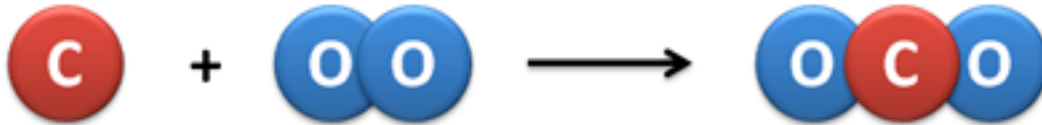


Post Test - Science

1. In the International System (SI) of measurement, 4.4 meters equal _____ centimeters.

- A. 4.4
 - B. 44
 - C. 52.8
 - D. 440
-

2.



Which of the following statements about the above chemical equation is true?

- A. The reactants and the product have identical properties.
 - B. Only the product is a pure substance and it has unique properties.
 - C. Only the reactants are pure substances and have the same properties as the product.
 - D. The reactants and the product are pure substances with different properties.
-

3. New scientific discoveries often _____ technology.

- A. depend on
 - B. lead to advances in
 - C. are made using
 - D. all of these
-

4. Look at the picture below.



Which of the following statements represents an opinion regarding the umbrella?

- A. There are polka dots and stars on the top of the umbrella.
 - B. The umbrella is pretty.
 - C. The handle of the umbrella is curved at the base.
 - D. The umbrella is colorful.
-

5. What happens when salt water is boiled?

- A. Both the salt and the water evaporate and leave the beaker.
 - B. The salt becomes a new compound.
 - C. The salt will evaporate from the water and disperse into the environment.
 - D. The water evaporates and the salt remains in the beaker.
-

6. If you were on the moon, and you were trying to move a 20-lb bowling ball and a 3-foot cube of Styrofoam, which item would take more work to move? Why?

- A. the Styrofoam; it weighs more on the moon
- B. the bowling ball; it is a harder object
- C. the bowling ball; it has greater mass anywhere

D. the Styrofoam; it is larger

7. In which of the following scientific investigations should social and ethical expectations be considered?

A. the cloning of animals and other living organisms

B. the use of embryonic stem cells to cure diseases

C. the testing of new medicines on human subjects

D. all of these

8. Which one of the following statements about eclipses is true?

A. An eclipse will always occur during a meteor shower.

B. During a solar eclipse the moon passes between Earth and the sun.

C. An eclipse may last as long as five days.

D. During a lunar eclipse the moon passes between Earth and the sun.

9.



The scientist shown in the picture above

- A. should not be using the liquid dropper indoors.
- B. should be wearing protective gloves and safety goggles.
- C. should be wearing a darker colored lab coat.
- D. should be using both hands to operate the liquid dropper.



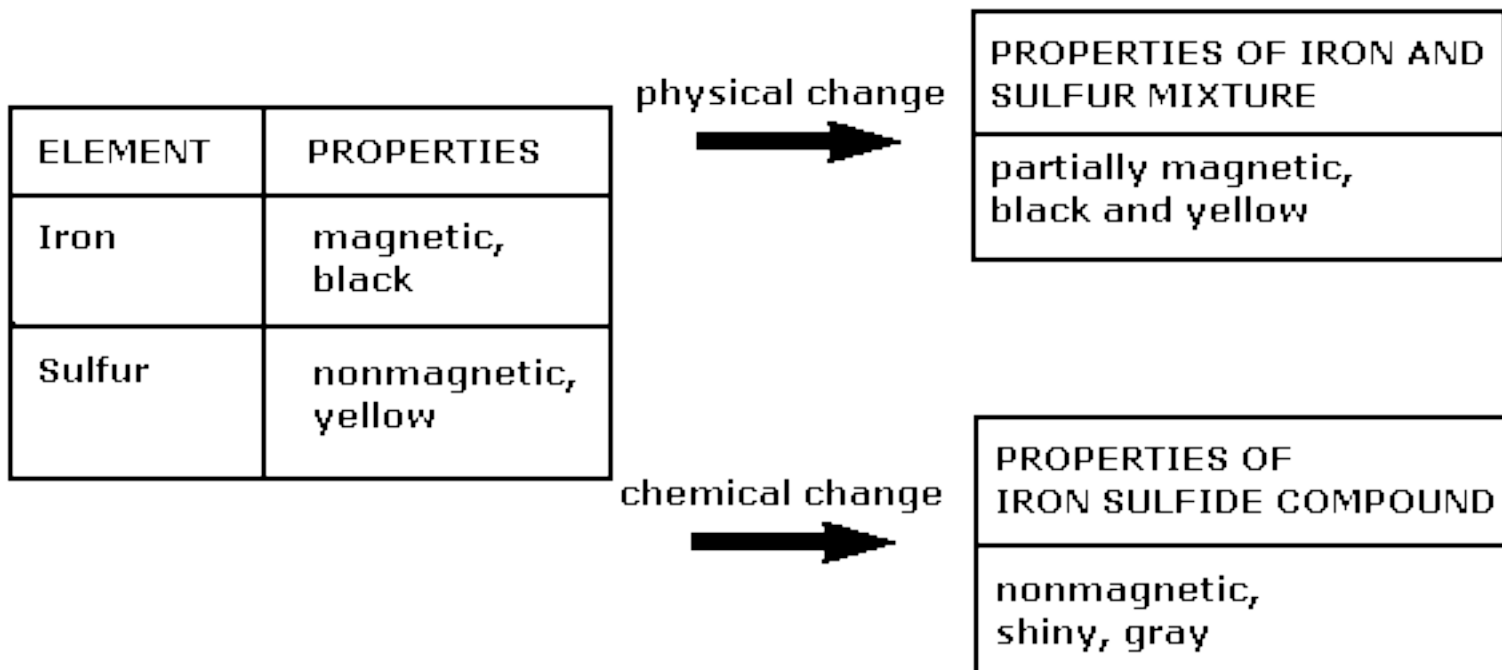
In the picture shown above, what is a living resource that the deer depends upon?

- A. grass
- B. water
- C. air
- D. soil

11. Which of the following lists Earth's compositional layers in order of increasing density?

- A. core, mantle, crust
 - B. crust, mantle, core
 - C. crust, core, mantle
 - D. mantle, core, crust
-

12.



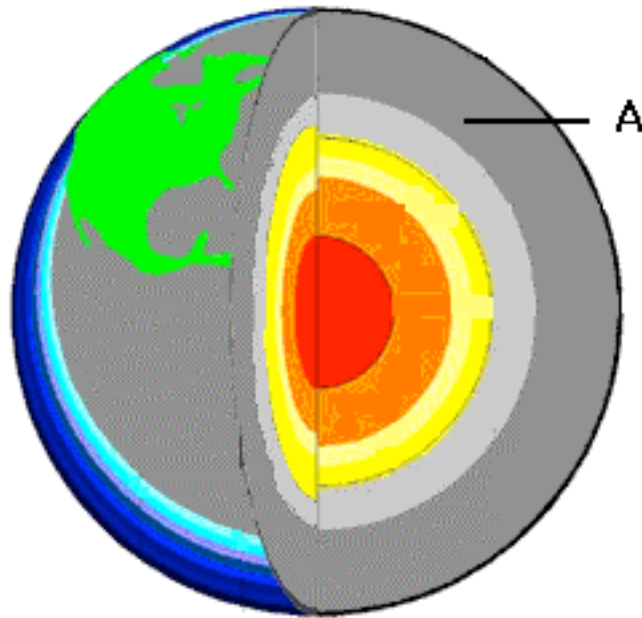
What evidence indicates that a chemical change took place when the iron and sulfur combined to form iron sulfide?

- A. The elements can be separated with a magnet.
 - B. The change is only temporary.
 - C. The change resulted in a new property.
 - D. During the change, gases are released.
-

13. Which of the following causes the change in seasons on Earth?

- A. the tilting of the Earth on its axis, and the Earth revolving around the Sun
 - B. the Earth revolving around the Sun, and the moon revolving around the Earth
 - C. the tilting of the Earth on its axis, and the sun revolving around the Earth
 - D. the spinning of the Earth on its axis, and the Earth revolving around the Sun
-

14. The picture below shows a cross-section of the Earth.



Which part of the Earth is labeled A?

- A. mantle
- B. outer core
- C. crust
- D. inner core

15. Ramon's mother gives him an ice cream cone after dinner. When he goes outside to eat it, the ice cream begins to melt very quickly. Which of the following describes what is happening to his ice cream?

- A. A chemical change is taking place.
 - B. A change in solubility is taking place.
 - C. A change in conductivity is taking place.
 - D. A physical change is taking place.
-

16. The body of each organism is organized in a certain manner. Which of the following shows the organization of the body from the simplest level to the most complex level?

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

17.

6	Atomic number
C	Symbol
Carbon	Name
12.011	Average Atomic Mass

Partial Periodic Table of the Elements

1A					8A
1 H Hydrogen 1.0079					2 He Helium 4.0026
3 Li Lithium 6.941	4A	5A	6A	7A	
	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797
11 Na Sodium 22.9898	14 Si Silicon 28.0855	15 P Phosphorus 30.9738	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948

Which of these elements has the greatest atomic mass?

- A. sodium
 - B. hydrogen
 - C. fluorine
 - D. helium
-

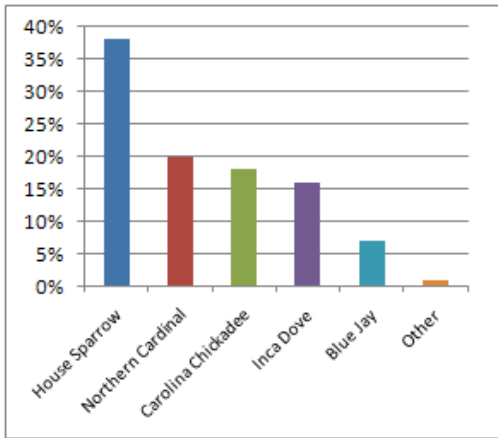
18.

Organism Group	Number of Species in 1910	Number of Species in 2010
Plants	7	5
Fungi	12	9
Invertebrates	33	27
Fish	7	4
Amphibians	12	8
Reptiles	4	3
Mammals	0	0

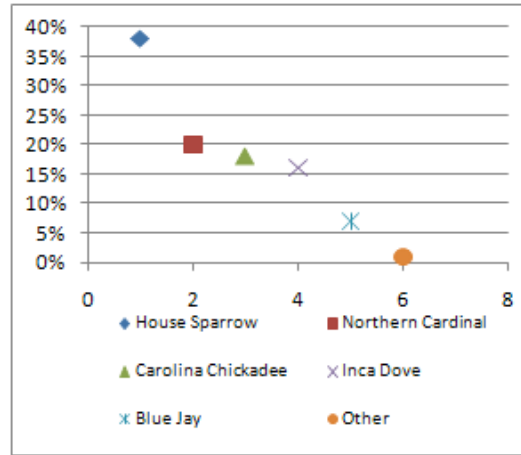
The table above compares the types and numbers of species in an ecosystem at two different points in time. Based on this data,

- A. the ecosystem was more stable in 2010 due to less biodiversity at that time.
 - B. the ecosystem was not stable at either time due to the absence of mammal species.
 - C. the ecosystem was more stable in 1910 due to more biodiversity at that time.
 - D. even though biodiversity was different, the ecosystem was equally stable at both times.
-

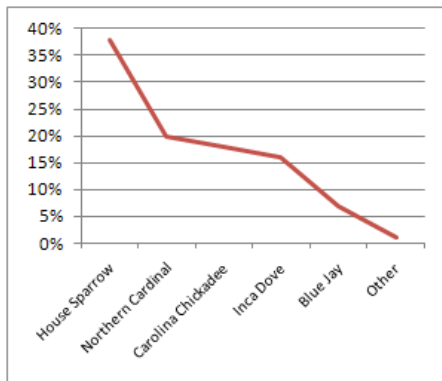
19. Doug observed the birds in his backyard for a period of one month. Based on his observations, he estimated the percentage of each type of bird in his backyard bird population. Which of the graphs or charts below is the most appropriate for representing these percentages?



