CONTESTANT NUMBER:

FOR GRADER USE ONLY Score Test Below: _____Initials_____ _____Initials_____ **Papers contending to place:** _____Initials_____	**University Interscholastic League** **A+ Science Contest • Answer Sheet**

Write your contestant number in the upper right corner and circle your grade below.

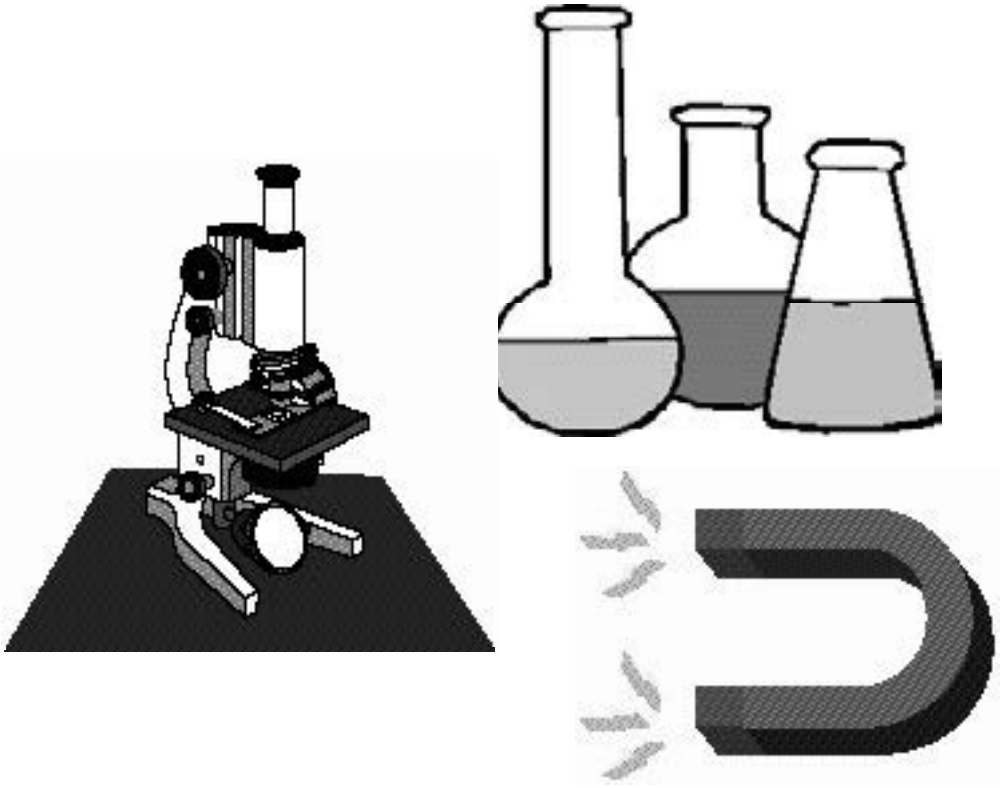
Circle Grade Level: 6 7 8

1.	A	B	C	D	18.	A	B	C	D	35.	A	B	C	D
2.	A	B	C	D	19.	A	B	C	D	36.	A	B	C	D
3.	A	B	C	D	20.	A	B	C	D	37.	A	B	C	D
4.	A	B	C	D	21.	A	B	C	D	38.	A	B	C	D
5.	A	B	C	D	22.	A	B	C	D	39.	A	B	C	D
6.	A	B	C	D	23.	A	B	C	D	40.	A	B	C	D
7.	A	B	C	D	24.	A	B	C	D	41.	A	B	C	D
8.	A	B	C	D	25.	A	B	C	D	42.	A	B	C	D
9.	A	B	C	D	26.	A	B	C	D	43.	A	B	C	D
10.	A	B	C	D	27.	A	B	C	D	44.	A	B	C	D
11.	A	B	C	D	28.	A	B	C	D	45.	A	B	C	D
12.	A	B	C	D	29.	A	B	C	D	46.	A	B	C	D
13.	A	B	C	D	30.	A	B	C	D	47.	A	B	C	D
14.	A	B	C	D	31.	A	B	C	D	48.	A	B	C	D
15.	A	B	C	D	32.	A	B	C	D	49.	A	B	C	D
16.	A	B	C	D	33.	A	B	C	D	50.	A	B	C	D
17.	A	B	C	D	34.	A	B	C	D					

INVITATIONAL 2024-2025

A+ ACADEMICS

University Interscholastic League



Science

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UNIVERSITY INTERSCHOLASTIC LEAGUE
2024-2025 A+ SCIENCE
INVITATIONAL TEST

1. Which of the following is made of cells?
   a. Rocks
   b. Water
   c. Sea anemone
   d. Sun

2. Based on the table, which items indicate a chemical change occurred?

I.	Cutting foil into strips
II.	Melting an ice cube
III.	Mixing blue and clear liquids and it turning red
IV.	Evaporation of a puddle of rain water
V.	Two liquids forming a precipitate

   a. III and V
   b. I, II, and IV
   c. II and III
   d. I and V

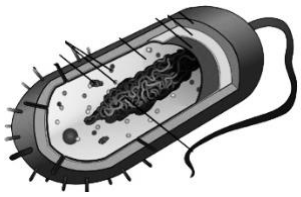
3. Aristotle was able to conclude from looking at the shadow the earth casts on the moon during an eclipse that
   a. Earth is spherical
   b. Earth rotates
   c. Earth is old
   d. Earth rotates around the sun

4. Which would have the most significant effect on the daily tides of the earth?
   a. Changing the rate of the rotation of the moon
   b. Altering the distance between the earth and the moon
   c. Changing the rate of the rotation of the earth
   d. Increasing the distance between the sun and the moon

5. Which is NOT an example of kinetic energy?
   a. Toy car rolling down a hall
   b. Paper airplane flying across the room
   c. A stretched rubber band
   d. A baseball being pitched

6. Rank the levels of organization from the most complex to the least complex.
   a. Organism, population, community, ecosystem
   b. Ecosystem, community, population, organism
   c. Population, community, organism, ecosystem
   d. Community, population, ecosystem, organism

7. Why would this be classified as a prokaryote?
    a. It has a nucleus-bound organelle
    b. It contains genetic material
    c. It is multicellular
    d. It does not have a nucleus



