

VIRGINIA STANDARDS OF LEARNING

TEST ITEM SET

GRADE 8 SCIENCE

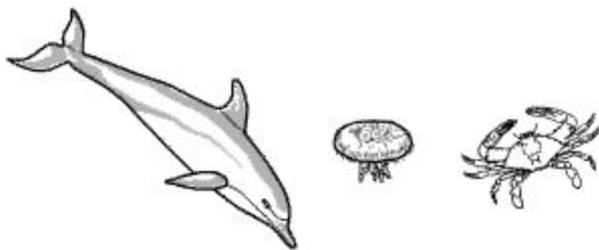
2010 Science Standards of Learning

Released Spring 2015

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SAMPLE A



These animals are grouped together because all of them —

- A** live in the water
- B** are fish
- C** are warm-blooded
- D** lay eggs

Directions: Click and drag a term into each box. Each term may be used more than once.

SAMPLE B

A student conducted an investigation to determine the effect of water temperature on the amount of sugar that dissolves in a beaker of water. Identify components for trial 1 of this investigation.

Trial 1

Beaker Number	Amount of Water (mL)	Temperature of Sugar (°C)	Temperature of Water (°C)	Amount of Sugar Dissolved (g)
1	100	20	5	185
2	100	20	10	189
3	100	20	15	194
4	100	20	20	204

Terms

Variable

Constant

Clownfish and Sea Anemone



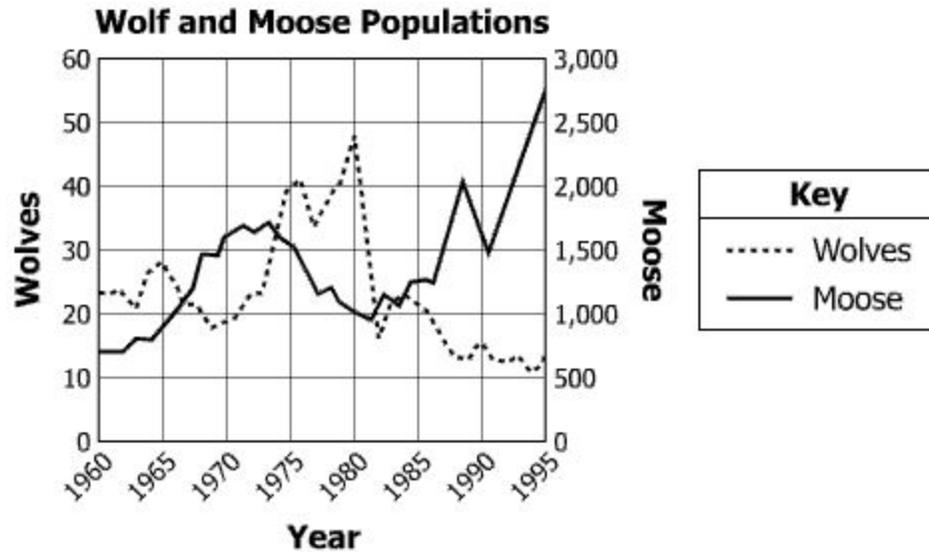
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Sea anemones are poisonous. However, the clownfish has developed an outer layer of mucus which provides protection from the stinging cells of the sea anemone. The mucus is best described as —

- A an adaptation
- B a relationship
- C an energy requirement
- D a social hierarchy

Hurricanes form in tropical waters between 8 and 20 degrees north and south of the equator. Hurricanes rarely form at higher latitudes because the water is too —

- A** warm
- B** deep
- C** shallow
- D** cold



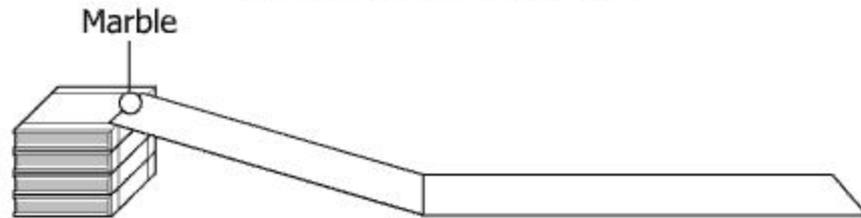
On a small island, scientists observed and graphed changes in wolf and moose populations. From 1965 to 1970, which data pattern did scientists observe?

