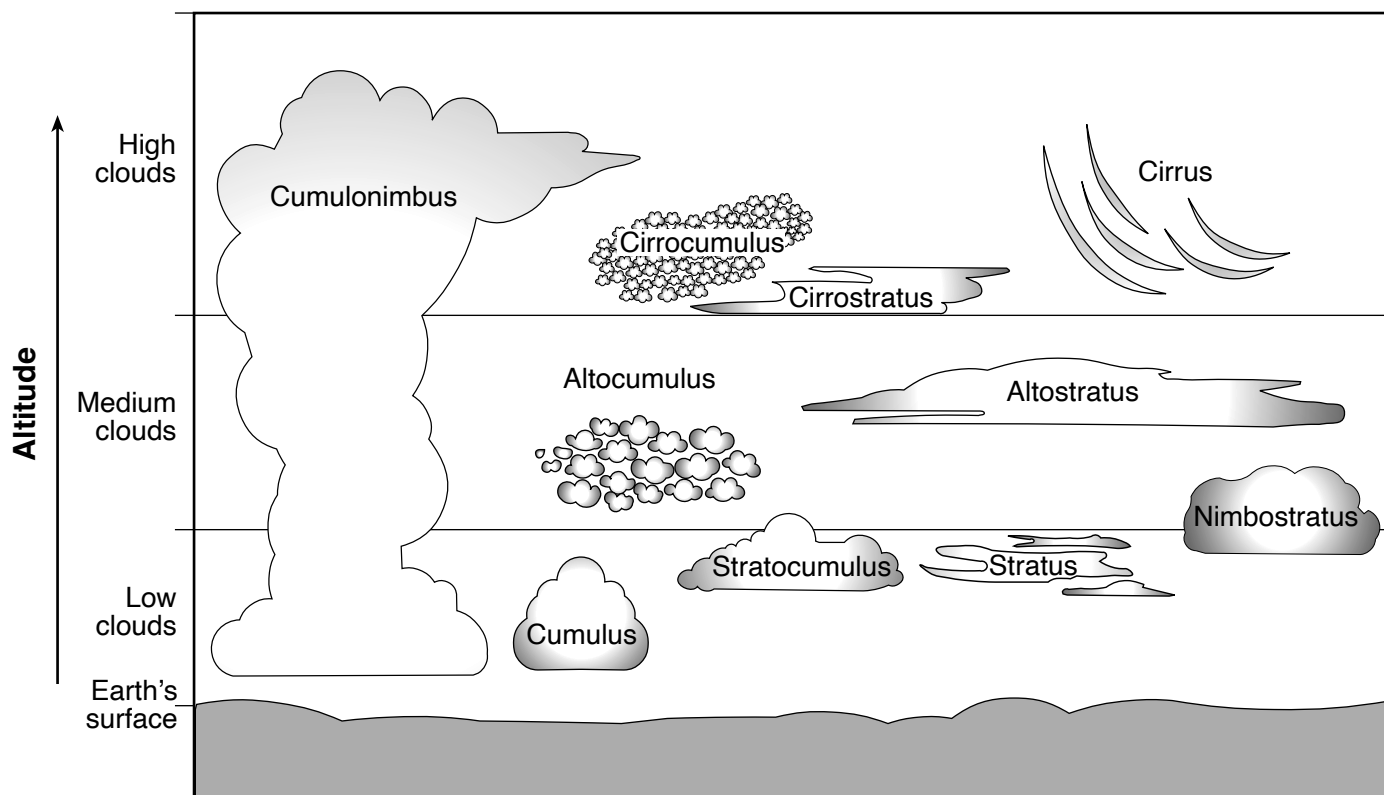
Data Table

Time (hours)	Number of Bacteria A in Sample	Number of Bacteria B in Sample
0	1	1
0.5	2	1
1.0	4	2
1.5	8	2
2.0	16	4
2.5	32	4
3.0	64	8
3.5	128	8
4.0	256	16
4.5	512	16
5.0	1024	32

51 Based on the pattern in the data table, predict the number of bacteria *B* at 6 hours. [1]

52 Describe how the reproductive rates for bacteria *A* and bacteria *B* differ. [1]

Base your answers to questions 53 through 55 on the diagram below and on your knowledge of science. The diagram represents ten types of clouds and where they are found in Earth's atmosphere.