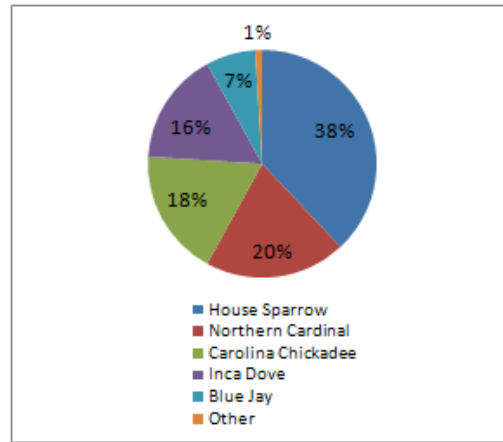
W.



X.



Y.



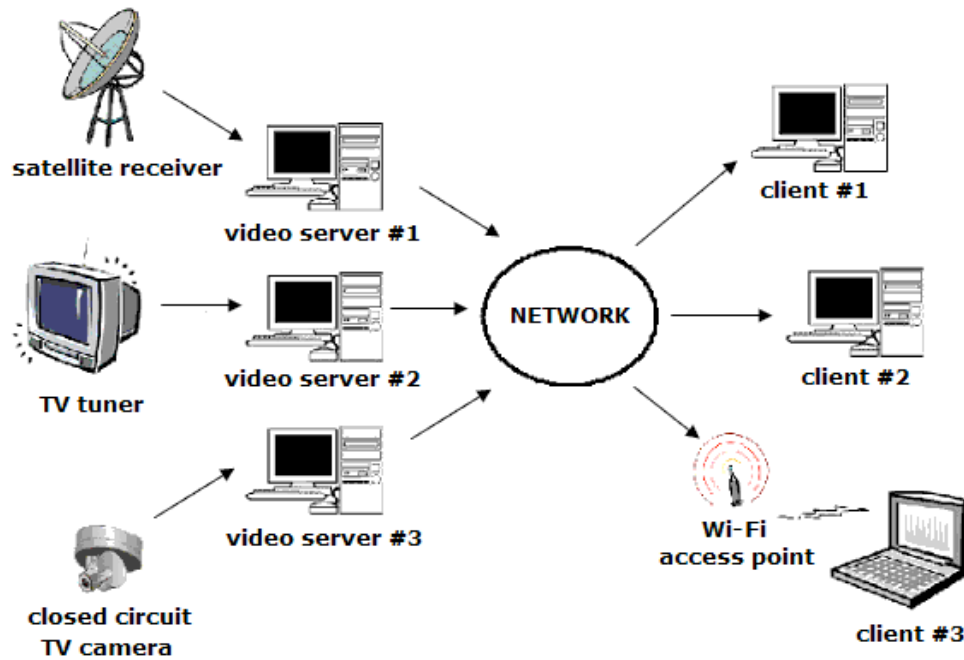
Z.

- A. W
- B. Z
- C. X
- D. Y

20. In what way does the human digestive system primarily interact with the human circulatory system?

- A. The digestive system breaks food down into nutrients that can be distributed to the body through the circulatory system.
- B. The circulatory system is an open system whereas the digestive system is a closed system.
- C. The circulatory system supplies the digestive system with nutrients while the digestive system supplies the circulatory system with blood.
- D. The digestive system filters wastes out of blood found in the circulatory system.

21. The diagram below shows a simple internet protocol television system. This system allows television services to be transmitted through the internet.



Which of the following is an input into this system?

- A. the network
- B. TV tuner
- C. client #3
- D. video server #3

22.



A gardener wants to produce the flower shown above. Which of the following flowers should the gardener selectively breed in order to increase the probability of producing the desired flower?



W



X



Y



Z

- A. X and Y
 - B. W and Y
 - C. W and X
 - D. Y and Z
-

23. A solar eclipse occurs when

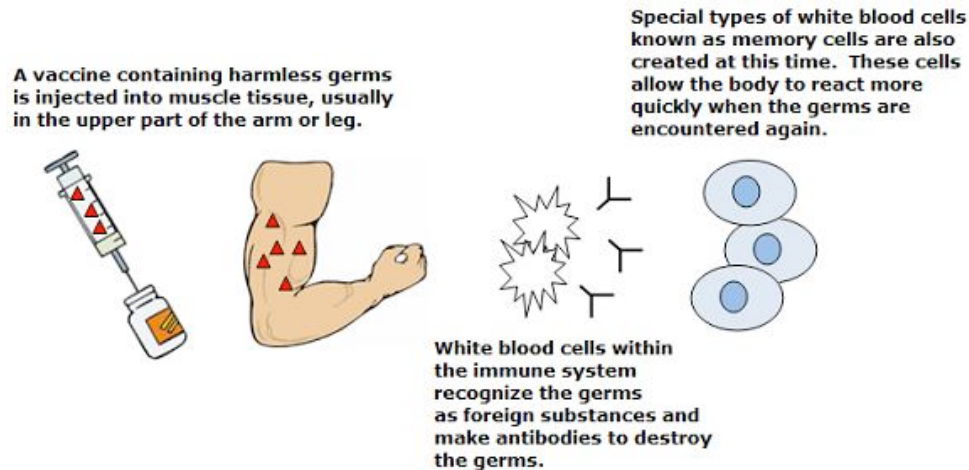
- A. clouds cover the sun.
 - B. Earth passes between the sun and the moon.
 - C. the moon passes between the sun and Earth.
 - D. the sun passes between Earth and the moon.
-

24. Mandy is testing an unknown solution to determine whether it is an acid or a base. She places a piece of red litmus paper into the solution and the paper turns blue.

Mandy's unknown solution

- A. does not have a pH.
 - B. is a base.
 - C. is a neutral substance.
 - D. is an acid.
-

25.



According to the above diagram, how do vaccines work?

- A. Vaccines induce a disease within an organism so antibodies can be stored for later use.
- B. Vaccines only allow the body part that was injected to build a resistance to a disease; multiple injections are needed throughout the body to provide full immunity.
- C. Since harmless germs are used, vaccines allow an organism to build immunity to a disease without actually causing the disease.
- D. Vaccines create white blood cells and memory cells within the human body.

26. Below is a false-color satellite image of the Grand Canyon.



Image courtesy of NASA, Earth Observatory

The canyon was formed by crustal uplift and by

- A. nearby volcanic eruptions.
- B. chemical weathering from the atmosphere.
- C. erosion from the Colorado River.
- D. deposition from the Colorado River.

27. Which of the following is a testable question?

- A. Are tropical climates better than temperate climates?
 - B. Is the Earth's climate good or bad?
 - C. Does the Earth's climate change slowly?
 - D. Do tropical climates get more annual rainfall than arid climates?
-

28. Which of following are natural factors that can cause extinctions?

I. climate change

II. asteroid impacts

III. volcanic eruptions

IV. changes in oxygen levels in seawater

- A. I and IV only
 - B. I, II, III, and IV
 - C. II and III only
 - D. I, II, and III only
-

29. Antoine Lavoisier tested the concept of conservation of matter through a series of experiments. In his experiments,

- A. he was careful to conserve as much matter as possible so that only a small amount was destroyed.
 - B. the total mass of materials after the chemical reactions was greater than the total mass of materials before the reactions.
 - C. the total mass of materials before the chemical reactions equaled the total mass of materials after the reactions.
 - D. he was unable to conserve any matter, and all of it was destroyed.
-

The First Five Planets from the Sun

Planet	Mean Distance from Sun (millions of km)	Orbital Period of Revolution (Earth time)	Period of Rotation (Earth time)	Equatorial Diameter (km)	Density (g/cm ³)
Mercury	57.9	88 days	59 days	4,880	5.4
Venus	108.2	224.7 days	243 days	12,104	5.2
Earth	149.6	365.3 days	23 hours 56 minutes	12,756	5.5
Mars	227.9	687 days	24 hours 37 minutes	6,787	3.9
Jupiter	778.3	11.86 years	9 hours 50 minutes	142,800	1.3

30. Which of these planets has the shortest day?

- A. Jupiter
- B. Mars
- C. Mercury
- D. Venus

31. How do septic and sewage systems help improve the quality of surface and ground water?

- A. by channeling untreated waste water directly into surface and ground water
 - B. by containing waste water and preventing it from entering surface and ground water
 - C. by evaporating surface and ground water before waste water can contaminate it
 - D. all of these
-

32. Our Sun is one of many stars in the Milky Way Galaxy. The Milky Way is a/an _____ galaxy.

- A. super
- B. spiral
- C. elliptical
- D. irregular

33. The atmosphere is comprised mainly of

- A. nitrogen and oxygen.
- B. nitrogen and carbon.
- C. water and helium.
- D. oxygen and carbon.

34.

1																	18																																											
1	H 1.008																	He 4.003																																										
2	Li 6.941	Be 9.012											B 10.81	C 12.01	N 14.01	O 16.00	F 19.00	Ne 20.18																																										
3	Na 22.99	Mg 24.31											Al 26.98	Si 28.09	P 30.97	S 32.07	Cl 35.45	Ar 39.95																																										
4	K 39.10	Ca 40.08	Sc 44.96	Ti 47.88	V 50.94	Cr 52.00	Mn 54.94	Fe 55.85	Co 58.93	Ni 58.69	Cu 63.55	Zn 65.39	Ga 69.72	Ge 72.61	As 74.92	Se 78.96	Br 79.90	Kr 83.80																																										
5	Rb 85.47	Sr 87.62	Y 88.91	Zr 91.22	Nb 92.91	Mo 95.94	Tc 98.91	Ru 101.1	Rh 102.9	Pd 106.4	Ag 107.9	Cd 112.4	In 114.8	Sn 118.7	Sb 121.8	Te 127.6	I 126.9	Xe 131.3																																										
6	Cs 132.9	Ba 137.3	La 138.9	Hf 178.5	Ta 180.9	W 183.8	Re 186.2	Os 190.2	Ir 192.2	Pt 195.1	Au 197.0	Hg 200.6	Tl 204.4	Pb 207.2	Bi 209.0	Po 209.0	At 210.0	Rn 222.0																																										
7	Fr 223.0	Ra 226.0	Ac 227.0	Rf 261.1	Db 261.1	Sg 263.1	Bh 264.1	Hs 265.1	Mt 268	Uun 269	Uuu 272	Uub 277	Uut 289	Uuq 289	Uup 289	Uuh 289	Uus 293	Uuo 293																																										
6	<table border="1"> <tr> <td>57</td><td>58</td><td>59</td><td>60</td><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td> </tr> <tr> <td>La</td><td>Ce</td><td>Pr</td><td>Nd</td><td>Pm</td><td>Sm</td><td>Eu</td><td>Gd</td><td>Tb</td><td>Dy</td><td>Ho</td><td>Er</td><td>Tm</td><td>Yb</td> </tr> <tr> <td>138.9</td><td>140.1</td><td>140.9</td><td>144.2</td><td>146.9</td><td>150.4</td><td>152.0</td><td>157.3</td><td>158.9</td><td>162.5</td><td>164.9</td><td>167.3</td><td>168.9</td><td>173.0</td> </tr> </table>																		57	58	59	60	61	62	63	64	65	66	67	68	69	70	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	138.9	140.1	140.9	144.2	146.9	150.4	152.0	157.3	158.9	162.5	164.9	167.3	168.9	173.0
57	58	59	60	61	62	63	64	65	66	67	68	69	70																																															
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb																																															
138.9	140.1	140.9	144.2	146.9	150.4	152.0	157.3	158.9	162.5	164.9	167.3	168.9	173.0																																															
7	<table border="1"> <tr> <td>89</td><td>90</td><td>91</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>100</td><td>101</td><td>102</td> </tr> <tr> <td>Ac</td><td>Th</td><td>Pa</td><td>U</td><td>Np</td><td>Pu</td><td>Am</td><td>Cm</td><td>Bk</td><td>Cf</td><td>Es</td><td>Fm</td><td>Md</td><td>No</td> </tr> <tr> <td>227.0</td><td>232.0</td><td>231.0</td><td>238.0</td><td>237.0</td><td>244.1</td><td>243.1</td><td>247.1</td><td>247.1</td><td>251.1</td><td>252.0</td><td>257.1</td><td>258.1</td><td>259.1</td> </tr> </table>																		89	90	91	92	93	94	95	96	97	98	99	100	101	102	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	227.0	232.0	231.0	238.0	237.0	244.1	243.1	247.1	247.1	251.1	252.0	257.1	258.1	259.1
89	90	91	92	93	94	95	96	97	98	99	100	101	102																																															
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No																																															
227.0	232.0	231.0	238.0	237.0	244.1	243.1	247.1	247.1	251.1	252.0	257.1	258.1	259.1																																															

Legend: Atomic number (top left), Symbol (top center), Atomic weight (bottom center). Carbon (C) is highlighted in yellow.