- A** A drop in wolf population and a drop in moose population
- B** An increase in wolf population and a drop in moose population
- C** A drop in wolf population and an increase in moose population
- D** An increase in wolf population and an increase in moose population

A metal spoon was placed in a dish of ice cream and became cool. Which correctly describes the heat transfer process that resulted in the cooling of the spoon?

- A** Conduction, because the spoon was in contact with the cold ice cream
- B** Convection, because the spoon was in contact with the cold ice cream
- C** Conduction, because cold air currents affected the temperature of the spoon
- D** Convection, because cold air currents affected the temperature of the spoon

Classroom Investigation



Students performed several trials using the laboratory setup shown. Students were also given this hypothesis: If friction increases, then the rolling distance of a marble will decrease. What should be changed to best test this hypothesis?

- A** Height of the ramp
- B** Height and length of the ramp
- C** Roughness of the ramp surface
- D** Height of the ramp and roughness of the ramp surface

A student recorded the temperature of an aquarium each hour for 8 hours. Which of these will best display the data the student collected?

- A** Bar graph
- B** Circle graph
- C** Picture graph
- D** Line graph

A cold air mass moves underneath a warm air mass causing the warm air to rise. This event can best be identified as —

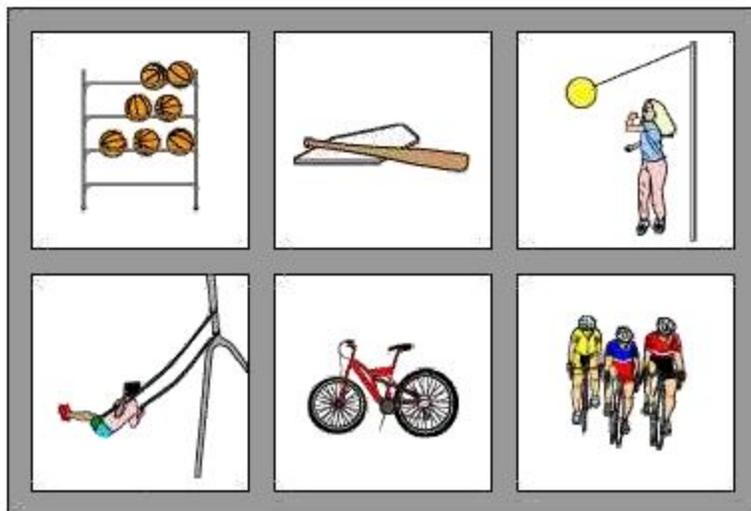
- A** a cold front
- B** a warm front
- C** an occluded front
- D** a stationary front

Which body of water is often protected naturally from storms by barrier islands and also contains a mixture of fresh water and salt water?

- A** Estuary
- B** Ocean
- C** Lake
- D** Pond

Directions: Click on the correct answers.

Which three drawings best represent objects with kinetic energy?



Conversion Table

$$1 \text{ km} = 1,000 \text{ ?}$$

$$1 \text{ m} = 100 \text{ ?}$$

Which of these best completes the Conversion Table?

A

$$\begin{array}{l} 1 \text{ km} = 1,000 \text{ mm} \\ 1 \text{ m} = 100 \text{ cm} \end{array}$$

C

$$\begin{array}{l} 1 \text{ km} = 1,000 \text{ cm} \\ 1 \text{ m} = 100 \text{ mm} \end{array}$$

B

$$\begin{array}{l} 1 \text{ km} = 1,000 \text{ m} \\ 1 \text{ m} = 100 \text{ mm} \end{array}$$

D

$$\begin{array}{l} 1 \text{ km} = 1,000 \text{ m} \\ 1 \text{ m} = 100 \text{ cm} \end{array}$$

A student measured the power of a motor operating at different temperatures. The student recorded a total of 11 measurements, one at each 2 degree interval between 10°C and 30°C. Which change in the procedure would most improve the validity of conclusions based on this investigation?