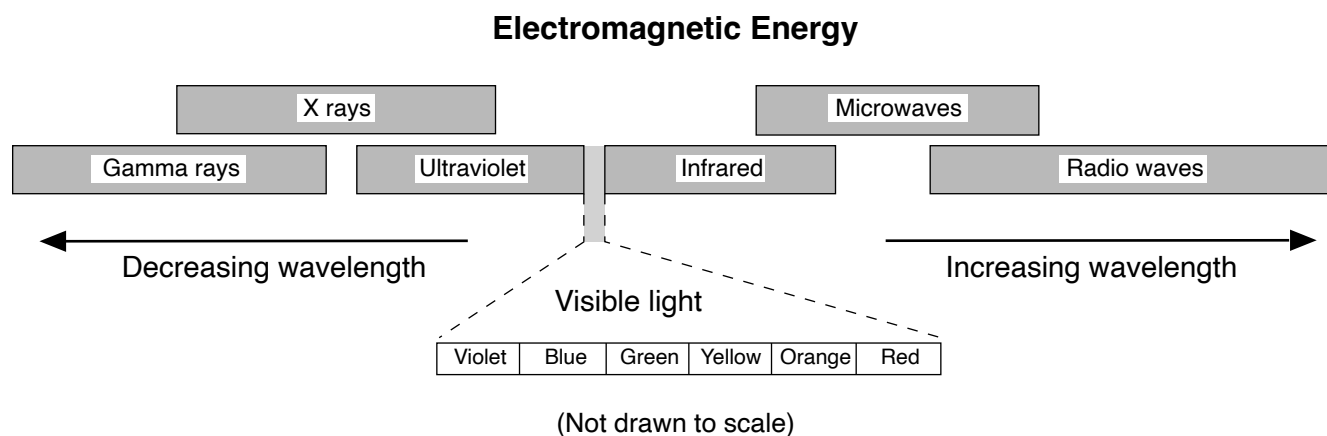


53 Identify *one* factor represented in the diagram that is used to classify the ten types of clouds. [1]

54 Identify the water cycle process that forms clouds when moist air cools as it rises. [1]

55 Explain why less sunlight reaches Earth's surface when cumulonimbus clouds are over a location than when cirrus clouds are over the same location. [1]

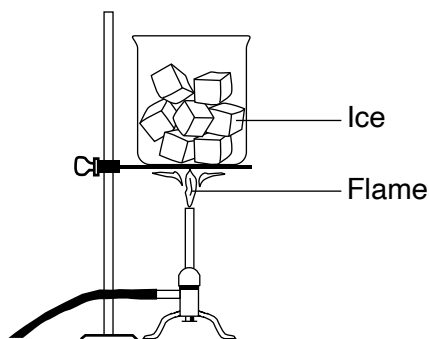
56 The diagram below represents the electromagnetic spectrum.



List the following three types of electromagnetic energy in order from shortest wavelength to longest wavelength: infrared, x rays, red visible light. [1]

Shortest _____
↓
Longest _____

57 The diagram below shows a beaker of ice placed over an open flame.



Describe what happens to the molecules in the ice as the temperature of the ice increases. [1]

Base your answers to questions 58 and 59 on the passage below and on your knowledge of science.

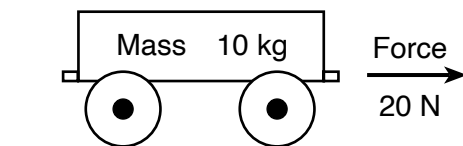
Ultraviolet Radiation

The Sun's radiation comes to Earth as many different wavelengths of electromagnetic energy. One form of energy is ultraviolet radiation. A person's overexposure to the Sun's ultraviolet radiation (UV rays) is the biggest risk factor for skin cancer. Some ultraviolet radiation is absorbed by the ozone layer, which is located in Earth's atmosphere. This ozone layer provides a natural protection for living organisms.

- 58 State *one* reason why all of the ultraviolet radiation coming toward Earth does *not* reach Earth's surface. [1]

- 59 Describe *one* action a person can take to avoid overexposure to UV radiation. [1]

Base your answers to questions 60 and 61 on the diagram below and on your knowledge of science. The diagram represents a cart with a mass of 10 kilograms (kg) being pulled to the right with a force of 20 newtons (N).