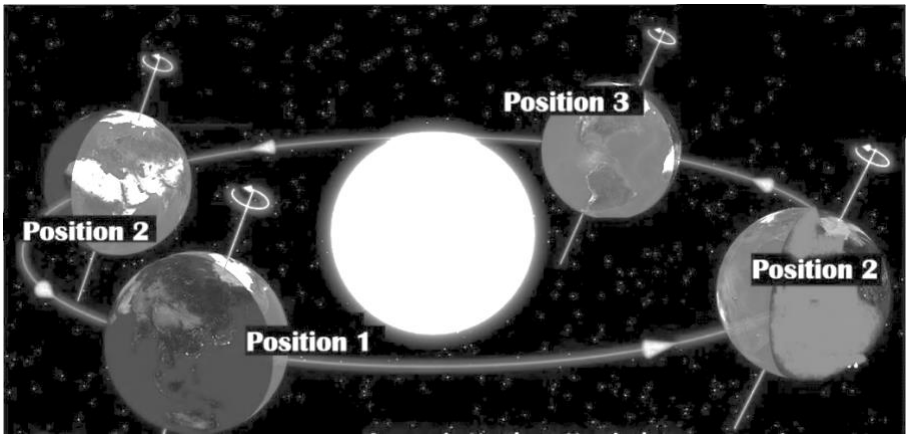
8. Plants are organisms that contain numerous cells. This means that plants are considered –
    a. Unicellular
    b. Multicellular
    c. Prokaryotic
    d. Heterotrophic

9. Why is alcohol currently used in glass thermometers?
    a. It is denser when heated
    b. It is more soluble when cooled
    c. It has less mass when cooled
    d. It expands when heated

10. What symbiotic relationship is shown between the tree and the squirrel?
    a. Competition
    b. Mutualism
    c. Commensalism
    d. Parasitism

11. Hummingbirds have long, tubular structures used to get nectar from flowers. Which is most similar to a hummingbird's beak?
    a. Needle nose pliers
    b. Straw
    c. Forceps
    d. Bug net

12. Based on the diagram, what seasons would the southern hemisphere be at position 1?

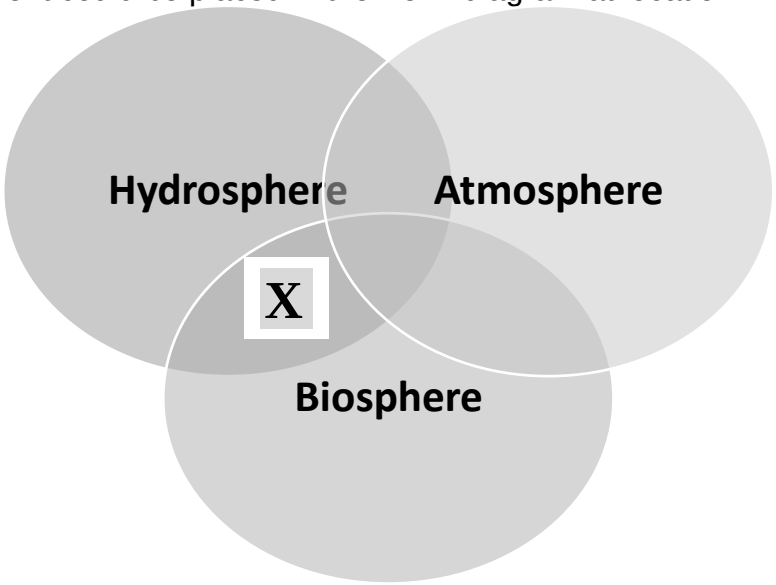


    a. Fall
    b. Winter
    c. Spring
    d. Summer

13. Which of the following statements about solar energy is FALSE?
    a. Solar energy travels in electromagnetic waves
    b. Solar energy doesn't require a media to travel through
    c. Solar energy is available at all times, day and night
    d. Solar energy is considered a clean energy source

14. Which planet species would have the advantage to survive in an environment with numerous plant-eating bugs?
    a. Plants with a darker color
    b. Plants that experience an increase in predators
    c. Plants with a larger surface area
    d. Plants that produce bad-tasting chemicals

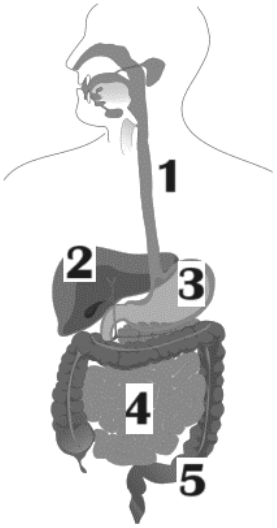
15. Which statement could be placed in the Venn diagram at location x?



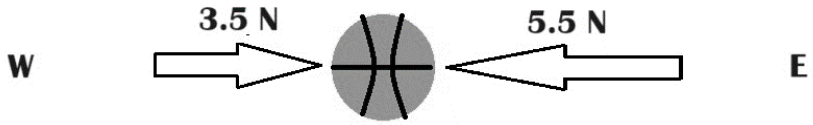
    a. Fish swimming in an ocean
    b. Birds flying in the sky
    c. Sun shining on a mountain
    d. Water evaporating

16. Which of the following sections of the digestive system is least likely to have a chemical change occur?

    a. 1
    b. 2
    c. 3
    d. 4



17. Based on the images, in which direction and with what force will the basketball move?



a. West at 9 N
b. West at 2 N
c. East at 9 N
d. East at 2N

18. It takes three hours to drive a total of two hundred miles. Using this information, the ___ of the object would be determined.
a. Instantaneous speed
b. Velocity
c. Displacement
d. Average speed

19. Based on the following characteristics, correctly identify the boundary described.
- Can create a mid-ocean ridge
- Occurs where two tectonic plates move away from each other

a. Convergent
b. Transformative
c. Divergent
d. Hotspot

20. A student wants to model the path a frog takes when it jumps and returns to the ground. Which of the following is the best way to represent the shape?
a. Pushing a box on the floor
b. Pushing a ball off a table
c. Using a magnet to attract a spoon
d. Throwing a free throw

1	$48^{o}C$
2	$55^{o}C$
3	$52^{o}C$

21. A set of blocks are stacked as shown. Where would heat be transferred downward?
a. Sample 1 to 2
b. Sample 2 to 3
c. Sample 1 to 3
d. Sample 2 to 1