- A** Increasing the number of variables
- B** Decreasing the range of the independent variable
- C** Repeating the experiment several times
- D** Producing a graph of numerical observations

Which of these has the strongest gravitational field?

- A** Sun
- B** Earth
- C** Saturn
- D** Jupiter

Observations of Steel Wool in Four Liquids

pH of Liquid	Observation of Liquid	Observation of Steel Wool
2	Bubbles appear quickly	Color turns brown
3	Bubbles appear moderately quickly	Color turns brown
5	A few bubbles appear slowly	No change in color
7	No bubbles appear	No change in color

Students placed steel wool in beakers of four different liquids in order of the most acidic to neutral. The students recorded their observations in the table. Which is the best conclusion based on the table?

- A** The more acidic the substance, the faster it reacts with steel wool.
- B** The more acidic the substance, the faster the steel wool turns to a gas.
- C** The less acidic the substance, the faster the steel wool becomes covered with air bubbles.
- D** The less acidic the substance, the faster the steel wool changes color.

Which is the result of using a more powerful motor to run an elevator?

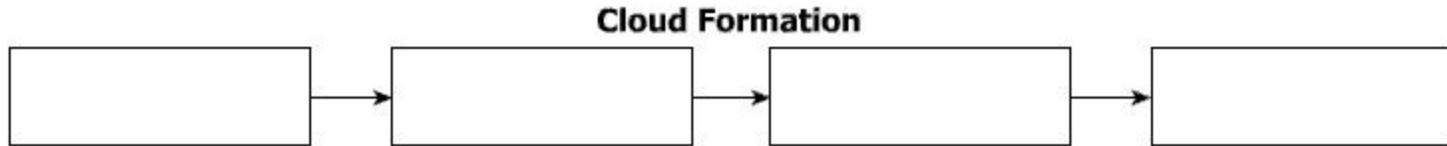
- A** The same amount of work is done in less time.
- B** Less work is done in the same amount of time.
- C** The same amount of time is needed to move the same distance.
- D** A longer time is needed to move a shorter distance.

A major scientific concern over nuclear energy is how to —

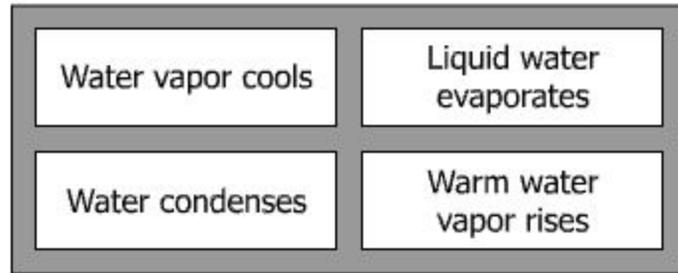
- A** deal with the large amounts of fossil fuels required
- B** reduce the high levels of carbon dioxide emitted into the air
- C** prevent the depletion of the ozone layer
- D** store the waste products safely

Directions: Click and drag the answers to the correct boxes.

What are the ordered steps for cloud formation?



Steps



Why is water known as the “universal solvent”?

- A** It dissolves all known substances.
- B** It dissolves only solid substances.
- C** It dissolves the greatest number of substances.
- D** It dissolves substances faster than all other solvents.

Which of these has been improved by genetic engineering?

- A** Visibility of insects to predators
- B** Growth of insects in cornfields
- C** Reduced number of pollinating insects
- D** Resistance of corn plants to insects

Which action will most reduce the use of nonrenewable energy resources in a school district?

- A** Installing low-flow faucets and toilets
- B** Recycling worksheets and other paper products
- C** Limiting the sweeping and mopping of classrooms to once a month
- D** Replacing current lighting with more efficient lighting

Sound waves are unable to travel through —

- A** air
- B** a vacuum
- C** water
- D** a rock

The speed of light is about 300,000,000 m/s. Which is the correct expression for the speed of light in scientific notation?