- 60 Using the equation below, calculate the acceleration of the cart in meters per second squared (m/s^2). [1]

$\text{Force} = \text{Mass} \times \text{Acceleration}$

_____ m/s^2

- 61 Identify the force between the wheels of the cart and the ground surface that opposes forward motion of the cart. [1]

Base your answers to questions 62 and 63 on the information and data table below and on your knowledge of science.

Four students participated in an experiment to determine the effect of exercise on heart rate. Four students measured their heart rates while at rest. After exercising for 10 minutes, they measured their heart rates again. Data for these students are shown in the table below. Heart rate is measured in beats per minute (bpm).

The Effect of Exercise on Heart Rate

Student	Heart Rate (bpm)	
	At Rest	After Exercising for 10 Minutes
1	60	90
2	86	122
3	72	112
4	75	115

62 Based on the data table, describe the effect of exercising for 10 minutes on the heart rates of the four students. [1]

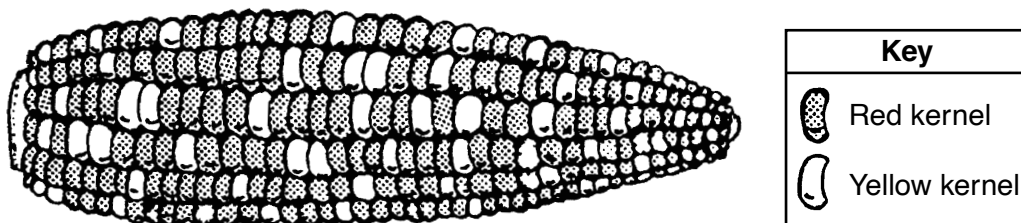
63 Describe *one* way to determine a person's heart rate. [1]

Base your answers to questions 64 and 65 on the Punnett square below and on your knowledge of science. In corn plants, the trait for red kernels (*R*) is dominant to yellow kernels (*r*). The Punnett square represents a cross between two corn plants, both of which have a gene for red kernels and a gene for yellow kernels (*Rr* x *Rr*).

	<i>R</i>	<i>r</i>
<i>R</i>	<i>RR</i>	<i>Rr</i>
<i>r</i>	<i>Rr</i>	<i>rr</i>

Key
<i>R</i> = red kernels
<i>r</i> = yellow kernels

64 The diagram below represents an ear of corn with both red and yellow kernels.

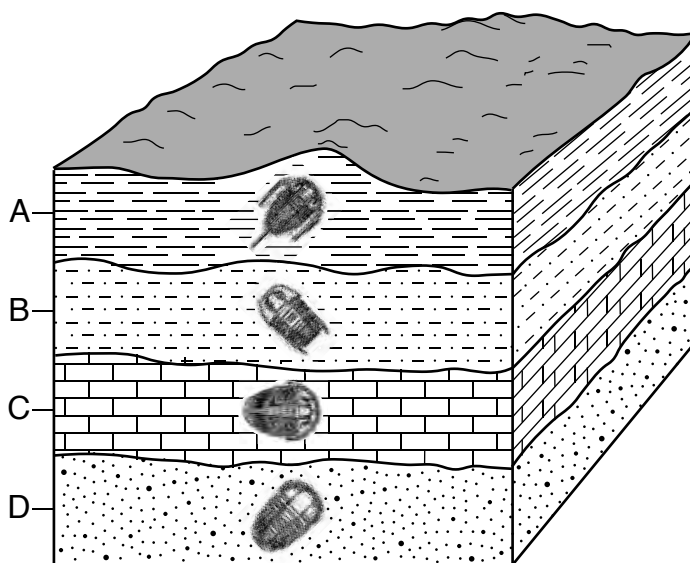


Explain why the number of red and yellow kernels on this ear of corn represents the results of the cross that is observed in the Punnett square. [1]

65 Identify the two genes of each parent that would always produce an ear of corn which has all yellow kernels. [1]

_____ × _____
 (parent 1) (parent 2)

Base your answers to questions 66 through 68 on the cross section below and on your knowledge of science. The cross section represents several rock layers that have not been overturned. Each layer contains trilobite fossils.