Picture adapted from <http://www.chem.wisc.edu/areas/reich/handouts/periodic-table.GIF>.

(c)1998
Kromer Paul

What are the elements highlighted in yellow classified as?

- A. metalloids
- B. metals
- C. chemicals
- D. nonmetals

35.

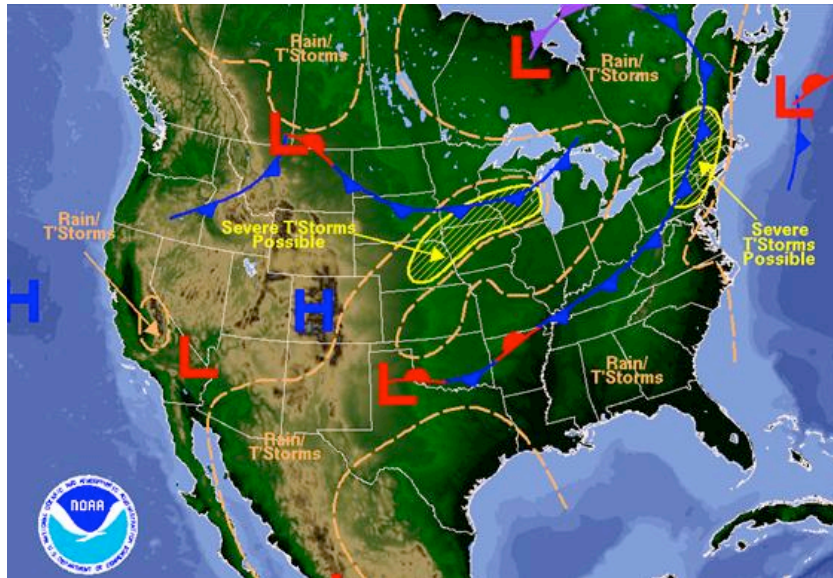


Image modified from NOAA

Based on the weather map above, rain and thunderstorms are associated mostly with _____ and _____ systems.

- A. warm fronts; low-pressure
- B. cold fronts; high-pressure
- C. warm fronts; high-pressure
- D. cold fronts; low-pressure

36. The Earth revolves around the sun once every _____.

- A. 48 weeks
- B. 360 days
- C. 24 hours
- D. 365 days

37. Robbie is trying to learn as much as he can about a rock that he found. This particular rock contains some fossils. What can Robbie learn from the fossils?

- A. the relative age of the rock
- B. whether the rock is a compound or an element
- C. whether or not the rock can float
- D. the mass of the rock

38. In animal cells, DNA is organized in the _____.

- A. nucleus
- B. endoplasmic reticulum
- C. lysosomes
- D. cytoplasm

39. About 1.7% of the water on Earth is in its solid form. Most of this water is located at high elevations or

- A. near the south pole and equator.
- B. near the equator.
- C. near the north and south poles.
- D. in the western hemisphere.

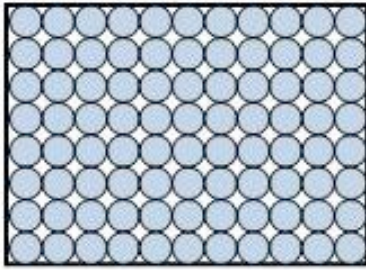
40. In which situation is a chemical reaction occurring?

- A. salt dissolves in water
- B. a nail rusts
- C. ice melts
- D. a glass breaks

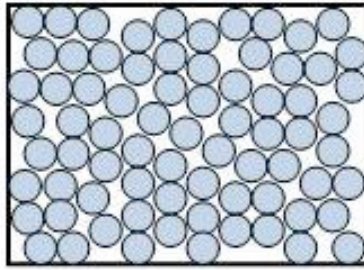
41. The gravitational force on the surface of Mars is less than it is on Earth's surface. The weight of an astronaut's toolbelt on Mars is _____ its weight on Earth. The toolbelt's mass on Mars is _____ its mass on Earth

- A. less than; equal to
 - B. greater than; equal to
 - C. greater than; less than
 - D. less than; greater than
-

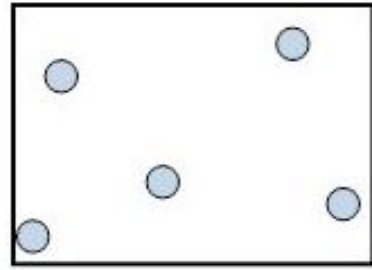
42.



SOLID



LIQUID



GAS

The images above show atoms in different states of matter. In which state of matter do the atoms have the highest temperature and the greatest average energy of motion?

- A. gas
- B. liquid
- C. solid
- D. Temperature and energy of motion are constant for all three states of matter.

43. During the summer, cool coastal breezes blow from the ocean toward the land during the day, and they blow from the land toward the ocean during the night. This shift in wind direction is due to temperature differences in the air over the land and the ocean.

What specific role does the ocean play in this process?

- A. The ocean retains less heat, which causes the temperature of the air above it to change drastically between day and night.
- B. The ocean retains less heat, which stabilizes the temperature of the air above it.
- C. The ocean retains more heat, which causes the temperature of the air above it to change drastically between day and night.
- D. The ocean retains more heat, which stabilizes the temperature of the air above it.

44. Julie is walking her dog around her neighborhood. She walks 1.5 miles in 45 minutes. What is her average speed?

- A. 2.0 miles per hour
 - B. 0.03 miles per hour
 - C. 67.5 miles per hour
 - D. 1.2 miles per hour
-

45. Natalie placed sandy loam soil in a 1 L container with drainage holes in the bottom. Then, she poured 250 mL of water on the soil and measured the quantity of water that passed through the container.

Meanwhile, Dave simultaneously performed the same experiment in the classroom next door. Their data appears below:

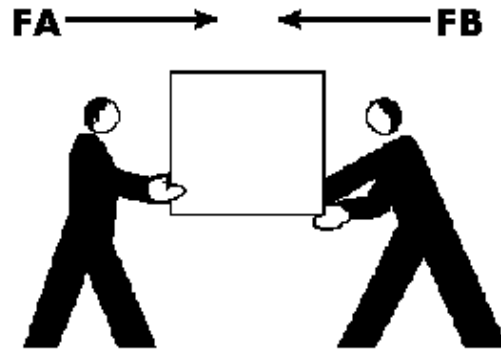
Trial	Volume of Water
1	130 mL
2	125 mL
3	135 mL
4	127 mL
5	133 mL
Natalie's Mean	130 mL

Trial	Volume of Water
1	128 mL
2	137 mL
3	132 mL
4	120 mL
5	133 mL
Dave's Mean	130 mL

Which of the following statements is true of Natalie and Dave's results?

- A. The differences in their results are significant since they do not completely match.
 - B. The differences in their results are not significant since their means are the same.
 - C. The differences in their results are significant since they did not perform their experiments in the same classroom.
 - D. The differences in their results are not significant since all of their measurements are identical.
-

46.



From the illustration above, if the object is not moving, we can conclude that:

- A. Forces F_A and F_B are equal and opposite.
 - B. Force F_A is greater than force F_B .
 - C. Force F_A is less than force F_B .
 - D. Forces F_A and F_B are equal and in the same direction.
-

47. Which of the following is a characteristic of a good index fossil?

- A. The fossil closely resembles many other types of fossils.
 - B. The organism lived only during a short part of Earth's history.
 - C. The organism was restricted to only one location on Earth.
 - D. Only one specimen of the fossil is found in a given rock layer.
-

48. A gas is a phase of matter in which the particles possess a lot of energy. In this phase, gas particles also move very fast and are spread very far apart. What happens if a gas is cooled to a lower temperature?

- A. The volume of the gas decreases.
 - B. The volume of the gas increases.
 - C. The quantity of gas decreases.
 - D. The pressure of the gas increases.
-

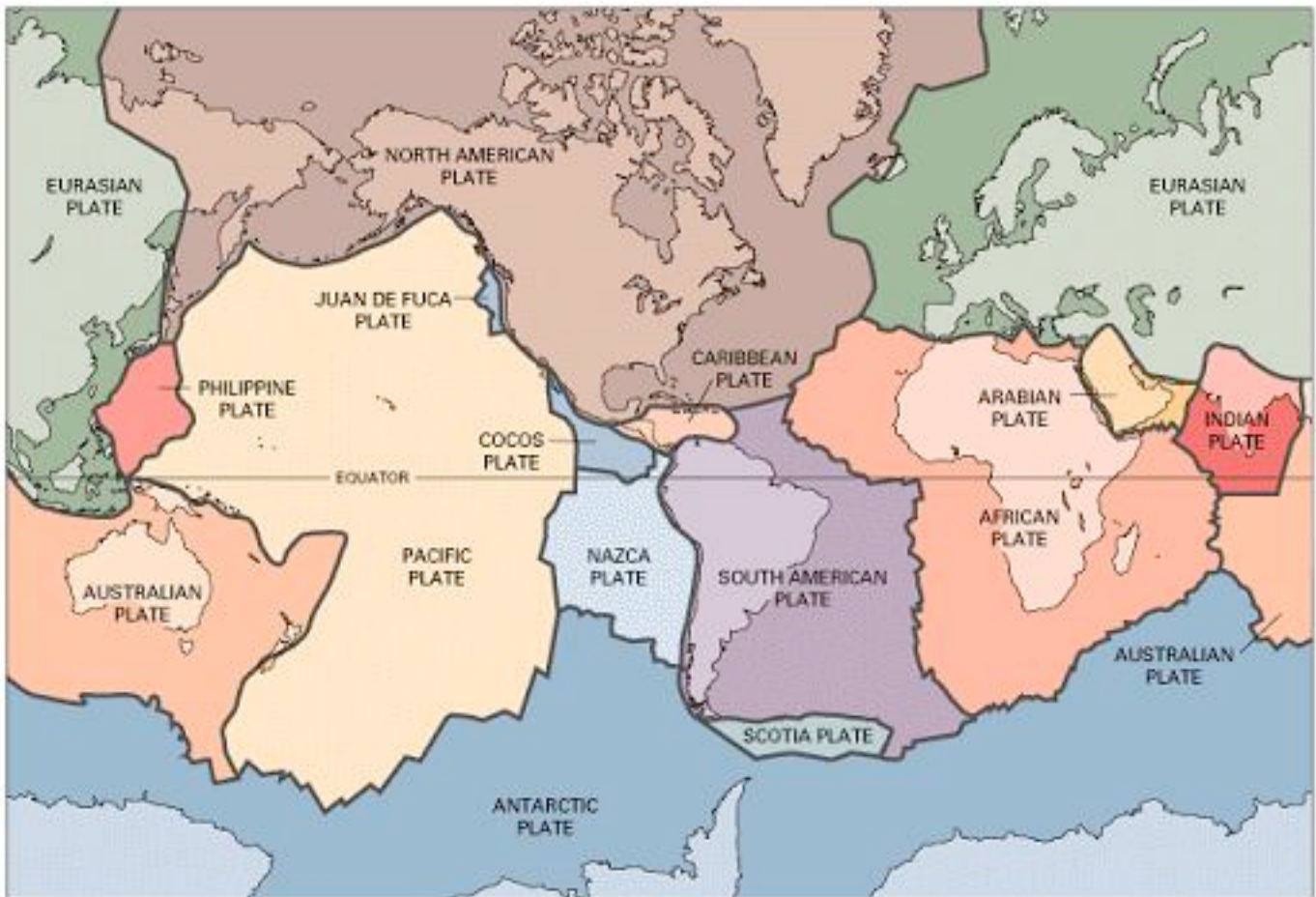
49. Elizabeth collects different types of rocks whenever she goes on vacation. She has rocks that contain shiny crystals, grainy rocks, and rocks that are smooth. These rocks are formed by different processes. Which of the following is **NOT** a process by which rocks are formed?