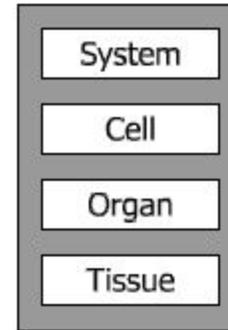
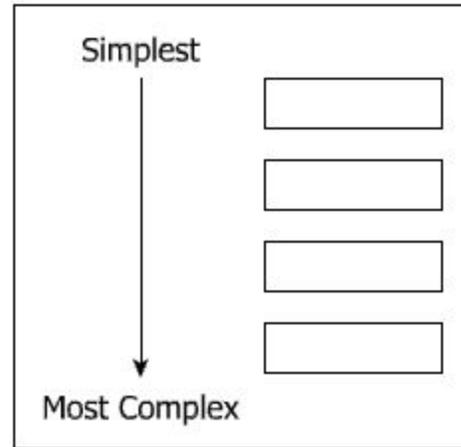
- A 30.0×10^7 m/s
- B 30.0×10^8 m/s
- C 3.0×10^7 m/s
- D 3.0×10^8 m/s

Which of these properties of an unknown liquid can be found using a beaker, a hot plate, and a temperature probe?

- A** Density
- B** Boiling point
- C** Oxygen level
- D** Chemical composition

Directions: Click and drag the answers to the correct boxes.

Place the terms in the order of the simplest level of organization to the most complex.



A group of campers travels to a cabin which has no electrical power. In order to provide the power for a heater and lights, which device would be appropriate?

- A** A resistor
- B** An insulator
- C** A generator
- D** A voltmeter

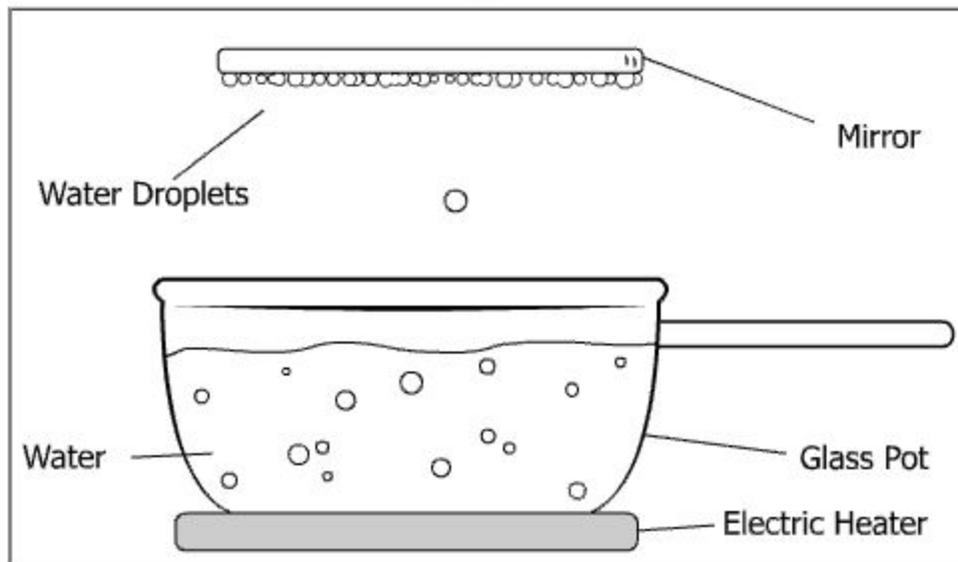
Which of these is most likely the result of weasels and foxes depending on the same food source?

- A** The populations will compete with each other.
- B** One of the populations will become herbivores.
- C** Birthrates for both populations will increase.
- D** New species of prey will evolve in the area.

A farmer wants to plant a crop that grows well in a marshland environment. In order to produce a good harvest, the most important characteristic this plant should have is the ability to —

- A** thrive in wet soil
- B** mature quickly
- C** survive in dry conditions
- D** attract a variety of pollinators

Heating Water



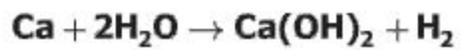
The volume of water in the pot decreases during this investigation. Water droplets form on the mirror when positioned over the pot. In this setup, water —

- A vaporizes and then freezes
- B vaporizes and then condenses
- C condenses and then vaporizes
- D freezes and then vaporizes

Which is an abiotic change in an ecosystem?