(Not drawn to scale)

- 66 Explain why the trilobite fossils found in rock layer *A* are considered to be younger than the trilobite fossils in rock layer *D*. [1]

- 67 Circle the class (type) of rock below that most likely includes rock layers *A*, *B*, *C*, and *D*, and give evidence to support your choice. [1]

Circle one: igneous metamorphic sedimentary

Evidence: _____

68 Explain how studying fossils supports the theory of evolution. [1]

Base your answers to questions 69 through 71 on the information below and on your knowledge of science. The list below describes some characteristics of the Canada lynx, an animal that is a member of the cat family.

Canada Lynx

- Found in the colder climates of Canada and Alaska
- Thick, dense fur
- Preys on small animals, such as the snowshoe hare
- Large spaces between teeth so that bite enters prey as deeply as possible
- Wide feet to walk better over snow and ice

69 Explain why the Canada lynx is classified as a carnivore. [1]

70 Choose *one* characteristic from the list that helps the Canada lynx carry out the life process of locomotion. [1]

71 Explain why the population of the Canada lynx in one area may decrease if the population of snowshoe hares decreased in that same area. [1]

Base your answers to questions 72 and 73 on the information below and on your knowledge of science.

Keeping Goldfish

Goldfish are one of the most common fish kept in a home aquarium. One thing these fish need is an appropriately sized environment. Goldfish produce a hormone, known as somatostatin, that can limit their growth and can keep them from outgrowing their tank. Somatostatin allows the fish to grow to an appropriate size so that the concentration of wastes produced by the fish do not reach harmful levels in the aquarium.

72 Identify the body system in the fish that is most likely producing the hormone somatostatin. [1]

_____ **system**

73 Explain how limiting growth is advantageous for the goldfish's survival in a home aquarium. [1]

74 The diagrams below represent human body cells that have divided normally and human body cells that have divided *abnormally*.

Human body cells that
have divided normally



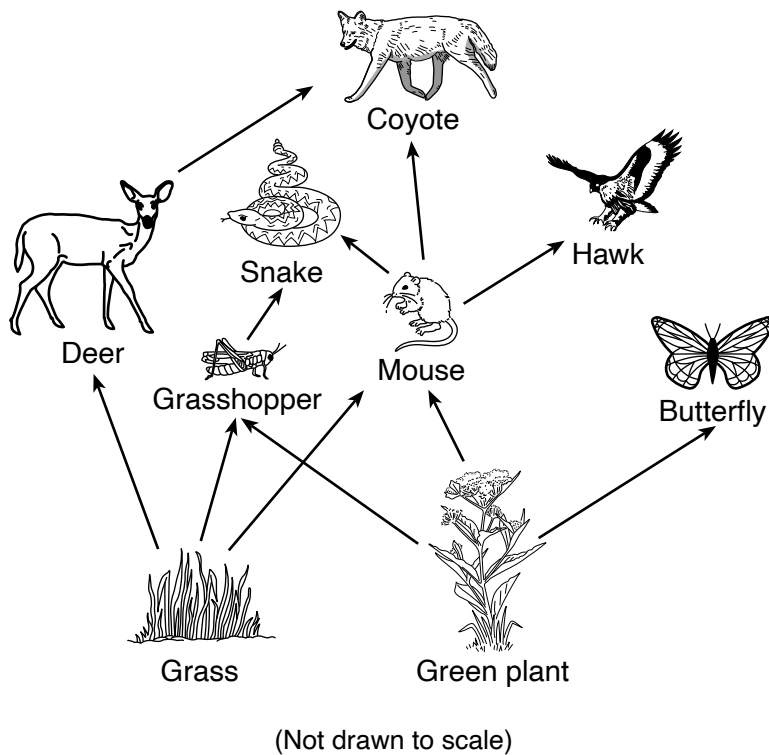
Human body cells that
have divided abnormally



(Not drawn to scale)

What disease results from abnormal cell division? [1]

Base your answers to questions 75 and 76 on the partial food web below and on your knowledge of science.