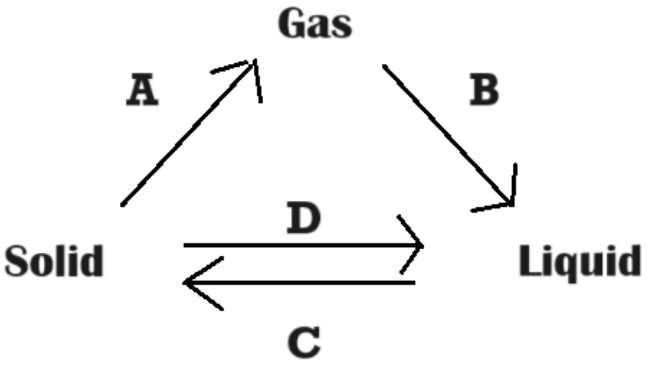
22. Newton made important discoveries concerning forces and gravity. These discoveries would be most beneficial for which of the following professions?
a. Astronomer
b. Biologist
c. Psychologist
d. Electrician

23. How many of the following characteristics allow Earth to maintain a suitable temperature for maintaining life?
- The distance from the sun
- A solid crust
- Mountain and valley formations
- Carbon dioxide in the atmosphere
- Lunar cycle of 28 days

a. 1
b. 2
c. 3
d. 4

24. A model of Earth's day and night cycle is created using a small ball and toothpicks. A flashlight is used to represent the sun in this model. What needs to be done to demonstrate the day and night cycle correctly?
    a. Rotate the flashlight
    b. Tilt the ball
    c. Spin the ball
    d. Lift the ball up and down

25. Which would be the most appropriate for the diagram shown?

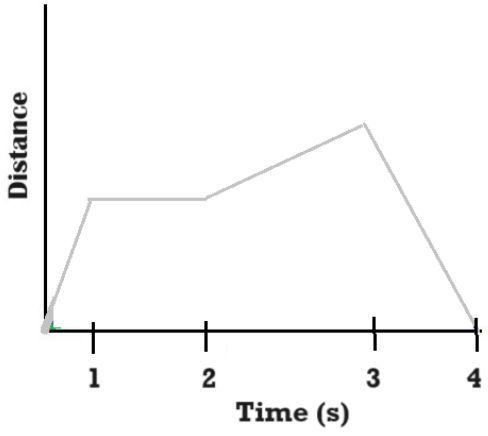


    a. A shows the particles becoming more tightly packed
    b. B shows the temperature increasing
    c. C shows the particles becoming more widely spaced
    d. D shows the kinetic energy of the particles increasing

26. Magnetic striping in the sea floor spreading is evidence to support the plate tectonic theory. Which of the following statements best supports this?
    a. A theory that describes that energy is not created or destroyed
    b. A theory that describes how the lithosphere is divided and how it moves
    c. A theory that describes the survival of the fittest
    d. A theory that describes how the climate changes

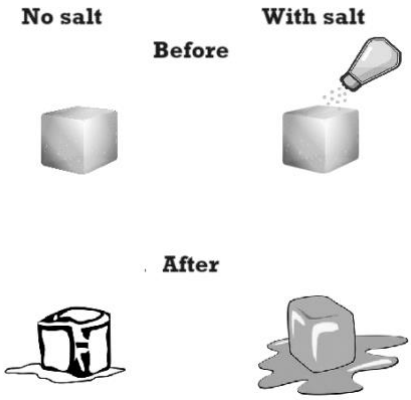
27. What change could decrease the negative effect of bycatching from the commercial fishing industry?
    a. Fish in different locations periodically
    b. Decrease the size of the fishing nets
    c. Fish in deeper regions of the ocean
    d. Redesign the fishing nets

28. What does the graph show about the object's movement from three to four seconds?
    a. It remains stationary
    b. It speeds up
    c. It returns to the starting point
    d. It increases the displacement



29. How are the nutrients returned back to the soil?
    a. Detritivores recycle decaying matter
    b. Organisms deposit it directly into the soil
    c. It is absorbed through the air
    d. Paper products being recycled

30. Two ice cubes are set on a countertop. Salt is sprinkled over one of the ice cubes. Based on the image shown, which statement is true?
    a. The salt stops the ice from melting
    b. The salt makes the ice melt faster
    c. The salt makes the ice double in size
    d. The salt makes the ice remain frozen longer



31. Which of the following has the longest wavelength?
    a. X-rays
    b. Ultraviolet waves
    c. Microwaves waves
    d. Infrared waves

32. A ball rolls towards the right. Which image shown will continue to accelerate to the right?

a.

b.

c.

d.

33. Which component of the universe has more mass than the solar system?
    a. Jupiter
    b. Moon
    c. Star
    d. Nebula

34. Warm air rises from the ground, and cool air sinks to the ground. What drives this process?
    a. Radiant energy from the sun
    b. Geothermal energy from the earth
    c. Precipitation
    d. Movement of air masses

35. This theory suggests that the universe always expands but maintains a constant average density. Which of the following best matches this statement?
    a. Oscillating universe
    b. Steady state
    c. Kepler's universe
    d. Anthropic

36. Based on the data, which star will most likely become a supernova?

Star	Solar Mass
A	2
B	1
C	10
D	5

a. Star A b. Star B c. Star C d. Star D

37. If the rotation of the earth was altered and became faster, which statement is most likely?
    a. The day would be shorter
    b. The seasons would be longer
    c. The tides would be much stronger
    d. The seasons would not change

38. Students constructed galaxies using pebbles in class. The following describes how each student created their models.

- Student 1 used pebbles and arranged the pebbles in a large swirl pattern
- Student 2 used pebbles and arranged the pebbles in a circle
- Student 3 used pebbles and dropped the pebbles and let them fall everywhere
- Student 4 used pebbles and stacked the pebbles on top of each other like a tower

Which student best represented an irregular galaxy with the model they created?
    a. Student 1
    b. Student 2
    c. Student 3
    d. Student 4

39. A clear water bottle is filled halfway with soil. Then, a thermometer is placed in the bottle and sealed. A desk lamp is turned on and placed so that it shines on the sealed container. Which would most help to demonstrate the effect of greenhouse gases on temperature?
    a. By adding soil and water to the bottle
    b. By removing the soil and increasing the wattage of the light
    c. Add a second smaller container
    d. Add bubble wrap around a second identical bottle

40. What is most directly responsible for the cooling effect after the eruption of a volcano?
    a. The sun
    b. The volcanic ash
    c. The jet stream
    d. Precipitation