- A** Plant photosynthesis rates increase.
- B** Fish species populations increase.
- C** Aquatic predator survival rates increase.
- D** Annual rainfall totals for an area increase.

Directions: Type your answer in the box. Use a whole number.



How many different elements are involved in the chemical reaction shown?

Physical and chemical weathering processes are responsible for breaking down rocks. Which of these is an example of chemical weathering by water?

- A** Mineral crystals form as water evaporates from rocks.
- B** Limestone reacts with acid rain and dissolves.
- C** Water freezes in rock cracks and causes the rock to split.
- D** Moss collects and grows on the surface of rocks.

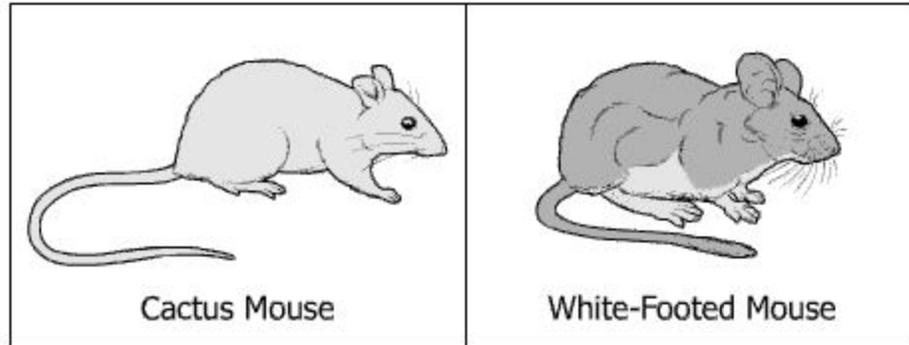
Partial Periodic Table of the Elements

1 H 1.0																	2 He 4.0
3 Li 6.9	4 Be 9.0											5 B 10.8	6 C 12.0	7 N 14.0	8 O 16.0	9 F 19.0	10 Ne 20.2
11 Na 23.0	12 Mg 24.3											13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.5	18 Ar 39.9
19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 48.0	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zn 65.4	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8
37 Rb 85.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc 98.0	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 181.0	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po 209.0	85 At 210.0	86 Rn 222.0
87 Fr 223.0	88 Ra 226.0	89 Ac 227.0	104 Rf 261	105 Db 262	106 Sg 263	107 Bh 262	108 Hs 265	109 Mt 266	110 Ds 269								

The shaded row in the table is called a —

- A column
- B family
- C group
- D period

Two Mice From the Same Genus



White-footed mice having thicker fur than cactus mice is probably influenced most by the differences in the —

- A** food that they eat
- B** time of day they are active
- C** environmental climates where they live
- D** amount of predators they encounter

During human fertilization, an egg and a sperm cell unite. Which structures in these cells carry the genes that will be transferred to the offspring?

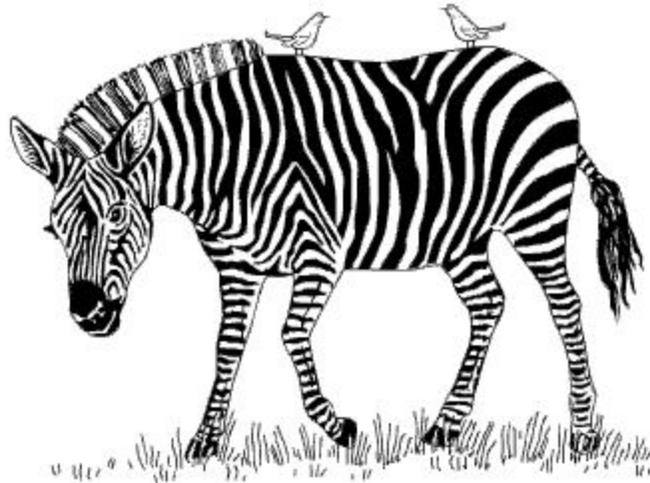
- A** Vacuoles
- B** Ribosomes
- C** Chromosomes
- D** Cell membranes

Which facility relies on a nonrenewable source of energy?