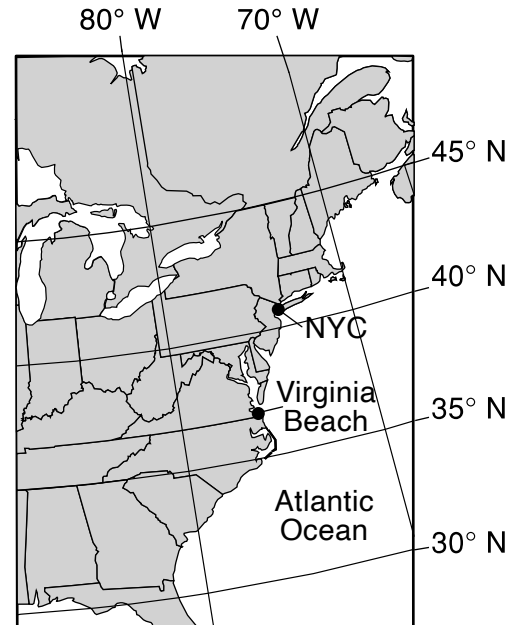
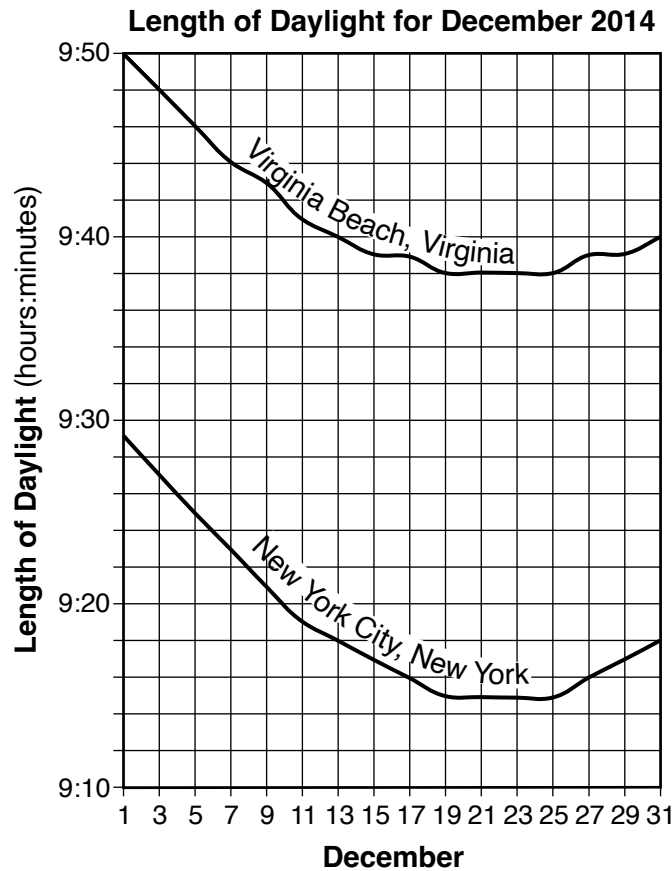


75 Identify *two* organisms in the food web that compete for food. [1]

_____ and _____

76 Fungi and bacteria are not shown in this food web but play a role in this ecosystem. Describe the role of fungi and bacteria in this food web. [1]

Base your answers to questions 77 and 78 on the graph and map below and on your knowledge of science. The graph shows the length of daylight for two cities, New York City (NYC), New York and Virginia Beach, Virginia, during the month of December 2014. The map shows the locations of New York City and Virginia Beach in the United States.



77 Determine the number of hours and minutes of daylight for Virginia Beach and New York City on December 13. [1]

Virginia Beach: _____

New York City: _____

78 Describe the general relationship between the latitude of a location in the United States and the length of daylight in December for that location. [1]

Base your answers to questions 79 through 81 on the passage below and on your knowledge of science. The passage describes some of the properties of earthquake waves.

Earthquake Waves

An earthquake occurs when pieces of Earth's crust move, producing waves of energy called seismic waves. Two types of seismic waves that travel through Earth's interior are called *P*-waves and *S*-waves. *P*-waves can travel through solids and liquids, but *S*-waves can only travel through solids.