41. Which of the following would be a long-term change to the environment that could affect organisms and possibly future generations?
    a. A tornado
    b. A forest fire
    c. A volcanic eruption
    d. A hurricane

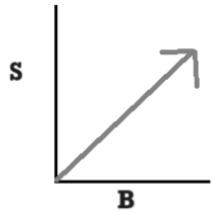
42. Which of the following has the most positive effect from humans on the environment?
    a. Deforestation
    b. Coal power plants
    c. Internal combustion engine usage
    d. Windmills

43. A road is built for a new housing addition but due to financial issues, no homes were ever constructed. After a year, with no activity, which most likely will be observed?
    a. Trees begin to grow over the road
    b. Weeds begin to grow in cracks in the road
    c. Shrubs and animals become abundant in the area
    d. Bushes begin to grow and flourish

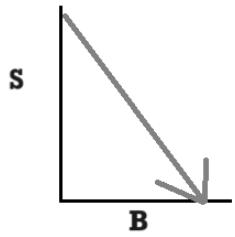
44. Gregor Mendel's contribution to science is most related to the work of a –
    a. Pathologist
    b. Archaeologist
    c. Engineer
    d. Geneticist

45. Which sketch correctly shows how biodiversity and sustainability are related?

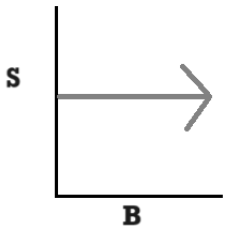
a.



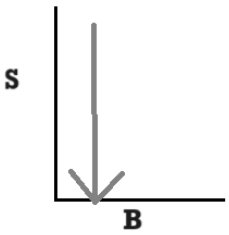
c.



b.

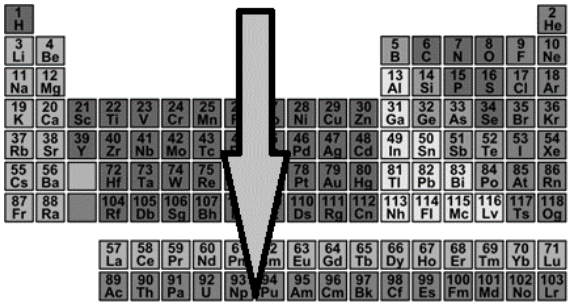


d.



46. The body is constantly regulating to maintain homeostasis. Which two systems work together to regulate internal and external conditions?
    a. Muscular and digestive
    b. Respiratory and digestive
    c. Nervous and muscular
    d. Nervous and endocrine

47. When moving down a column in the Periodic Table, which of the following stays the same?
    a. The atomic mass
    b. The number of valence electrons
    c. The atomic number
    d. Chemical reactivity



48. Why do radio waves and infrared waves not have enough energy to damage cells in the human body?
    a. As wavelength increases, the waves become more harmful.
    b. As wavelength decreases, the waves become less harmful.
    c. As frequency decreases, the waves become less harmful.
    d. As frequency increases, the waves become less harmful.

49. Students work in groups to create a filtration system to filter particles from running water. The students draw a schematic and create a prototype of their group's filtration system. Which activity would best incorporate the science and engineering practice of applying mathematical concepts into the project?
    a. Averaging the amount of water each student uses at home in a day
    b. Calculating the amount of water that their system can filter in an hour
    c. Estimating the cost of building a larger version of each of the filters
    d. Counting the number of large particles their filter removes from the water

50. A group of students created a model during an engineering design activity that did not perform as effectively as they had anticipated. Which of the following steps would be best for the students to do next?
    a. Make adjustments to meet the parameters of the activity
    b. Research similar studies to validate the results
    c. Start the investigation over from the beginning
    d. Repeat the investigation to replicate the results

UNIVERSITY INTERSCHOLASTIC LEAGUE
2024-2025 SCIENCE
INVITATIONAL TEST

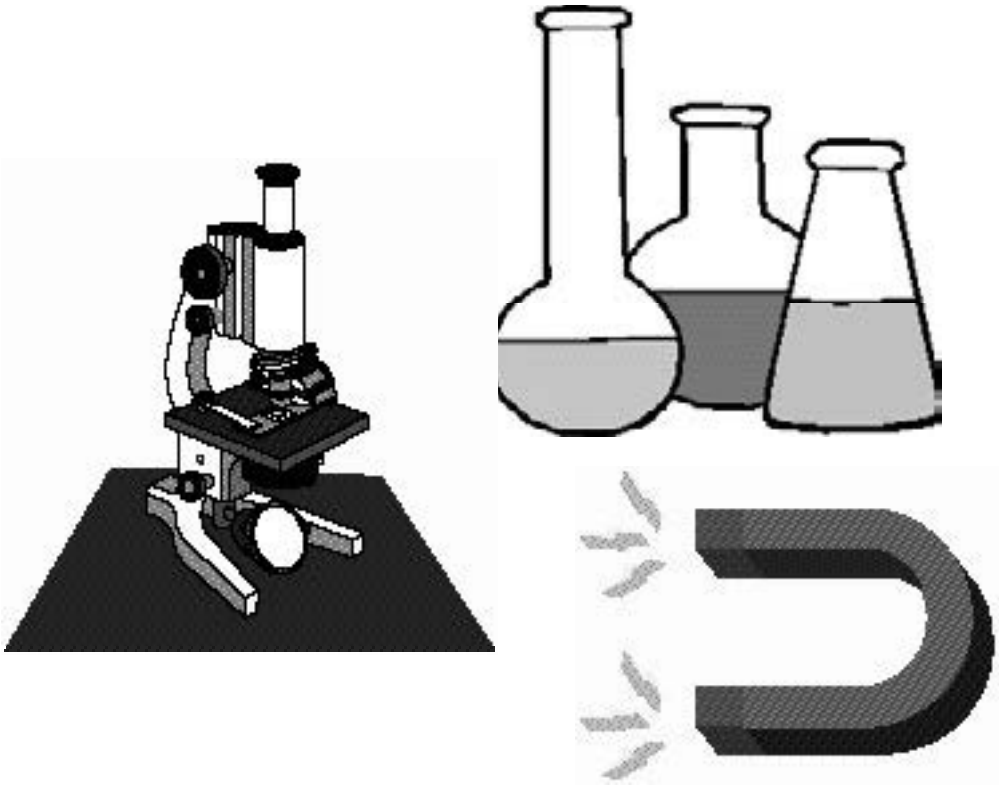
Answer Key

1. C	18. D	35. B
2. A	19. C	36. C
3. A	20. D	37. A
4. B	21. B	38. C
5. C	22. A	39. D
6. B	23. B	40. B
7. D	24. C	41. C
8. B	25. D	42. D
9. D	26. B	43. B
10. C	27. D	44. D
11. B	28. C	45. A
12. A	29. A	46. D
13. C	30. B	47. B
14. D	31. C	48. C
15. A	32. D	49. B
16. A	33. D	50. A
17. B	34. A	