- A. freezing of sediments
- B. cooling of magma at Earth's surface
- C. compaction of sediments
- D. heat and pressure within Earth

50. Over time, rocks begin to break down to form soil. Which of the following is a way that rocks can be broken down?

- A. a full moon
- B. wind erosion
- C. an eclipse
- D. thunder

51.



As shown in the image above, the Earth's outermost layer is divided into several tectonic plates. Which of the following is true about these plates?

- A. All of Earth's tectonic plates move away from each other.
 - B. All of Earth's tectonic plates move toward each other.
 - C. The plates move either toward or alongside each other, but not away from each other.
 - D. Some plates move toward each other, while others move away from or alongside each other.
-

52. Gregor hits an anvil with a hammer, causing the anvil to rapidly vibrate.



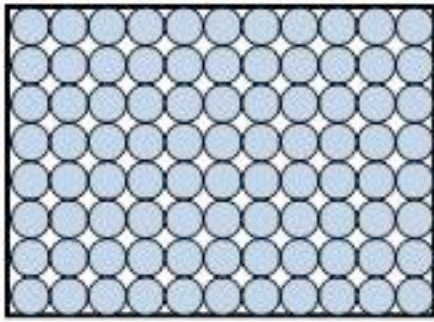
How is the energy of the anvil's vibration transferred to the surrounding air?

- A. as visible light waves
- B. as x-rays
- C. as electric impulses
- D. as sound waves

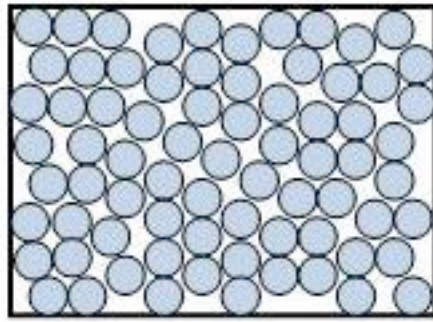
53. When a gas changes into a liquid, it is called _____, and the speed of the molecules is _____.

- A. sublimation; increasing
 - B. condensation; decreasing
 - C. evaporation; decreasing
 - D. condensation; increasing
-

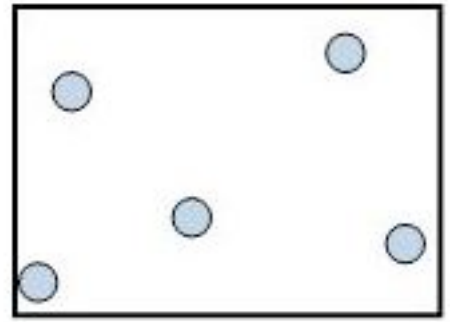
54.



SOLID



LIQUID

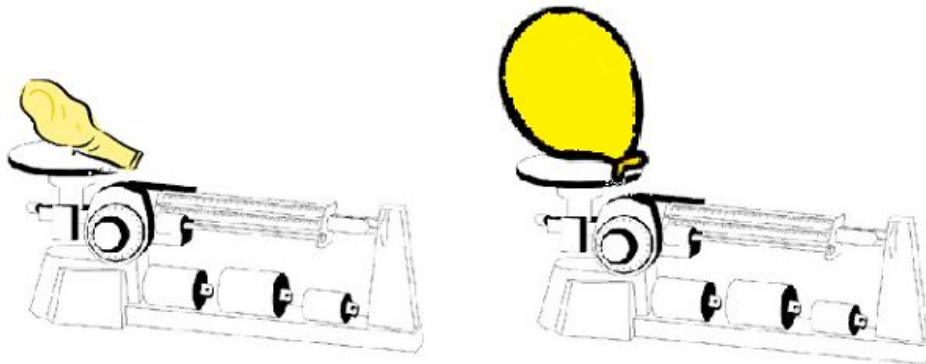


GAS

The images above show atoms in different states of matter. Based on their arrangements, the atoms move the most freely in the _____ state and the least freely in the _____ state.

- A. solid; gas
- B. gas; liquid
- C. liquid; solid
- D. gas; solid

55. Naomi hypothesized that air does not have mass. To check her hypothesis, Naomi measured the mass of a balloon. Then, she filled the balloon with air and measured the mass of the filled balloon. After subtracting the mass of the balloon from the mass of the filled balloon, Naomi calculated that the mass of the air in the balloon was 2.5 g.



Naomi assumed that she made a mistake because she expected the air to have no mass, so she changed her data and recorded the mass of air as 0 g. With this new data, she concluded that her hypothesis was confirmed.

This example shows how

- A. her balance must have been improperly calibrated.
 - B. the conclusion must always match the hypothesis.
 - C. it is acceptable to change one's data to match the hypothesis.
 - D. prior expectations can influence the conclusions of scientific investigations.
-

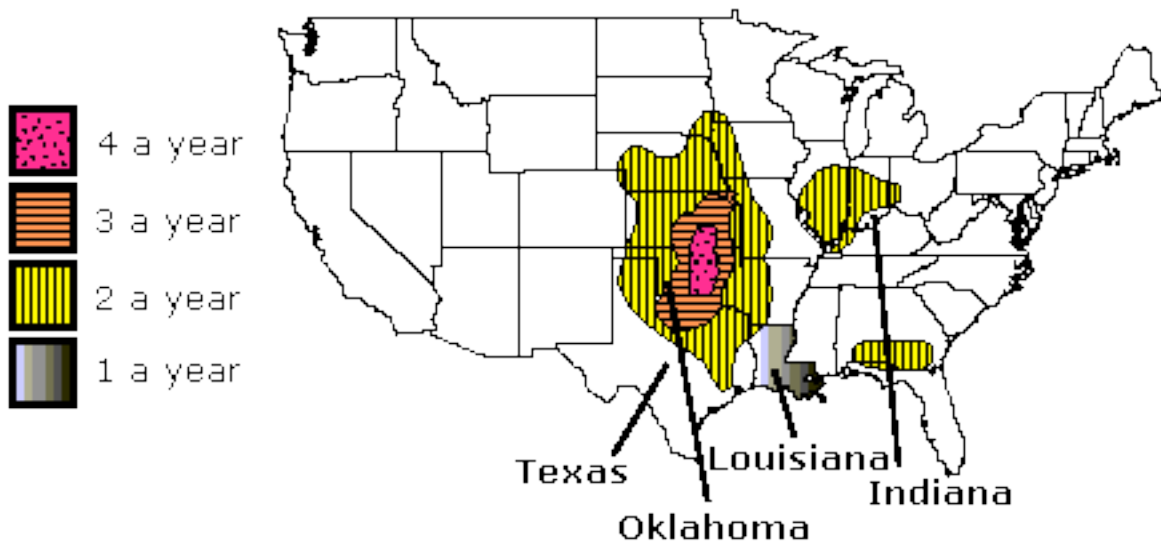
56. Which of the following statements is true?

- A. Our galaxy contains many billions of universes, and each universe contains many billions of stars.
- B. Our solar system contains many billions of stars, and each star contains one galaxy.
- C. The universe contains many billions of galaxies, and each galaxy contains many billions of stars.
- D. The universe contains one galaxy, which contains about three million stars.

57. To determine the location of an earthquake's epicenter, scientists measure the arrival times of _____ waves, which arrive first, and _____, which arrive second.

- A. S; P
- B. surface; P
- C. P; S
- D. S; surface

58.



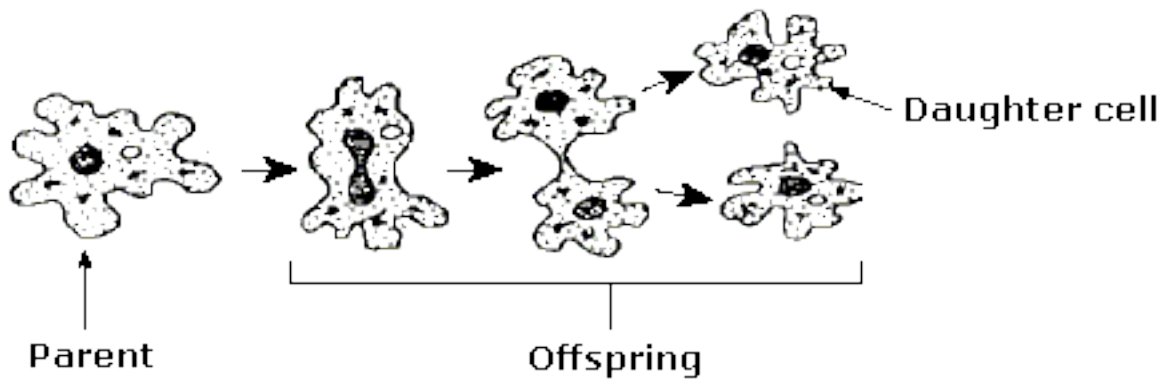
Tornadoes occur primarily with storm fronts during spring and summer months. According to this map, which state averages the most tornadoes yearly?

- A. Texas
- B. Indiana
- C. Louisiana
- D. Oklahoma

59. An increase in distance between two objects will _____ the gravitational force between them. An increase in the total mass of two objects will _____ the gravitational force between them.

- A. decrease; increase
- B. increase; decrease
- C. decrease; decrease
- D. increase; increase

60.



Which type of reproduction is shown in the diagram?

- A. asexual reproduction
- B. fertilization
- C. sexual reproduction
- D. mammal reproduction

61. Christopher collected a dozen leaves from each of three oak trees. He measured each leaf from the stem to the opposite tip. Part of his lab book is shown below.

	<u>Tree 1</u>	<u>Tree 2</u>	<u>Tree 3</u>
	13.2 cm	12.9 cm	4.9 in
	12.0 cm	12.4 cm	5.0 in
	12.8 cm	12.5 cm	5.3 in
	12.2 cm	13.1 cm	5.2 in
	12.3 cm	12.7 cm	4.8 in

Christopher wants to compare the data he collected, but he made an error while recording the measurements. What did Christopher do wrong? (See the answer choices on the next page)

- A. Christopher did not organize his data so that the leaf sizes are listed for each tree.
 - B. Christopher did not record leaf size data for enough trees.
 - C. Christopher did not report the size of each leaf in units of length.
 - D. Christopher recorded part of his data in SI units and part of it in English units.
-

62. The Earth rotates around its axis once every

- A. 52 weeks.
 - B. 365 days.
 - C. 24 hours.
 - D. 29.5 days.
-

63. The MAIN energy source that drives the water cycle is

- A. chemical energy.
 - B. the Sun.
 - C. the wind.
 - D. hydroelectric energy.
-

64. Which of the following is a limitation of using a model to study a natural event?

- A. The model and the results it generates will have no relation at all to the actual event.
 - B. The results of a model event are often much more accurate than those of the actual event.
 - C. The results of a model event may not be similar enough to the results of the actual event.
 - D. The size and design of the model will be too similar to the actual event.
-

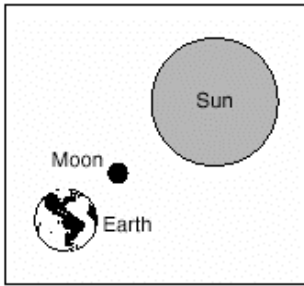
65. _____ carry out the life functions in all living organisms, including protists, fungi, plants, and animals.