- A** A wind farm that uses wind turbines
- B** A dam that uses the power of water
- C** A power station that burns coal
- D** A solar farm that collects sunlight

As the frequency of a wave decreases, the wave's —

- A** period decreases
- B** amplitude increases
- C** speed decreases
- D** wavelength increases



This picture shows a zebra with two tick birds on its back. The tick birds alert the zebras that predators are near as well as remove and eat ticks found on zebras. What is the primary type of interaction between the tick birds and the zebras?

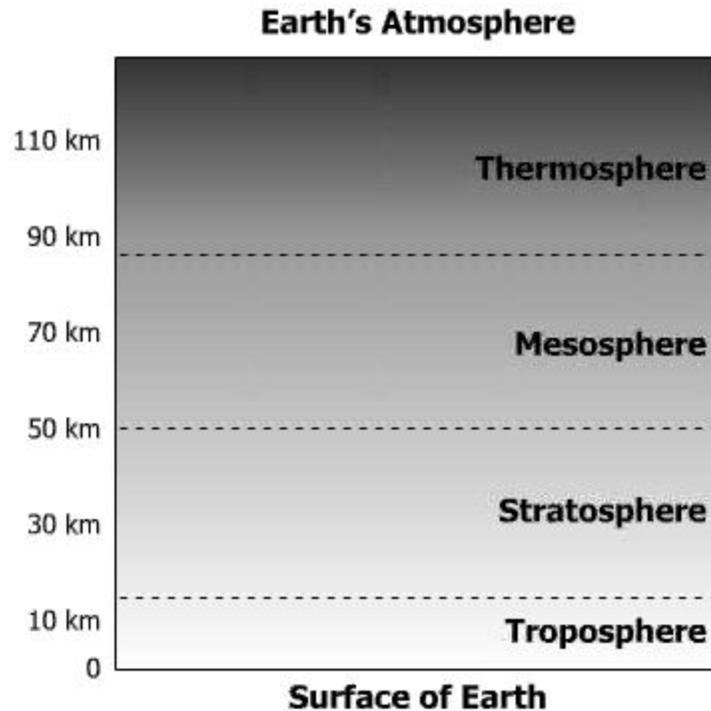
- A** Mutualism
- B** Parasitism
- C** Competition
- D** Commensalism

Which change will most likely increase the strength of a magnetic field produced by an electromagnet?

- A** Reduce the number of turns of the coil
- B** Switch the direction in which the battery is connected
- C** Remove the iron nail
- D** Add a battery

The physical expression of a trait in an organism is known as the —

- A** chromosome
- B** genotype
- C** phenotype
- D** double helix

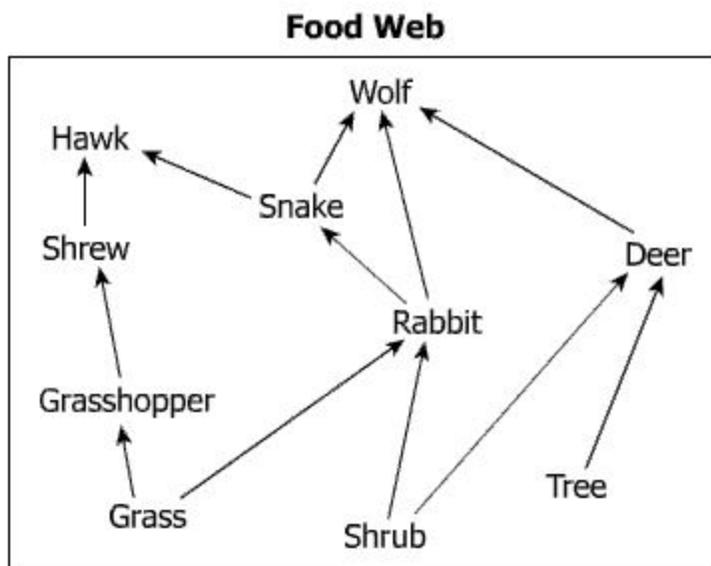


Which statement correctly describes a difference between the mesosphere and the stratosphere?