FALL/WINTER DISTRICT 2024-2025

A+ ACADEMICS

University Interscholastic League



Science

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UNIVERSITY INTERSCHOLASTIC LEAGUE
2024-2025 A+ SCIENCE
FALL/WINTER TEST

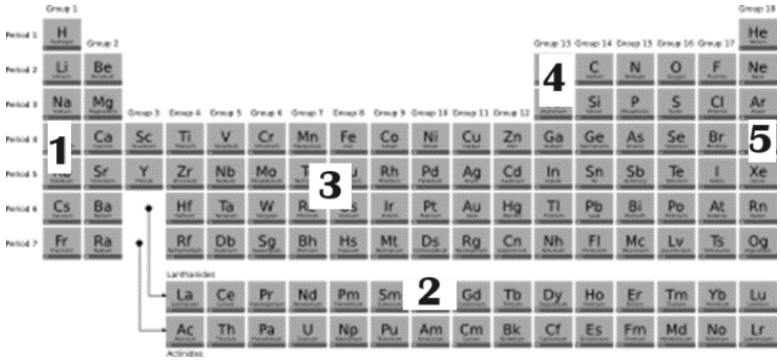
1. Which of the following can be classified as a compound?
   a. Sand
   b. Dirt
   c. Silver ring
   d. Hydrogen peroxide

2. What happens to the kinetic energy of atoms in a liquid as it is heated and how does the motion of the atoms differ?
   a. Atoms begin to move faster, spread out, and becomes a gas
   b. Atoms begin to move slower, condense, and becomes plasma
   c. Atoms begin to move slower, spread out, and take a solid form
   d. Atoms begin to move faster, condense, and become a solid

3. Seasons bring changes in weather. Which most likely explains why summers in most parts of the world are hotter than other times of the year?
   a. The earth's rotation is closer to the sun
   b. The sun's rays shine directly on the earth
   c. The earth's revolution is unstable
   d. The earth tilts away from the sun

4. Which of the following is NOT used to determine if a substance is a mixture or a pure substance?
   a. Separating chemically
   b. Filtering
   c. Evaporating
   d. Separating physically

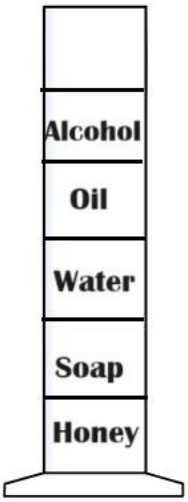
5. Which statement does NOT show an example of potential energy?
   a. Jumping on a pogo stick
   b. Pulling an arrow back to launch it from a bow
   c. Skateboard rolling down a sidewalk
   d. Ball sitting at the top of a hill

6. 

Which elements on the periodic table are metallic, normally found in small quantities and mixed with other elements?
   a. 1 b. 2 c. 3 d. 4

7. Which is NOT a part of the geosphere?
    a. Molten magma
    b. Sand
    c. Fossils
    d. Air

8. Students created a density column as shown. Which of the following statements is incorrect?
    a. Water is less dense than alcohol
    b. Honey is the most dense
    c. Alcohol is less dense than oil
    d. Soap is denser than water



9. A local school installed several solar panels to help provide electrical energy for the school. During which time period would the school not have a large electric bill?
    a. Cold, cloud winter month
    b. Rainy, warm month in autumn
    c. Cold, rainy spring month
    d. Hot, dry summer month

10. A child is playing on a see saw at the playground. What contact force acts to make the see saw move?
    a. Normal force
    b. Applied force
    c. Gravity
    d. Friction

11. A student placed a birdfeeder in their backyard. Very few birds were seen during the winter months compared to the spring months. Which most likely explains these observations?
    a. The bird migrated
    b. The birds hibernated
    c. The birds ate berries
    d. The birds were building nests

12. A tennis ball hits a racket with 50 N of force. What is the force and direction exerted by the ball on the racket?
    a. 100 N in the same direction
    b. 100 N in the opposite direction
    c. 50 N in the opposite direction
    d. 50 N in the same direction

13. Which is NOT an interaction that illustrates a commensalisic relationship?
    a. Tree frogs and plants
    b. Egrets and cattle
    c. Pseudoscorpions and beetles
    d. Bats and pitcher plants

14. Which statement is true about the image shown?

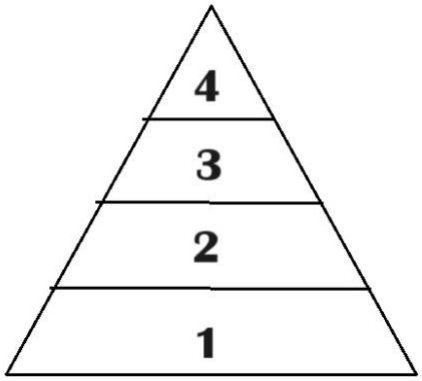
a. Horizontal forces are unbalanced
b. Horizontal forces are balanced
c. Vertical forces are unbalanced
d. Vertical forces are balanced

15. Determine which of the following statements best describes a level of organization.
    a. Ducks swim in a pond while fish sim underwater constitute an ecosystem
    b. A pride of lions constitutes an organism
    c. Several cats from the same litter constitute a community
    d. Butterflies getting nectar from a flower constitutes a cell

16. Which of the following is a product resulting from the chemical change during photosynthesis?
    a. Water
    b. Carbon dioxide
    c. Glucose
    d. Light

17. Which will NOT increase the rate of dissolution of solid solutes in an aqueous solution?
    a. Stirring or crushing
    b. Adding water
    c. Increase the temperature
    d. All of these

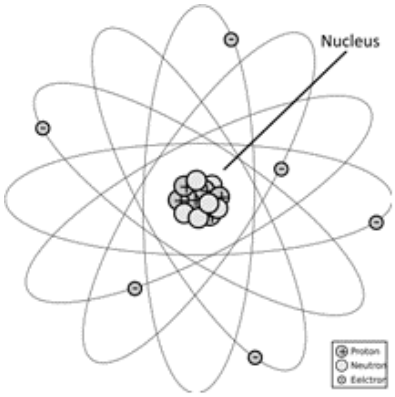
18. Based on the energy pyramid shown, which of the following would be correct about how energy transfers within an ecosystem?