- A. Genes
- B. Cells
- C. Atoms
- D. Bacteria

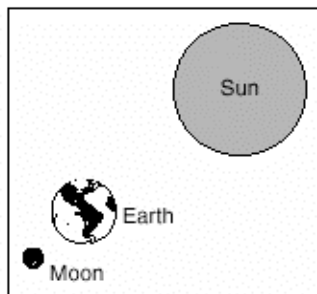
66. Compounds can be made by combining _____ two or more atoms in _____ ratio.

- A. certain sets of; any
- B. certain sets of; a specific
- C. any; a specific
- D. any; any

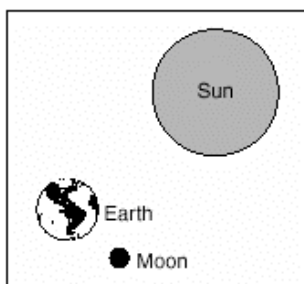
67. Which of the following diagrams represents a solar eclipse?



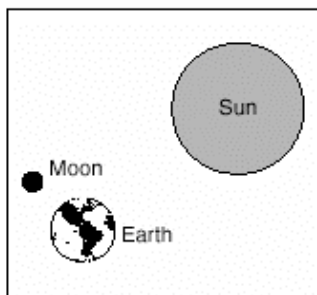
W.



X.



Y.



Z.

- A

- B

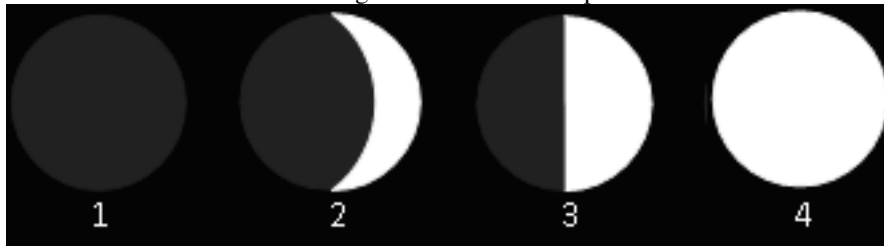
- C

- D

68. When baby birds are ready to hatch out of their eggs, they peck on the inside of their shells until they can get out. This is an example of

- A. an autoimmune response.
 - B. a learned behavior.
 - C. an inherited behavior.
 - D. a feedback loop.
-

69. The Moon revolves around the Earth. As it revolves, the Moon's appearance changes because different amounts of the illuminated side of the Moon are visible from Earth. These visual changes are known as the phases of the Moon.



Which Moon phase is shown as number 3 in the picture above?

- A. first quarter Moon
 - B. new Moon
 - C. waxing crescent Moon
 - D. full Moon
-

70. Which of the following is a noncontact force?

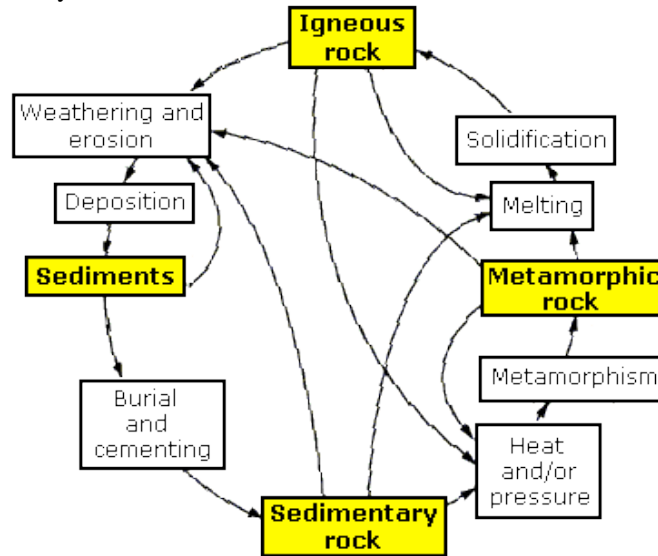
- A. electrical forces
 - B. magnetic forces
 - C. gravitational forces
 - D. all of these
-

71. If Jan takes exactly 27 minutes to walk to school each day, and her school is 2.3 miles away, what is her average walking speed (rounded to the nearest tenth)?

- A. 0.1 miles per min

- B. 0.9 miles per min
- C. 11.7 miles per min
- D. 62.1 miles per min

72. The diagram below shows the rock cycle.



Which two processes result in the formation of igneous rocks?

- A. crystallization then cementation
- B. sedimentation then precipitation
- C. compression then evaporation
- D. melting then solidification

73. The planets within our solar system can be divided into categories based on their composition. Terrestrial planets are composed mainly of rock and metal. Gas giants, on the other hand, are composed primarily of hydrogen and helium.

The terrestrial, or rocky, planets within our solar system are

- A. Earth, Venus, Saturn, and Neptune.
- B. Jupiter, Saturn, Uranus, and Neptune.
- C. Mercury, Venus, Earth, and Mars.
- D. Mercury, Mars, Jupiter, and Uranus.

74. Rex makes himself a bowl of cereal. He puts 28 g of cereal in a bowl and then adds 245 g of milk. Before eating the cereal, he remembers that he has not yet finished his homework, and he runs off to his room to complete his work.

Fifteen minutes later, Rex comes back to the kitchen to eat his cereal. He notices that the milk has soaked into the cereal grains and made them larger. Which of the following is true about Rex's cereal-milk mixture? (answer choices are on the next page)

- A. The mass of the cereal-milk mixture is now greater than 273 g because the cereal grains have increased in size.
 - B. The mass of the cereal-milk mixture is equal to 217 g, which is the difference in mass between the milk and cereal grains.
 - C. The mass of the cereal-milk mixture is still 273 g even though the volume of the cereal grains has increased.
 - D. The mass of the cereal-milk mixture is now less than 273 g because the cereal grains have decreased in density.
-

75. A renewable resource is a resource that may be replaced by nature in a relatively short time span. A non-renewable resource occurs in limited amounts and may take millions of years to replace. Which of the following is a non-renewable resource?

- A. sunlight
 - B. wind
 - C. coal
 - D. water
-

76. Length measurement in the International System (SI) is expressed in

- A. meters.
 - B. liters.
 - C. feet.
 - D. degrees Celsius.
-



77.

Image courtesy of NASA, Earth Observatory

The satellite image above shows a large island off the coast of Italy in the Mediterranean Sea. The arrows are pointing to _____ caused by _____.

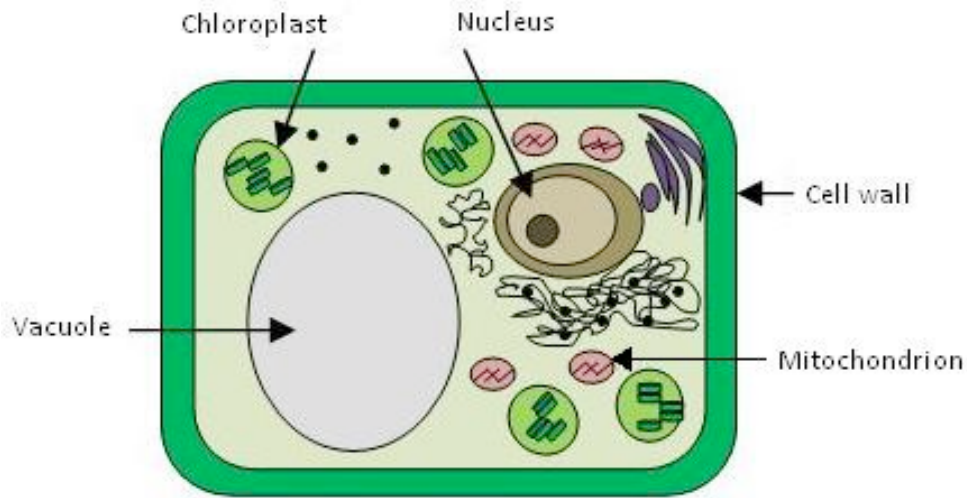
- A. deposition; the jet stream
- B. runoff; erosion
- C. ash and dust; a volcano
- D. an ocean current; the sea

78. The Earth's winds are caused by uneven heating of the atmosphere by solar radiation. The uneven heating causes air masses to have different temperatures and densities.

Which of the following correctly explains how these differences cause the air masses to move?

- A. Warmer, less dense air masses rise in the atmosphere; colder, denser air masses sink in the atmosphere.
- B. Colder, denser air masses rise in the atmosphere; warmer, less dense air masses sink in the atmosphere.
- C. Warmer, denser air masses rise in the atmosphere; colder, less dense air masses sink in the atmosphere.
- D. Colder, less dense air masses rise in the atmosphere; warmer, denser air masses sink in the atmosphere.

79. Anya looks at a slide of a cell under a microscope. The cell has a thick cell wall and contains several chloroplasts.



What can Anya determine about the cell?

- A. It is a muscle cell.
 - B. It is a plant cell.
 - C. It is an animal cell.
 - D. It is a sex cell.
-

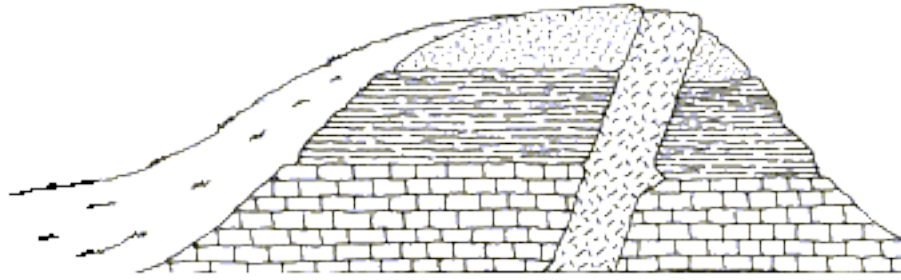
80. Reading glasses use what property of light waves to help people see better?

- A. wave theory
 - B. reflection
 - C. refraction
 - D. particle theory
-

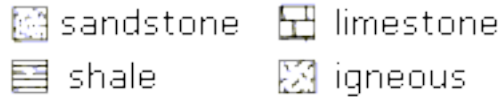
81. Which statement about gravitational attraction is correct?

- A. The less massive a body is, and the farther an object is from its center of mass, the stronger the gravitational attraction the body exerts on the object.
 - B. The less massive a body is, and the closer an object is to its center of mass, the stronger the gravitational attraction the body exerts on the object.
 - C. The more massive a body is, and the closer an object is to its center of mass, the stronger the gravitational attraction the body exerts on the object.
 - D. The more massive a body is, and the farther an object is from its center of mass, the stronger the gravitational attraction the body exerts on the object.
-

Diagram of a Hillside



Key:



The diagram above shows a vertical section of a hillside. Which of the formations in the hillside is the **youngest**?