79 Identify *one* Earth layer in which earthquakes may occur. [1]

80 Explain how the properties of *P*-waves and *S*-waves have been used to determine that Earth's outer core is liquid. [1]

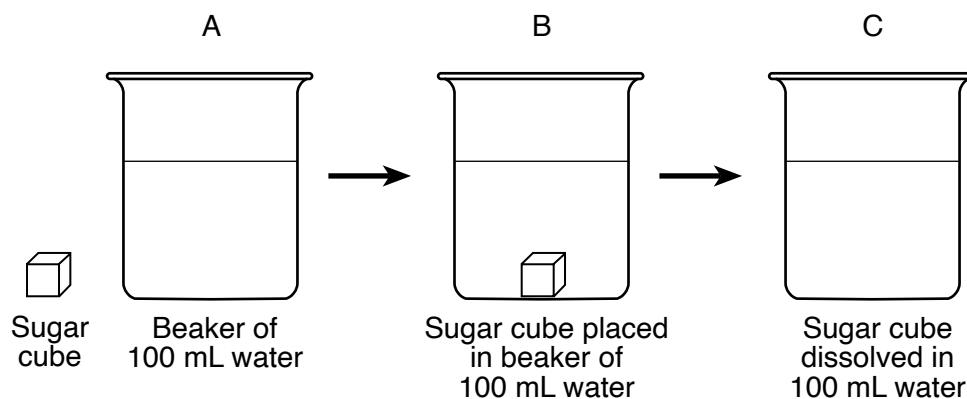
81 Other than moving to a new area, describe *two* actions people should take in order to prepare for the possibility of strong earthquakes. [1]

(1) _____

(2) _____

Base your answers to questions 82 and 83 on the information below and on your knowledge of science.

A sugar cube was placed into a beaker containing 100 mL of water at room temperature and completely dissolved into the water. This process is represented by the series of diagrams labeled A, B, and C below.



82 Describe *one* way to make the sugar cube dissolve faster in the 100 mL of water. [1]

83 Describe *one* way that the dissolved sugar at C could be separated from the water. [1]

Base your answers to questions 84 and 85 on the passage and data table below and on your knowledge of science.

A group of students were experimenting with building electromagnets in science class. To do this, the students wrapped a piece of insulated copper wire around an iron nail and then connected the two ends of the wire to a battery, making the nail magnetic. The number of wraps of the wire around the nail affected the number of metal paperclips that the electromagnet could pick up at one time. The results of the students' experiment are shown in the data table below.

Electromagnet Strength

Number of Wire Wraps	Number of Paperclips Picked Up
10	4
15	7
20	9
25	13

- 84 Predict how many paperclips the electromagnet would have picked up if the students had wrapped the wire around the nail only five times. [1]

_____ **paperclips**

- 85 When the wires were disconnected from the battery, all of the paper clips fell off the nail. Explain why the battery is needed to pick up the paperclips. [1]

THE UNIVERSITY OF THE STATE OF NEW YORK

GRADE 8

INTERMEDIATE-LEVEL SCIENCE TEST

JUNE 2018 WRITTEN TEST

FOR TEACHERS ONLY

SCORING KEY AND RATING GUIDE

Note: All schools (public, nonpublic, and charter) administering the Grade 8 Intermediate-Level Science Test are required to make arrangements to obtain answer sheets and associated scanning services from a Regional Information Center (RIC) or a large-city scanning center. These centers will scan and score the answer sheets according to the following criteria:

1. One credit will be awarded for each correct response.
2. Credit will not be allowed if two or more answers have been marked for the same question.
3. The raw score for Part I will be determined by counting the number of correct responses.

For information only, correct responses are listed in the chart below.

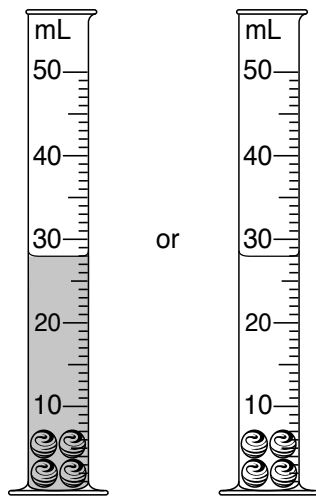
Question Number	Correct Response	Question Number	Correct Response	Question Number	Correct Response
1	3	16	4	31	1
2	2	17	3	32	4
3	2	18	1	33	2
4	3	19	2	34	2
5	4	20	2	35	3
6	1	21	1	36	4
7	2	22	1	37	3
8	3	23	2	38	2
9	4	24	1	39	4
10	1	25	4	40	3
11	4	26	3	41	1
12	3	27	3	42	3
13	1	28	4	43	2
14	1	29	1	44	2
15	3	30	4	45	4