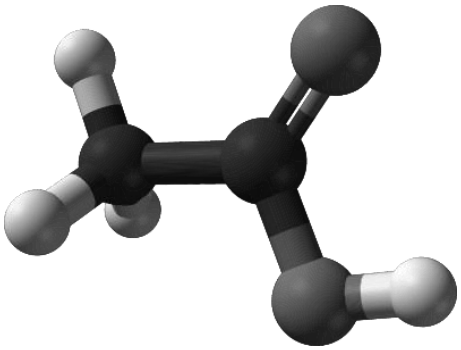


    a. Organisms at level four give indirect energy to all the consumers in the ecosystem
    b. Energy transfers directly from organisms at level two to organisms at level three
    c. Organisms at level one give direct energy to organisms in levels three and four
    d. All organisms receive 50% energy from the previous energy level

19. A student measures a cup of iced lemonade. The system's mass is 150 g. One hour later, the ice completely melted. What change occurred, and what is the system's mass now?
    a. Physical change; 100 g
    b. Chemical change; 150 g
    c. Physical change; 150 g
    d. Chemical change; 100 g

20. How are the two substances shown different?





a. Both substances are elements
b. Both substances are molecules
c. The substance on the left is a molecule, and the substance on the right is an atom
d. The substance on the left is an atom, and the substance on the right is a molecule

21. A car travels north for two hours and has a displacement of ninety miles. A second car travels north for four hours and also has a displacement of ninety miles. Which correctly identifies the similarity between the motion of the cars?
    a. Both cars travel at the same speed and travel the same displacement
    b. Both cars travel at the same displacement and travel in the same direction
    c. Both cars travel at the same time and travel at the same velocity
    d. Both cars travel at the same velocity and travel in the same direction

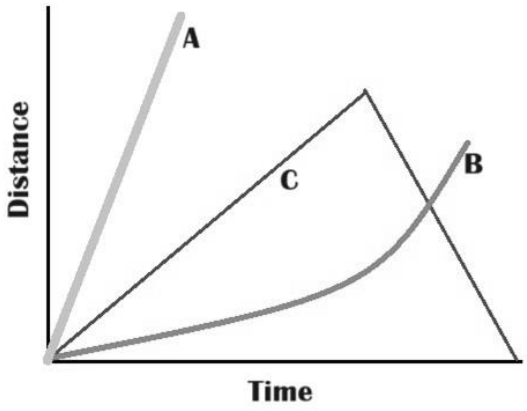
22.

$$H_3PO_4$$

Based on this chemical formula, there are __ more oxygen atoms than phosphorus atoms.
    a. 1
    b. 2
    c. 3
    d. 4

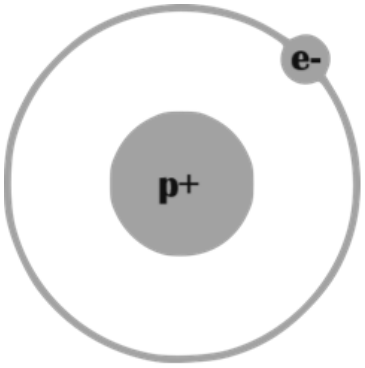
23. Which celestial object does not continuously orbit another body within the solar system?
    a. Jupiter's moon Europa
    b. Stars
    c. Comets
    d. Asteroid

24. Which statement doesn't indicate that a physical change occurred?
    a. Drink mix is placed into water, and it dissolves
    b. Water boiling on a stove top
    c. Ice cream melting
    d. Two liquids are combined and a precipitate forms



25. Three objects are tossed in the air, and the data is shown in the graph. Which correctly describes object A's path?
    a. The object is moving faster each second
    b. The object is moving at a constant fast speed
    c. The object is not moving
    d. The object is moving at a constant speed to return to the origin

26. Based on the hydrogen atom shown, choose the best statements that describe the atom's charge.
    a. Hydrogen has three subatomic particles, making it a negative charge atom
    b. Hydrogen has three subatomic particles, making it an atom with no charge
    c. Hydrogen has two subatomic particles, making it a negative charge atom
    d. Hydrogen has two subatomic particles, making it an atom with no charge



27. The gravitational attraction between two objects is increased the most when –
    a. The mass decreases, and the distance increases
    b. The mass decreases, and the distance decreases
    c. The mass increases, and the distance decreases
    d. The mass increases, and the distance increases

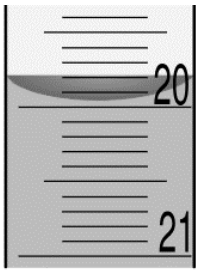
28. When mixed together, which will form a solution?
    a. Sand and salt
    b. Water and drink mix
    c. Sand and water
    d. Salt and pepper

29. Which human activity most likely leads to subsidence?
    a. Using toxic chemicals for pesticides
    b. Removing pollutants from water
    c. Storing rainwater in above-ground tanks
    d. Removal of water from aquafers

30. Salt is poured into a glass of water and then a spoon is used to stir the water. The salt seems to disappear because it is –
    a. Melting
    b. Evaporating
    c. Reducing the surface area
    d. Freezing

31. Choose which statement does NOT describe the characteristics of a neutron.
    a. Total number of neutrons can change
    b. Neutron determine the identity of the element
    c. Neutrons are located in the nucleus of the atom
    d. Neutrons have the mass of 1 amu

32. Which two properties of water are represented in the image shown?
    a. Adhesion and cohesion
    b. Adhesion and surface tension
    c. Cohesion and surface tension
    d. Gravity and polarity



33. How do melting points of helium, beryllium, and carbon relate to their position on the periodic table?
    a. Increased number of protons reduces the melting point
    b. Decreased number of protons reduces the melting point
    c. Increased number of protons increases the melting point
    d. Decreased number of protons increases the melting point

34. Which statement is true about a homogeneous mixture?
    a. They are always chemically combined
    b. They only contain one material
    c. The composition is uniform throughout
    d. They are always made up of two different atoms

35. Grape juice, soda, mouthwash, and a cleaning solution were tested by dipping a strip of test paper in each solution. The test strips were then compared to a color chart. What test was performed?
    a. Sugar test
    b. Dissolved oxygen test
    c. Salinity
    d. pH test

36. A student investigates how Newton's laws of motion are incorporated into a softball game. Which description does NOT describe the law of inertia?
    a. A player swings a bat forward until it comes in contact with the ball.
    b. The acceleration of the ball is dependent on the ball's mass and the force applied by the bat.
    c. Once pitched, the ball moves and will continue to move until the bat makes contact with it or the catcher stops it.
    d. A player walking back to the dugout.