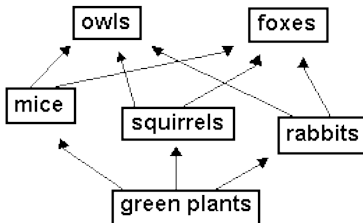
- A. shale formation
- B. sandstone formation
- C. igneous formation
- D. limestone formation

83. Which of the following statements BEST describes a virus?

- A. A virus needs a living cell's waste for fuel.
- B. A virus needs a living host cell to reproduce.
- C. A virus is always active and reproducing, whether inside or outside a host cell.
- D. A virus only infects cells which are dead.

84. Many natural ecosystems have been destroyed by human activity. To better manage our remaining natural ecosystems, we must first understand how the ecosystems are structured. One way to do this is to determine how the organisms in the ecosystem obtain the matter and energy they need to survive. The figure below shows a simplified food web.

Often, organisms compete with each other for a food source. Which of the following pairs of organisms compete with each other for food?



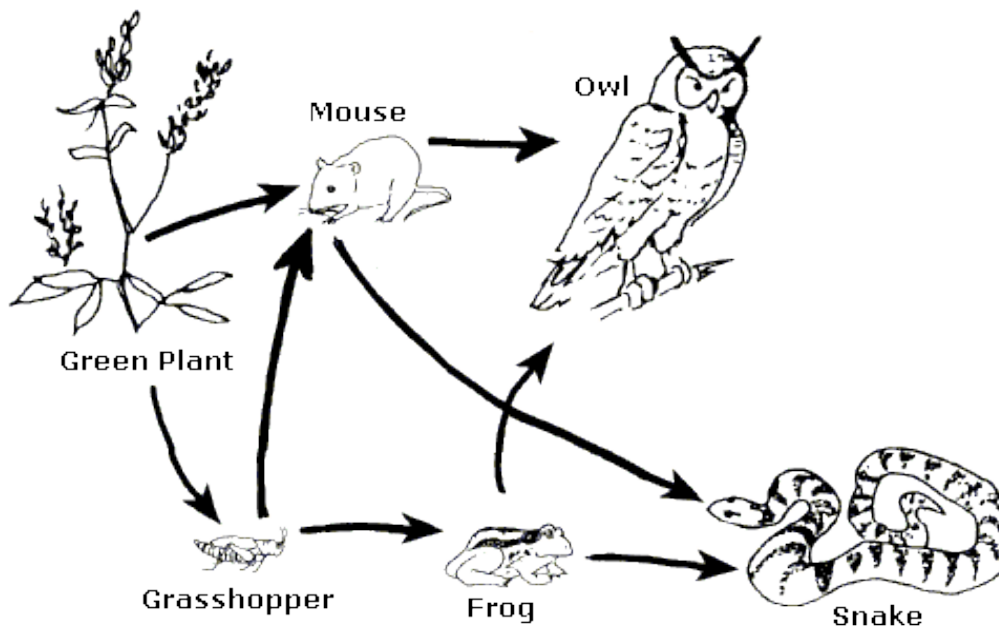
Note: The arrows point in the direction that matter and energy flow.

- A. squirrels and owls
 - B. mice and rabbits
 - C. rabbits and green plants
 - D. mice and owls
-

85. Applying force to an object in motion can change

- A. the object's speed but never its direction.
 - B. the object's direction and its speed.
 - C. neither the object's speed nor its direction.
 - D. the object's direction but never its speed.
-

86.



Which is a producer in the food web above?

- A. grasshopper
 - B. green plant
 - C. mouse
 - D. snake
-

87. Which of the following processes requires the production of gametes through meiosis?

- A. sexual reproduction
 - B. cellular respiration
 - C. photosynthesis
 - D. asexual reproduction
-

88. _____ is the only form of heat transfer that can occur across empty space. This means that no solid, liquid, or gas molecules are required for the transfer.

- A. Reduction
 - B. Convection
 - C. Radiation
 - D. Conduction
-

89. Fossils similar to marine life found in the oceans today have been found in rocks on top of mountains. How can this be explained?

- A. Marine organisms were once able to breathe air.
 - B. Marine organisms have evolved from land organisms.
 - C. The marine life can live on land or sea.
 - D. The rocks in which the fossils were found were formed under an ocean.
-

90. Cynthia measures amount of rain falling into in a rain gauge in her back yard every day for the month of April. How can Cynthia use her data to see if this April's rainfall was typical of her town's climate?

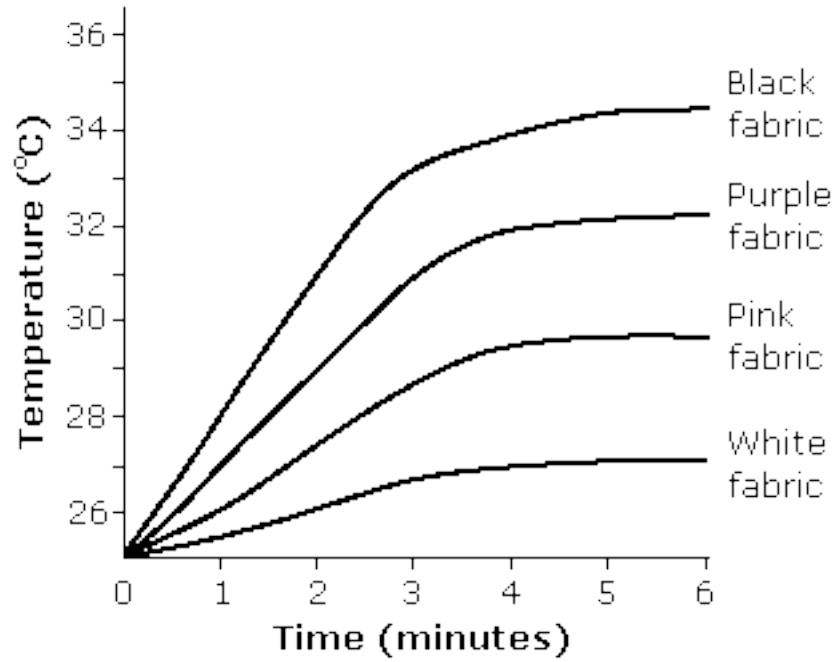
- A. She can compare the amount of rain that fell on the wettest day to the amount that fell on the driest day.
 - B. She can subtract the amount of rain that fell on the wettest day from the total amount of rain that fell in April.
 - C. She can compare the amount of rain that fell on April 1st to the amount that fell last June 1st.
 - D. She can compare the total amount of rain that fell to the average amount of rain that has fallen in past Aprils.
-

During the summer a student noticed the color of the clothes she wore affected how hot she felt. The student designed an experiment to test this.

The student obtained four identical samples of sand. Each sample was covered with a different color of cotton fabric. Each sample was then placed directly under a 110-watt lightbulb. The student recorded the initial temperatures of the sand, then turned on the

lamps. At one-minute intervals, for six minutes total, the student measured the temperature of each sample. The data is shown in the graph below.

Temperature of Samples



91. According to the graph, which sample had the lowest final temperature?

- A. purple
- B. black
- C. pink
- D. white

92. Some rocks are formed by heat and pressure. What is the heat source for rock formation?

- A. heat from forest fires
 - B. heat from the sun
 - C. heat from Earth's interior
 - D. heat from electrical currents
-

93. What is the **first** step in designing a product?

- A. identify the need or want
 - B. communicate the solution
 - C. model a solution
 - D. build a prototype
-

94. Joe wanted to experiment with different factors that affect the freezing rate of water. He put two cups of water into each of two identical glass bowls. Next, he stirred sugar into the water in one of the bowls, and he put both bowls in the freezer. He checked their temperatures after one hour, and measured how much water was still liquid in each bowl.

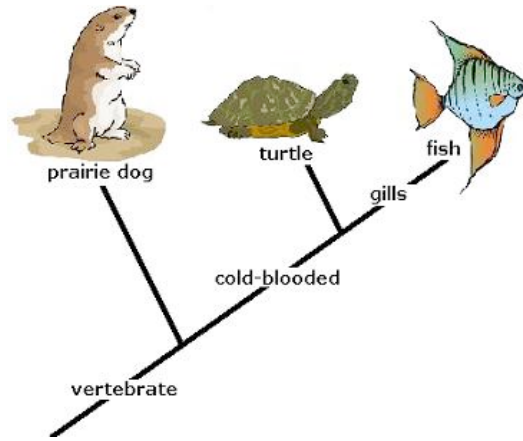
What was the variable that changed in this experiment?

- A. the size and shape of each bowl
 - B. the amount of sugar mixed into each bowl
 - C. the amount of water each bowl contained
 - D. the amount of time each bowl was left in the freezer
-

95. When a gas changes into a liquid, it is called _____, and the speed of the molecules is _____.

- A. evaporation; decreasing
 - B. sublimation; increasing
 - C. condensation; decreasing
 - D. condensation; increasing
-

96.



Which of the following statements BEST describes a relationship between two animals in the diagram?

- A. The turtle and fish are cold-blooded.
- B. The turtle and prairie dog are cold-blooded.
- C. The turtle and prairie dog have gills.
- D. The turtle and fish have gills.

97.



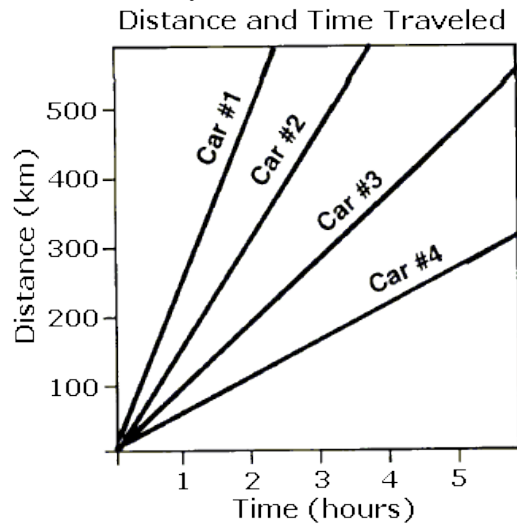
In the visible spectrum of light, which color has the longest wavelength?

- A. yellow
- B. red
- C. green
- D. blue

98. The simplest unit of a given chemical substance is a group of two atoms. This chemical substance must be

- A. atomic hydrogen.
 - B. water.
 - C. an element.
 - D. a compound.
-

99. The graph below shows the distance and time traveled by four cars.



Which car traveled the slowest?

- A. Car #2
 - B. Car #4
 - C. Car #3
 - D. Car #1
-

100. The reason the same side of the Moon always faces the Earth is because

- A. the Moon does not rotate on its axis or revolve around the Earth.
- B. the Moon does not rotate on its axis as it revolves around the Earth.
- C. the Moon rotates in a clockwise direction but revolves in a counterclockwise direction.
- D. the Moon completes one rotation on its axis each time it revolves around the Earth.

101. On April 20, 2010, an offshore drilling unit located in the Gulf of Mexico exploded. The explosion damaged the wellhead and allowed thousands of barrels of oil to leak into the water every day for approximately three months.



This image is courtesy of the US Coast Guard.

What was the impact of this explosion on the local populations and communities?

- A. Nesting sites in nearby marshes became polluted.
 - B. Fisherman and other coastal businessmen suffered economic losses.
 - C. Hundreds of birds, sea turtles, and other local animals were killed.
 - D. all of these
-

102. How do magma and lava compare?

- A. Lava is solid rock underground, whereas magma is molten rock on the surface.
 - B. Magma is molten rock underground, whereas lava is molten rock on the surface.
 - C. Magma is solid rock underground, whereas lava is molten rock on the surface.
 - D. Lava is molten rock underground, whereas magma is molten rock on the surface.
-

103. In living organisms, more cells are created for growth and repair through the process of

- A. photosynthesis.
 - B. cell specialization.
 - C. cell division.
 - D. predation.
-

104. Most objects in the solar system are held in regular and predictable motion by _____ and _____.

- A. gravity; inertia
 - B. gravity; magnetism
 - C. radiation; inertia
 - D. radiation; magnetism
-

105. After harvesting their main crops, such as corn and wheat, many farmers plant a second crop called a cover crop. This cover crop grows during the fall and winter and is then plowed over in the spring. What is the main purpose of a cover crop?