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ALBANY, NEW YORK 12234

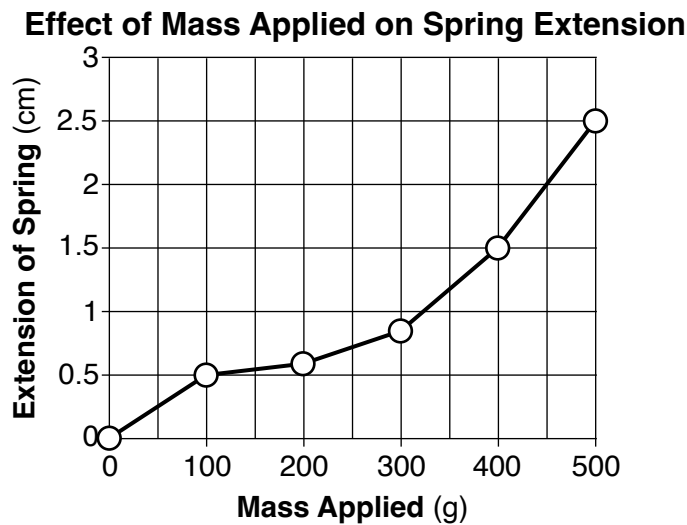
- 46 [1] Allow 1 credit for indicating 28 mL with shading and/or a line.

Examples of a 1-credit response:



Note: Allow credit if the student draws a meniscus, as long as the bottom of the meniscus indicates 28 mL.

- 47 [1] Allow 1 credit if the centers of *all six Xs* are plotted within or touch the circles shown and are correctly connected with a line that passes within or touches the circles.



Note: Allow credit if a symbol other than an **X** is used to plot points.

It is recommended that an overlay of the same scale as the student test booklet be used to ensure reliability in rating.

- 48** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The greater the mass on the spring, the longer it will stretch.
 - direct relationship
 - As mass increases, the extension of the spring increases.
 - less mass, less extension
- 49** [1] Allow 1 credit for a value greater than 0.6 but less than 0.8 *or* any correct value based on student's drawn graph.
- 50** [1] Allow 1 credit for gravity *or* gravitational force.
- 51** [1] Allow 1 credit for 64.
- 52** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Bacteria *A* reproduce faster.
 - Bacteria *B* reproduce slower.
 - Bacteria *A* doubles every half hour and *B* doubles every hour.
 - It takes twice as much time for bacteria *B* to reproduce.
 - Bacteria *A* reproduce twice as fast as bacteria *B*.
- 53** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- altitude/elevation/height
 - cloud shape
 - temperature
- 54** [1] Allow 1 credit for condensation *or* a change from gas to liquid.
- 55** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Cumulonimbus clouds are thicker.
 - Cirrus clouds are thinner.
 - The cumulonimbus reflects, absorbs, and/or blocks more sunlight.

56 [1] Allow 1 credit for:

Shortest	x rays
↓	red visible light/red light/visible light
Longest	infrared

57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The molecules move faster.
- The molecules move farther apart.
- The molecules speed up/vibrate faster.
- The forces between the molecules are getting weaker.
- The molecules are absorbing heat/thermal energy.

Note: Do *not* allow credit for “melt”/“turn to liquid” or “expand” because the ice makes the physical change but the individual molecules do not.

58 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Ozone absorbs UV rays.
- It’s filtered by the atmosphere.
- Some is reflected back to space.

59 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- stay inside
- put on sunscreen lotion
- wear protective clothing/hat
- use a beach umbrella

60 [1] Allow 1 credit for 2 *or* 2.0 m/s².

61 [1] Allow 1 credit for friction.

62 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Exercise increases heart rate.
- The students’ heart rates were higher after exercising.
- The heart beats faster.
- increase in pulse rate

63 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Count the pulse rate.
- Place fingers on an artery/blood vessel and count the number of beats.
- Use a stethoscope to count the beats.
- Use a heart monitor.
- Take a pulse.
- Feel the wrist or neck.

Note: Do *not* allow credit for “beats per minute” alone. (This is a unit, not an action. Students need to describe an action.)

64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Approximately one-quarter of the kernels are yellow, as predicted by the Punnett square.
- 75% of the kernels are expected to be red in color.
- Many more red kernels are expected than yellow kernels in the Punnett square.