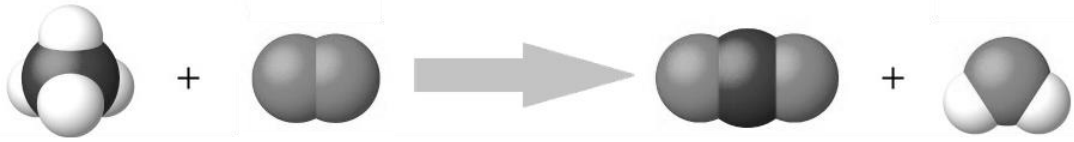
37. A student measures 20 g of baking soda into a sealable bag. Then, 30 mL of vinegar (30 g) is poured into the bag and sealed. A reaction occurs. Based on the law of conservation of mass, how much mass does the bag contain?
    a. 10 g
    b. 20 g
    c. 30 g
    d. 50 g

38. Which characteristic would be expected for a solution that is basic to have?
    a. High pH and feels slippery
    b. Low pH and tastes bitter
    c. Low pH and sour taste
    d. High pH and feels sticky

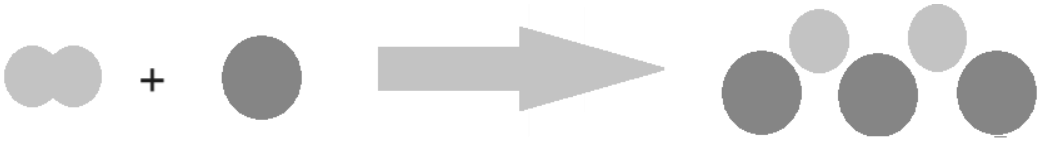
39. A baseball curves as it is pitched from the mound to home plate due to air resistance. This is a result of –
    a. Newton's laws of gravitation
    b. Newton's first law of motion
    c. Newton's second law of motion
    d. Newton's third law of motion

40. Which atomic models correctly show the law of conservation of mass?
    a.

    b.



    c.



    d.

41. Students were testing the effect of forces by pushing two objects with same force across the floor. Object one has a mass of 20 kg, and object two has a mass of 25 kg. Which statement best describes the motion of these objects?
    a. Object one will travel a farther distance with a greater speed
    b. Both objects will move in the same direction at the same speed
    c. Object two will travel a farther distance with a lower speed
    d. Both objects move in opposite directions with object two having a greater speed

42. Which of the following statements correctly identifies the relationship shown in the electromagnetic spectrum?
    a. As wavelength increases, so does the frequency
    b. As frequency increases, you will reach radio waves
    c. As wavelength decreases, the energy will increase
    d. As wavelength decreases so does the frequency

43. What type of heat transfer is used to heat food in a microwave oven?
    a. Conduction
    b. Radiation
    c. Convection
    d. Neutralization

44. Which of the following is used in the medical field to kill pathogens on equipment?
    a. Ultraviolet waves
    b. Radio waves
    c. X-rays
    d. Microwave

45. The magnitude of a star's brightness is most dependent upon –
    a. Density
    b. Temperature
    c. Mass
    d. Shape

46. Three groups of students each design and build a device to protect a raw egg when dropped to the ground from a height of 12 m. The students drop the devices with the eggs inside and record some data for each device, as shown in the data table. This investigation can be classified as which of the following?

Group	Mass of Egg (kg)	Time to Stop Egg (s)
1	0.06 kg	0.01 s
2	0.06 kg	0.08 s
3	0.06 kg	0.1 s

    a. Experimental
    b. Comparative
    c. Descriptive
    d. Design

47. What statement best describes the membrane-bound organelles and the relationship between different types of cells?
    a. Both prokaryotic and eukaryotic cells contain membrane-bound organelles.
    b. Mitochondria are the powerhouses of cells, and cells without mitochondria are unable to convert energy.
    c. Membrane-bound organelles are found in prokaryotes, not eukaryotes.
    d. Membrane-bound organelles are found in eukaryotes, not prokaryotes.

48. The following chemical equation shows the combustion of methane:

$$CH_4 + O_2 \rightarrow CO_2 + H_2O$$

Which of the following options would balance this equation correctly using the law of conservation of mass?

a. Place a coefficient of 2 in front of both reactants.
b. Place a coefficient of 2 in front of the CH_4 on the reactant side and 2 in front of the H_2O on the product side.
c. Place a coefficient of 2 in front of the oxygen on the reactant side and 2 in front of the H_2O on the product side.
d. Place a coefficient of 2 in front of the CO_2 on the product side and 2 in front of the H_2O on the product side.

49. On a roller coaster, where would the most work be done on the system?

a. As it goes up the second highest hill
b. As it drops down the highest hill
c. As it drops down the second highest hill
d. As it rounds a small curve in the track