- A. to prevent erosion of the topsoil by wind and water
 - B. to prevent water runoff into other parts of the farmers' field
 - C. to restore minerals into the soil for next year's crops
 - D. to get rid of excess seed rather than storing during the winter
-

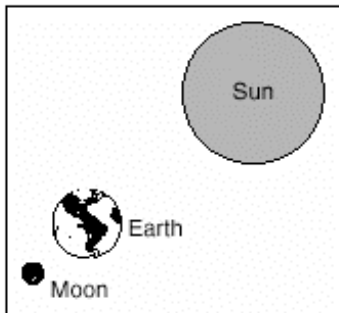
106. The data table below shows the average distance of four planets from the sun and the approximate time it takes those planets to orbit the sun.

Planet	Average Distance from the Sun (millions of kilometers)	Approximate Time It Takes the Planet to Orbit the Sun (Earth days)
Mercury	57.9	88
Venus	108.2	225
Earth	149.6	365
Mars	227.9	687

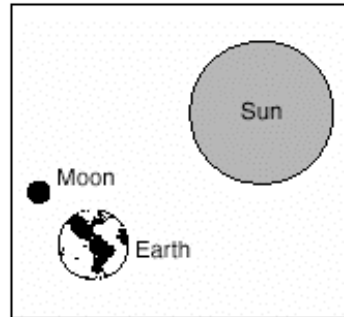
Which statement is best supported by the data in the table? (answer choices are on the following page)

- A. Venus takes more time to orbit the sun than Mars does.
- B. Mars takes less time to orbit the sun than Earth does.
- C. Mars takes more time to orbit the sun than Earth does.
- D. Venus takes less time to orbit the sun than Mercury does.

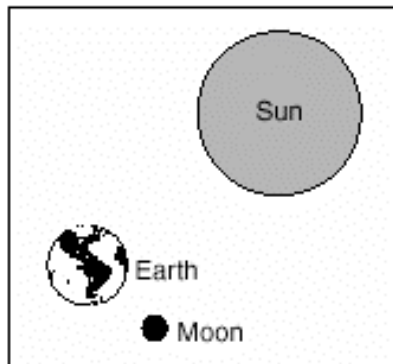
107. Which of the following diagrams represents a solar eclipse?



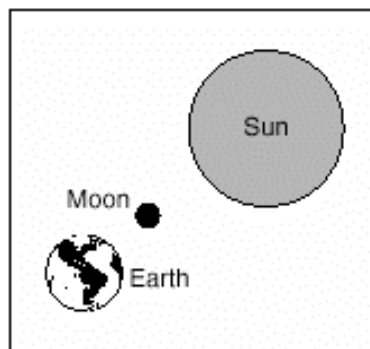
W.



X.



Y.



Z.

- A. Z
- B. W
- C. X
- D. Y

108. The Sun's gravitational pull keeps the _____ in their orbits, just as a planet's gravitational pull keeps its _____ in their orbits.

- A. moons; stars
 - B. planets; moons
 - C. planets; stars
 - D. stars; moons
-

109. Which of the following causes the change in seasons on Earth?

- A. the Earth revolving around the sun, and the moon revolving around the Earth
 - B. the tilting of the Earth on its axis, and the sun revolving around the Earth
 - C. the tilt of the Earth's axis, and the Earth revolving around the sun
 - D. the spinning of the Earth on its axis, and the Earth revolving around the sun
-

110. Which of the following devices typically transforms electrical energy into sound, visible light, and thermal energy?

- A. a loudspeaker
 - B. a light bulb
 - C. a television
 - D. a blender
-

111. Green plants get their food through

- A. digestion.
 - B. osmosis.
 - C. respiration.
 - D. photosynthesis.
-

112. In a certain ecosystem, foxes hunt and kill rabbits for food. The interaction between foxes and rabbits in this ecosystem can best be described as a _____ relationship.

- A. predator/prey
 - B. parasite/host
 - C. decomposer/prey
 - D. producer/consumer
-

113. Which of the following is true about the locations of earthquakes, volcanoes, and tectonic plate boundaries?

- A. Earthquakes and volcanoes are both commonly located near plate boundaries.
 - B. Earthquakes are commonly located near plate boundaries, but volcanoes are not.
 - C. Volcanoes are commonly located near plate boundaries, but earthquakes are not.
 - D. Neither earthquakes nor volcanoes are located near plate boundaries.
-

114. Greg is trying to push a box of books across the floor of his room. The box of books doesn't move because the forces on the box are _____. When his little brother walks in and starts pushing with him, the box begins to slide across the floor. His brother's pushing, combined with his, makes the forces on the box _____.

- A. not acting on the box; moving
 - B. unbalanced; balanced
 - C. shifting; still
 - D. balanced; unbalanced
-

115. Which of the following is an inherited trait in humans?

- A. eye color
 - B. clothing style
 - C. activity level
 - D. geographical location
-

116. Tobias notices that a particular kind of flower comes in many slightly different shades of pink. In other places, the same flower may be many shades of purple or even blue. He knows that some flowers' colors depend on where they are planted, while others' are determined by their breed. He hypothesizes that the different colors of these flowers are genetically different. Which of the following experimental setups is best for testing this hypothesis?

- A. Tobias collects data on many patches of the flowers he comes across. He records flower color, how much shade the plant gets, observes how moist the ground is, and measures the ground's pH. He compares his data and looks for patterns.
- B. Tobias transplants several of the flowers, swapping some from the middle of a pink patch with some in the middle of a blue patch. He observes the results.
- C. Tobias takes home several pink flowers, several purple flowers, and several blue flowers in pots. He breeds and interbreeds them, observing the results.
- D. Tobias experiments with using different fertilizers and composts, such as pine needles, observing if the presence of these substances will change the colors of the surrounding flowers.

117. Which of these is closest to the mass of a mouse?

- A. 10 micrograms
- B. 10 grams
- C. 10 milligrams
- D. 10 kilograms

Bread Mold Experiment

The table below shows the results of an experiment with bread molds.

Conditions		Amount of mold after two weeks
Temp. (°C)	Humidity	
0	Low	None
0	High	None
5.5	Low	Small amount
5.5	High	Medium amount
25.5	Low	Medium amount
25.5	High	Large amount

118. According to the data above, what are the best conditions for growing mold?

- A. cold temperature and high humidity
 - B. warm temperature and high humidity
 - C. warm temperature and low humidity
 - D. cold temperature and low humidity
-

119. Jeffery has a 1.0-gram sample of baking soda and a 5.0-gram sample of vinegar. He combines the two samples in a sealed plastic bag. The baking soda and vinegar react, releasing bubbles and heat.

After the reaction is complete, Jeffery measures the mass of the bag's contents. The bag's contents should measure _____.

- A. 1.0 grams
 - B. 7.0 grams
 - C. 5.0 grams
 - D. 6.0 grams
-

120. Chemical reactions produce new substances with different properties than the substances that reacted. Sometimes, the evidence for these new substances is easy to see. Other times, it is not quite so obvious.

Which of the following can be a clue that a chemical reaction has taken place?

- I. Bubbles form when two chemicals are mixed.
- II. A solution suddenly changes color.
- III. The chemicals are mixed at room temperature, and the solution heats up.

- A. I, II, and III
 - B. II only
 - C. I and II only
 - D. I and III only
-

Mineral	Hardness	Crystal System	Color	Streak	Specific Gravity
---------	----------	----------------	-------	--------	------------------

Graphite [C]	1	hexagonal	steel gray	black	2.2
Gypsum [CaSO ₄ ·2H ₂ O]	2	monoclinic	white to colorless to gray	white	2.3
Gold [Au]	2.5	isometric	golden yellow	golden yellow	19.3
Lazurite [(Na,Ca) ₈ Al ₆ Si ₆ O ₂₄ (S,SO ₄)]	5	isometric	brilliant blue	bright blue	2.3
Hematite [Fe ₂ O ₃]	6	hexagonal	steel gray	reddish-brown	5.1
Pyrite [FeS ₂]	6	isometric	golden yellow	greenish black	5.1

121. Which characteristic would best help to identify a sample of lazurite from among the other minerals in the table?

- A. hardness
- B. specific gravity
- C. streak
- D. crystal system

122. Which of the following is true about the Sun's radiation?

- A. It reaches the Earth with several wavelengths and one frequency.
- B. It reaches the Earth with a wide range of wavelengths.
- C. It reaches the Earth with several frequencies and one wavelength.
- D. It reaches the Earth only as ultraviolet light.

123. What is the source of energy that drives convection within the Earth's atmosphere?

- A. radiation received from the Sun
 - B. energy from the Earth's magnetic field
 - C. electrical energy from lightning
 - D. chemical energy in atmospheric molecules
-

124. Seatbelts save thousands of lives every year, but in order for seatbelts to work properly, the following recommendations must be followed:

- The shoulder strap should be worn tight across the chest. It should not be placed under the arm, nor should it be twisted or loose.
- The lap belt should be worn tight across the hips. It should not be placed across the midsection, nor should it be twisted or loose.
- The seat should be placed in the upright position, not reclined.

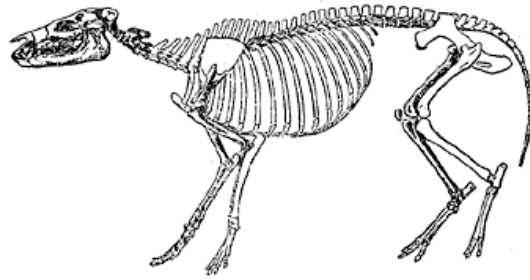
Failure to apply these recommendations could result in an injury or even death.

In what way does this example demonstrate that seatbelts are not a perfect technological design?

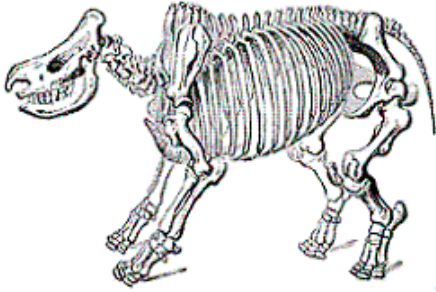
- A. Injury or death may result even when the seatbelt is being used.
 - B. It is unlawful to not wear a seatbelt in most states.
 - C. Seatbelts include both a shoulder strap and a lap belt.
 - D. Seatbelts save thousands of lives each year.
-

125. A _____ is a segment of DNA that contains the information necessary to express the inherited traits of an organism.

- A. sex cell
 - B. protein
 - C. phenotype
 - D. gene
-



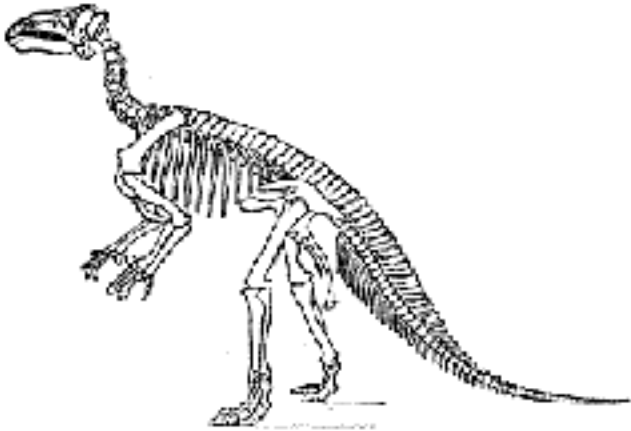
Based on similarities in their skeletal structures, which of the organisms below is most closely related to the organism shown above?



W.



X.



Y.



Z.