- A** The mesosphere has more active weather than the stratosphere.
- B** The mesosphere contains fewer oxygen molecules than the stratosphere.
- C** Air pressure is lower in the stratosphere than in the mesosphere.
- D** Temperatures decrease with altitude only in the stratosphere.

Directions: Click on all the correct answers.

Which organisms are producers in this food web?



Which of these represents the freezing point of water in correct SI units?

- A 0°C
- B 0°F
- C 32°F
- D -273°C

A girl kicks a soccer ball into the air. Which of these best explains why the soccer ball falls back to Earth?

- A** The acceleration of the ball is unstable.
- B** The motion of the ball is changed by external forces.
- C** The pressure on the ball changes with altitude.
- D** The force exerted on the ball is greater than gravity.

Effect of Water Temperature

Temperature (°C)	Grams of Substance That Dissolve in 100 Milliliters of Water		
	Trial 1	Trial 2	Trial 3
10	5.0	5.1	4.9
20	8.0	7.8	7.9
30	10.0	9.9	10.0
40	15.0	14.9	15.1

Students measured the amount of an unknown substance that dissolved in water at different temperatures. What was the independent variable in this investigation?

- A Amount of substance dissolved
- B Unknown substance used
- C Water temperature
- D Water volume

Which characteristic is common to the four outer planets in our solar system?

- A** Low mass
- B** High density
- C** Fast revolution
- D** Gaseous composition

When comparing a plant cell to an animal cell, only the plant cell will contain —

- A** ribosomes
- B** chromosomes
- C** chloroplasts
- D** mitochondria

Activities

1 hour of napping
1 hour of watching television
1 hour of walking on a treadmill

A student measures her heart rate after each of the activities listed. Based on this information, which is a constant in the student's investigation?

- A** Equipment needed for activity
- B** Length of activity time
- C** Activity performed
- D** Energy expended during activity

Which of these is the best description of a typical organism in the Plant kingdom?

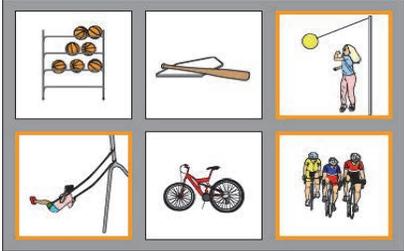
- A** Is unicellular
- B** Lacks a nucleus
- C** Makes its own food
- D** Lacks a cell wall

Which of these is a way that a person can help improve air quality?

- A** Build a compost pile
- B** Carpool with several people
- C** Burn leaves in the fall
- D** Use a gas-powered lawn mower

Grade 8 Science
Released Test Item Set Spring 2015
Answer Key

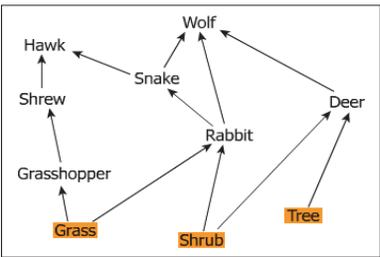
Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
1	MC	A	004	Ecosystems
2	MC	D	005	Earth and Space Systems
3	MC	C	001	Scientific Investigation
4	MC	A	002	Force, Motion, Energy, and Matter
5	MC	C	001	Scientific Investigation
6	MC	D	001	Scientific Investigation
7	MC	A	005	Earth and Space Systems
8	MC	A	004	Ecosystems

Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
9	TEI	<p>All three answers, and only these answers, must be selected: drawing located in the first row, third column; drawing located in the second row, first column; drawing located in the second row, third column</p> <div style="border: 1px solid gray; padding: 10px;"> <p>Directions: Click on the correct answers.</p> <p>Which three drawings best represent objects with kinetic energy?</p>  </div>	002	Force, Motion, Energy, and Matter
10	MC	D	001	Scientific Investigation
11	MC	C	001	Scientific Investigation
12	MC	A	005	Earth and Space Systems
13	MC	A	002	Force, Motion, Energy, and Matter
14	MC	A	002	Force, Motion, Energy, and Matter
15	MC	D	002	Force, Motion, Energy, and Matter

Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
16	TEI	<p>Answers must be placed in the correct order from left to right: Liquid water evaporates; Warm water vapor rises; Water vapor cools; Water condenses</p> <p>Directions: Click and drag the answers to the correct boxes.</p> <p>What are the ordered steps for cloud formation?</p> <p style="text-align: center;">Cloud Formation</p> <pre> graph LR A[Liquid water evaporates] --> B[Warm water vapor rises] B --> C[Water vapor cools] C --> D[Water condenses] </pre> <p style="text-align: center;">Steps</p> <div style="background-color: #cccccc; width: 150px; height: 60px; margin: 0 auto;"></div>	005	Earth and Space Systems
17	MC	C	002	Force, Motion, Energy, and Matter
18	MC	D	003	Life Systems
19	MC	D	005	Earth and Space Systems
20	MC	B	002	Force, Motion, Energy, and Matter
21	MC	D	001	Scientific Investigation
22	MC	B	002	Force, Motion, Energy, and Matter

Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
23	TEI	<p>Answers must be placed in the correct order from top to bottom: Cell; Tissue; Organ; System</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Directions: Click and drag the answers to the correct boxes.</p> <p style="text-align: center;">Place the terms in the order of the simplest level of organization to the most complex.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <p>Simplest</p>  <p>Most Complex</p> </div> <div style="margin-right: 20px;"> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Cell</div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Tissue</div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Organ</div> <div style="border: 1px solid gray; padding: 2px;">System</div> </div> <div style="width: 60px; height: 100px; background-color: gray; margin-left: 20px;"></div> </div> </div>	003	Life Systems
24	MC	C	002	Force, Motion, Energy, and Matter
25	MC	A	004	Ecosystems
26	MC	A	004	Ecosystems
27	MC	B	002	Force, Motion, Energy, and Matter
28	MC	D	004	Ecosystems

Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
29	TEI	<p>Typed response: 3</p> <div style="border: 1px solid black; padding: 10px;"> <p>Directions: Type your answer in the box. Use a whole number.</p> $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$ <p>How many different elements are involved in the chemical reaction shown?</p> <div style="border: 1px solid gray; display: inline-block; padding: 2px 5px; margin: 5px;">3</div> </div>	002	Force, Motion, Energy, and Matter
30	MC	B	005	Earth and Space Systems
31	MC	D	002	Force, Motion, Energy, and Matter
32	MC	C	005	Earth and Space Systems
33	MC	C	003	Life Systems
34	MC	C	005	Earth and Space Systems
35	MC	D	002	Force, Motion, Energy, and Matter
36	MC	A	004	Ecosystems
37	MC	D	002	Force, Motion, Energy, and Matter

Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
38	MC	C	003	Life Systems
39	MC	B	005	Earth and Space Systems
40	TEI	<p>These three answers, and only these answers, must be selected: Grass; Shrub; Tree</p> <div style="border: 1px solid black; padding: 10px;"> <p>Directions: Click on all the correct answers.</p> <p>Which organisms are producers in this food web?</p> <p style="text-align: center;">Food Web</p>  <pre> graph TD Grass[Grass] --> Grasshopper[Grasshopper] Grass --> Rabbit[Rabbit] Shrub[Shrub] --> Rabbit Tree[Tree] --> Deer[Deer] Grasshopper --> Shrew[Shrew] Grasshopper --> Snake[Snake] Rabbit --> Snake Rabbit --> Wolf[Wolf] Snake --> Hawk[Hawk] Deer --> Wolf style Grass fill:#f96 style Shrub fill:#f96 style Tree fill:#f96 </pre> </div>	004	Ecosystems
41	MC	A	001	Scientific Investigation
42	MC	B	002	Force, Motion, Energy, and Matter

Sequence Number	Item Type: Multiple Choice (MC) or Technology-Enhanced Item (TEI)	Correct Answer	Reporting Category	Reporting Category Description
43	MC	C	001	Scientific Investigation
44	MC	D	005	Earth and Space Systems
45	MC	C	003	Life Systems
46	MC	B	001	Scientific Investigation
47	MC	C	003	Life Systems
48	MC	B	005	Earth and Space Systems