Note: Do *not* allow credit for “there are red and yellow kernels,” because this does not address the number and is only an observation of the diagram.

65 [1] Allow 1 credit for: $\frac{r}{\text{(parent 1)}} \times \frac{r}{\text{(parent 2)}}$

66 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The fossils in rock layer A are in the top layer, so they are newer.
- Rock layer A was formed most recently.
- Rock layer A is the youngest layer, so the fossils found here would be the youngest.
- The oldest layers are on the bottom; the youngest layers are on top.
- because of the Law of Superposition

67 [1] Allow 1 credit for circling “sedimentary” *and* providing acceptable evidence. Acceptable responses include, but are not limited to:

- Sedimentary rock has flat layers.
- They contain fossils.
- The symbols in the diagram represent sedimentary rock.
- Fossils would most likely be destroyed in the formation of igneous and metamorphic rocks.

Note: Allow credit if the student does *not* circle any rock type, but gives an acceptable response that includes the term “sedimentary rock.”

68 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Life-forms can be observed to have changed over time.
- Fossils show similarities to and differences from existing life-forms.
- Organisms that lived later in history can be compared to the organisms from which they developed by studying fossils.
- Similarities between living and extinct species can be observed.

69 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The Canada lynx eats meat.
- It eats snowshoe hares.
- It eats animals.
- Its prey is an animal.
- It does not eat plants.

70 [1] Allow 1 credit for feet *or* wide feet.

71 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- If the snowshoe hare population decreased, the lynx wouldn't have enough food, so some would die off.
- Some lynx would go to a different location in search of food.
- fewer prey to eat

72 [1] Allow 1 credit for endocrine system.

73 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The fish will not outgrow its tank.
- Since there are limited resources in an aquarium, the goldfish will only grow to a size suitable for the tank.
- If the goldfish could not inhibit its growth, it might grow to be too big for its tank and not survive because there aren't enough resources.
- The concentration of waste in the water does not become harmful to the fish.

74 [1] Allow 1 credit for cancer *or* a specific form of cancer (lung cancer, leukemia, etc.).

75 [1] Allow 1 credit for *one* correct pair. Acceptable responses include:

- coyote and hawk
- coyote and snake
- snake and hawk
- deer and grasshopper
- deer and mouse
- mouse and grasshopper
- mouse and butterfly
- butterfly and grasshopper

76 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- They are decomposers.
- They break down dead organisms.
- They recycle nutrients.
- They are saprophytes.

77 [1] Allow 1 credit if *both* times are correct.

Virginia Beach: 9:40 *or* 9 hours 40 minutes

New York City: 9:18 *or* 9 hours 18 minutes

78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- As the latitude increases, the length of daylight decreases.
- The length of daylight is greater at lower latitudes in the United States in December.
- inverse/indirect relationship

79 [1] Allow 1 credit for crust, lithosphere, *or* mantle.

80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- S-waves do not travel through the liquid outer core.
- S-waves can only travel through solids and P-waves can travel through solids and liquids.
- by detecting which type of wave passes through the outer core
- S-waves can't travel through liquids.
- Only P-waves can travel through liquids.

81 [1] Allow 1 credit for *two* correct responses. Acceptable responses include, but are not limited to:

- stock up on batteries/water/canned food
- have an emergency-preparedness plan
- change building codes/build stronger buildings
- read up on what they should do in case of an earthquake/become more educated about earthquake risks
- buy a radio
- prepare a safety/emergency kit
- conduct earthquake drills
- secure furniture

82 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The mixture can be stirred.
- heat the water
- The cube could be crushed into powder (adding surface area) before it is added to the beaker.
- swirl/shake the beaker

Note: Do *not* allow credit for “change the temperature” because it does not specify an increase in the temperature.

83 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- evaporate the water
- boil the water off
- heat the water

84 [1] Allow 1 credit for any value from 0 to 3 paper clips.

85 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- An electric current/power/charge is needed to produce a magnetic field.
- Without electricity, the magnetic field breaks down.
- It supplies the energy needed to make an electromagnet.
- It makes the nail magnetic.
- It forms a complete circuit.

Note: Do *not* allow credit for “the battery is magnetic” or “provides magnetism.” (It is a power source to move electrons; it does not directly produce magnetism.)