- A. X
 - B. Z
 - C. W
 - D. Y
-

127.



Our Sun is _____ the Milky Way galaxy.

- A. one of many stars in
 - B. the only star in
 - C. millions of miles away from
 - D. neighboring
-

128. Which of the following relationships is parasitic in nature?

- A. a fish cleaning worms from a shark
 - B. two buzzards fighting over a dead animal
 - C. a ladybug eating the aphids (insects) on a plant
 - D. a flea feeding on a dog
-



Picture adapted from http://www.theodora.com/maps/united_states_map.html.

Los Angeles, California, and Oklahoma City, Oklahoma, have the same latitude. They are also at about the same height above sea level. The chart shows each city's average high temperature for the month of January.

Average daily high temperature in January	
Los Angeles	18°C
Oklahoma City	8°C

Which is the BEST reason that Los Angeles was warmer than Oklahoma City?

- A. Los Angeles is close to the ocean, where the water moderates the temperature.
 - B. The Pacific Ocean is warmer than the Atlantic Ocean.
 - C. Oklahoma City gets less direct sunlight than Los Angeles.
 - D. Los Angeles has more people to warm it up.
-

130. Within a fluid system, parts of the system move and exchange positions due to their temperature differences. This movement serves as a form of heat transfer called _____.

- A. reduction
 - B. conduction
 - C. convection
 - D. radiation
-

131. Technological advances in space exploration have

- A. shown scientists that the ideas of the earliest astronomers were all fully correct.
 - B. taught scientists many new things about the Earth, but not other planets.
 - C. revealed that the Moon is more capable of supporting life than Earth is.
 - D. helped scientists modify and expand previous knowledge about the solar system.
-

132. Which of our Solar System's eight planets is a gas giant, is the largest of the eight, was discovered to have rings, and has a visible feature known as the Great Red Spot?

- A. Neptune
 - B. Saturn
 - C. Jupiter
 - D. Uranus
-

133. A bird is flying north at 18 m/s. A gust of wind from the North exerts an unbalanced force on the bird. What will happen to the bird's speed?

- A. It will decrease.
 - B. It will increase.
 - C. It will remain the same.
 - D. It will change directions.
-

134. As the wavelength of electromagnetic radiation increases

- A. the amplitude increases.
 - B. the frequency increases.
 - C. the frequency decreases.
 - D. the amplitude decreases.
-

135. Mr. White is purchasing light bulbs for his new home. He wonders if he should use incandescent light bulbs or fluorescent light bulbs, so he prepares a chart comparing their properties.

	Materials	Heat	Longevity	Cost per Bulb
Incandescent Bulb	argon, tungsten, filaments	emits heat since filaments must be heated to produce light	approx. 2,000 hours	approx. \$1 - \$2
Fluorescent Bulb	argon, tungsten, mercury vapor, barium, strontium, and calcium oxides	emits very little heat since light is generated by sending electrical discharges	approx. 30,000 hours	approx. \$5 - \$6

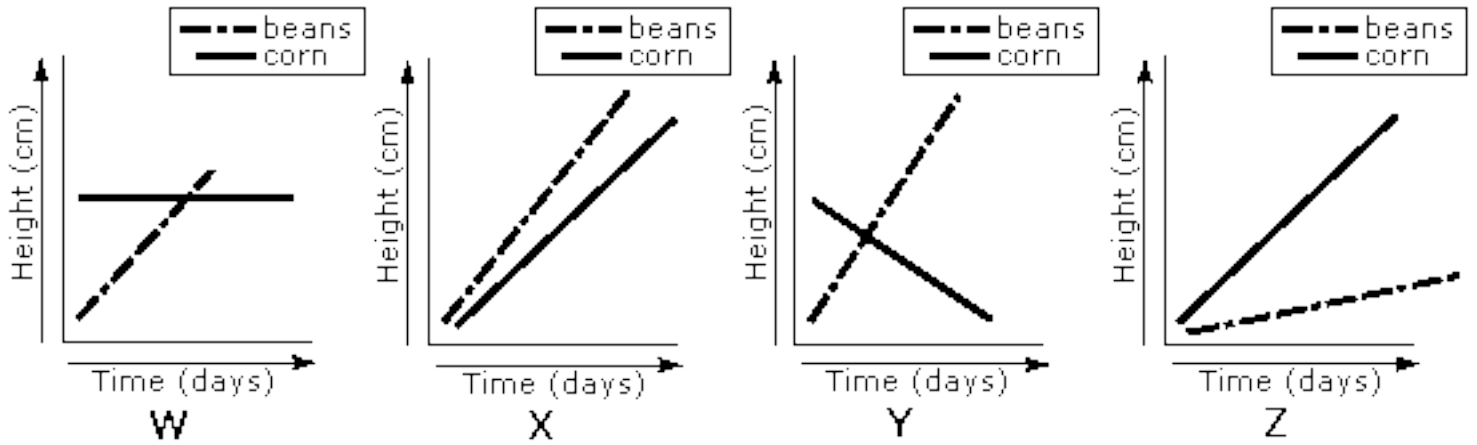
Which of the following correctly describes a trade-off of using incandescent light bulbs over fluorescent light bulbs?

- A. Incandescent light bulbs are cheaper to purchase, but they produce more heat than fluorescent light bulbs.
 - B. Incandescent light bulbs last longer than fluorescent light bulbs, but they are more expensive to buy.
 - C. Incandescent light bulbs produce more heat, but they last longer than fluorescent light bulbs.
 - D. Incandescent light bulbs are safer for the environment since they do not contain mercury, but they are more expensive to buy.
-

136. When more than one variable changes during a scientific experiment,

- A. the outcome of the experiment is linked to the variable that changes first.
 - B. the outcome of the experiment is linked to the variable that changes last.
 - C. the outcome of the experiment may not be linked to any one specific variable.
 - D. the outcome of the experiment is linked to the variable that changes the most.
-

137.



An experiment was conducted to measure the effect of equal amounts of fertilizer on the growth of bean plants and corn plants. The results indicated that, although both seedlings benefited from the fertilizer, the bean plants benefited slightly more. Which graph **best** shows these results?

- A. W
- B. Z
- C. X
- D. Y

138. John wanted to determine if increasing the amount of potassium in the soil of his garden would yield bigger cucumbers. He arranged four plots and gave each a different concentration of potassium. Which hypothesis **best** explains why the fourth plot yielded the poorest results?

Effect of Potassium on Cucumber Yard

	Plot1	Plot2	Plot3	Plot4
Size (meter²)	1.0	1.1	1.0	0.9
Amount of Potassium Applied (grams)	1.0	10.0	100.0	1000
Number of Cucumbers	2	4	7	1
Average Mass of Each Cucumber (grams)	113	181	227	91

- A. Weeds must have choked out the cucumbers growing there.

- B. The smaller plot accounts for the low cucumber yield and mass.
 - C. Any time potassium is added to soil, poor results occur.
 - D. Too much potassium probably damages the cucumber plants.
-

139. The picture below shows a sprinkler system that is often used to water large crop fields.



In this system, water is continuously supplied by a water source, the water travels through pipes, and the water exits through nozzles located every few feet along the pipes.

This system is an example of

- A. a closed system since a continuous supply of water is needed.
 - B. an open system since it constantly interacts with its environment.
 - C. a closed system since water exits through nozzles.
 - D. an open system since water is contained within pipes.
-

140. Phase changes are _____ changes that are _____.

- A. chemical; reversible
- B. chemical; permanent
- C. physical; reversible

D. physical; permanent

141. Which of the following energy sources is **nonrenewable**?

- A. wind
 - B. fossil fuel
 - C. hydroelectric
 - D. solar
-

142. _____ is the transfer of heat by the collision of atoms.

- A. Reduction
 - B. Convection
 - C. Radiation
 - D. Conduction
-

143.



Which of the following best explains why a person moves forward when he or she walks down the sidewalk?

- A. The person's feet push forward on the sidewalk; the sidewalk does not push on the person.
 - B. The person's feet push backward on the sidewalk; the sidewalk pushes forward on the person.
 - C. The person's feet push backward on the sidewalk; the sidewalk pushes backward on the person.
 - D. The person's feet push forward on the sidewalk; the sidewalk pushes forward on the person.
-

144. The first official vaccine was created in 1796 by the English scientist Edward Jenner. This vaccine reduced the chances of contracting smallpox. The next major vaccine was created in 1885 by the French scientist Louis Pasteur. Pasteur's vaccine reduced the chances of contracting rabies.

Throughout the 1900s, many other vaccines were created. For example, due to the work of an American microbiologist named Maurice Hilleman, vaccines that prevented Japanese B encephalitis, mumps, measles, hepatitis A, hepatitis B, chickenpox, meningitis, and pneumonia were created.

Which of the following statements is supported by the above information?

- A. People from different cultures and backgrounds have contributed to the development of vaccines over time.
 - B. Only physicians have contributed to the development of vaccines that cure diseases.
 - C. No new vaccines have been created since the 1900s.
 - D. Vaccines are 100% effective in the prevention of diseases, such as mumps, rabies, and smallpox.
-

145. Scientific knowledge

- A. can be modified as new information challenges prevailing theories.
 - B. must be modified by popular vote from the general public.
 - C. was modified regularly early in human history, but it can no longer be modified.
 - D. cannot be modified, even if new information challenges prevailing theories.
-

146.



Los Angeles, California, and Oklahoma City, Oklahoma, have the same latitude. They are also at about the same height above sea level. The chart shows each city's average high temperature for the month of January.

Average daily high temperature in January	
Los Angeles	18°C
Oklahoma City	8°C

Which is the BEST reason that Los Angeles was warmer than Oklahoma City?

- A. The Pacific Ocean is warmer than the Atlantic Ocean.
- B. Los Angeles has more people to warm it up.
- C. Oklahoma City gets less direct sunlight than Los Angeles.
- D. Los Angeles is close to the ocean, where the water moderates the temperature.

147. Dr. Martin is an ophiologist, or a scientist who studies snakes. During one experiment, Dr. Martin fed a snake a whole mouse and compared the mass of the snake before it consumed the mouse to the snake's mass immediately after it was fed.

According to the law of conservation of mass, how should the masses compare?

- A. The mass of the snake after feeding should be the same as the original mass of the snake.
- B. The mass of the snake after feeding should be equal to the original mass of the snake minus the mass of the mouse.
- C. The mass of the snake after feeding should be equal to the mass of the mouse.
- D. The mass of the snake after feeding should be equal to the original mass of the snake plus the mass of the mouse.

148. Since *Sputnik*, the first artificial satellite, was released into orbit in 1957, scientists have been working on developing new technology to allow people to learn more about space.

Space technology is not cheap, however. In fact, most satellites and space probes cost hundreds of millions of dollars to build and maintain. So, as a cost-cutting measure, parts that were originally designed for near-Earth space missions were used to build the Mars Observer, which was launched in 1992.



This image is courtesy of NASA

After spending almost a year in space, the valve seals in the fuel tanks failed. This allowed the chemicals within the tanks to mix, and the Mars Observer was destroyed. What can engineers learn from this past failure?

- A. Parts should always be recycled in future technological designs.
 - B. It is never possible to save money when building technological designs.
 - C. Sometimes techniques that are meant to save money can be more costly in the end.
 - D. There shouldn't be any more space missions in the future.
-

149. Which of the following is true regarding the frequency and wavelength of electromagnetic radiation?

- A. There is no relationship between frequency and wavelength.
 - B. Frequency and wavelength are always equal.
 - C. Frequency increases with increasing wavelength.
 - D. Frequency decreases with increasing wavelength.
-

150. Celia has a sample of an unknown substance. After testing it in several different ways, she finds that it is a conductor of both heat and electricity. This substance is most likely

- A. a nonmetal.
- B. hydrogen.
- C. a metal.
- D. oxygen.