50. Using the data from the table shown, determine the total distance traveled by the object.

Position (m)	Time (s)
0	0
2	1
4	2
4	3
10	4
5	4

a. 25 m
b. 15 m
c. 5 m
d. 10 m

UNIVERSITY INTERSCHOLASTIC LEAGUE
2024-2025 SCIENCE
FALL/WINTER TEST

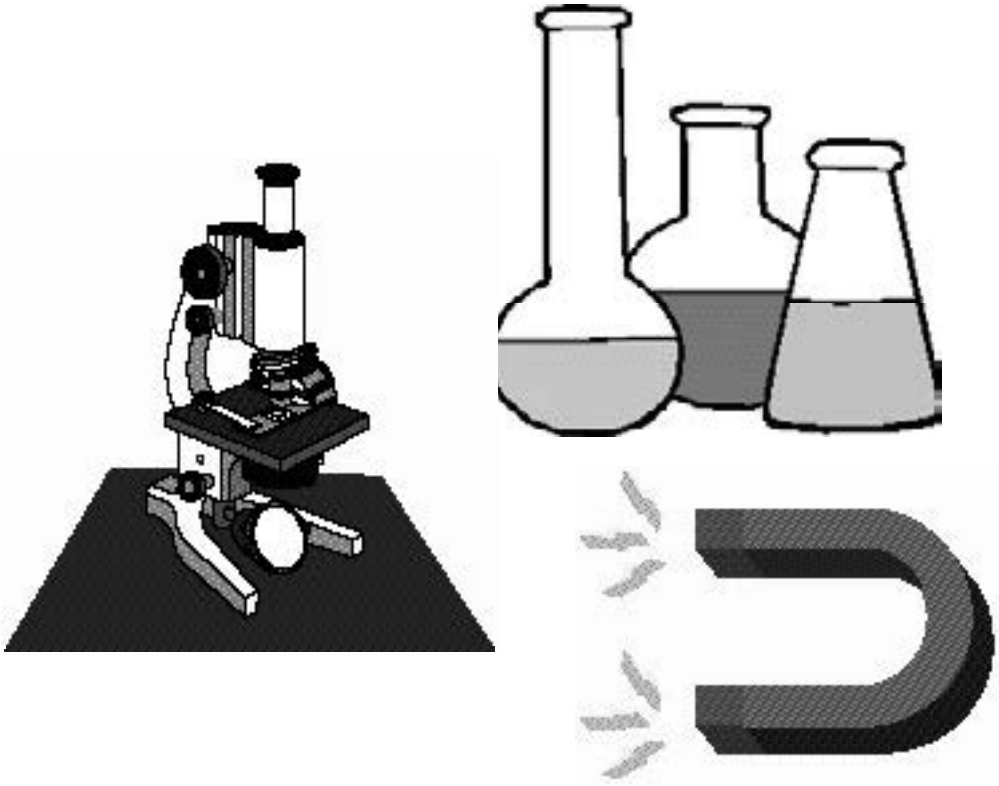
Answer Key

1. D	18. B	35. D
2. A	19. C	36. B
3. B	20. D	37. D
4. A	21. B	38. A
5. C	22. C	39. B
6. B	23. B	40. D
7. D	24. D	41. A
8. A	25. B	42. C
9. D	26. D	43. B
10. B	27. C	44. A
11. A	28. B	45. C
12. C	29. D	46. A
13. D	30. C	47. D
14. A	31. B	48. C
15. A	32. A	49. B
16. C	33. C	50. B
17. B	34. C	

SPRING DISTRICT 2024-2025

A+ ACADEMICS

University Interscholastic League



Science

DO NOT OPEN TEST
UNTIL TOLD TO DO SO

UNIVERSITY INTERSCHOLASTIC LEAGUE
2024-2025 A+ SCIENCE
SPRING TEST

1. As a liquid is boiled, what happens to change the volume of the substance?
    a. As heat is taken away, the volume becomes more definite
    b. Heat causes the molecules to move slower, taking up less space
    c. Heat causes the molecules to move rapidly, spread out, and take up more space
    d. As heat is taken away, the molecules grow bigger and spread out

2. Which of the following statements best represents a behavioral adaptation in a plant?
    a. Thorns on roses to help prevent organisms from eating the plant
    b. The movement or growth of a plant towards water
    c. The odor emitted by flowers to attract pollinators
    d. Edible roots of carrots and beets, which are specialized for food storage

3. Based on the images, which of the following is true?

X Y

    a. X and Y are both elements
    b. X and Y are both compounds
    c. X is a compound and Y is an element
    d. X is an element and Y is a compound

4. During a demonstration, a mosquito lands in a petri dish full of water. What property of water is observed and how does it happen?
    a. Since water is a polar molecule, it allows charges to cancel out to allow the mosquito to float
    b. Adhesion causes water to attract the mosquito to hold it up
    c. Cohesion causes water to attract to other water molecules to hold the mosquito up
    d. Surface tension allows the mosquito to float because water attracts to other water molecules

5. How many descriptions of rare earth elements are correct?
    - *Found in small amounts, mixed with other elements*
    - *Used in smartphones, digital cameras, and flat-screen TVs*
    - *Found in actinide and lanthanide series*
    - *Found only in a gaseous state*

    a. 1 b. 2 c. 3 d. 4

6. On the fourth of July, a student watched a display of fireworks. What is NOT evidence that there is a chemical change in the fireworks?
    a. The size of the fireworks
    b. The temperature change
    c. The production of light
    d. The color change

7. A student determines the density of two objects. The two objects are then placed in liquid dish soap, which has a density of 1.1 g/mL. Which statement is supported by the data shown?

Object	Density
1	1.5 g/mL
2	0.9 g/mL

    a. Both objects will sink
    b. Both objects will float
    c. Object 1 will float and Object 2 will sink
    d. Object 1 will sink and Object 2 will float

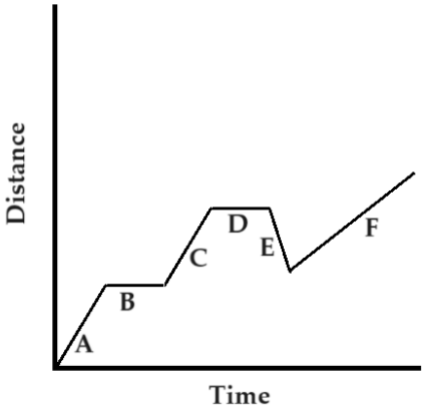
8. Which solute would NOT dissolve the fastest in a solvent?
    a. Granulated sugar
    b. Ground salt
    c. Salt granules
    d. Powdered sugar

9. While moving houses, a kid is pushing a box across the living room floor. How is friction at work in this scenario?
    a. Friction opposes the applied force and creates heat
    b. Friction results from the push or pull and is greater than the applied force
    c. Friction attracts the box to the floor
    d. Friction helps the move easier

10. A family traveled from Austin to Lubbock. They left at 12 pm and traveled 175 miles before they stopped to eat. Then, they continued an additional 195 miles before they arrived at the destination at 7 pm. What was the average speed for this trip?
    a. 185 mph
    b. 29 mph
    c. 25 mph
    d. 53 mph

11. A student throws a ball straight up into the air. Which correctly describes the forces in the scenario?
    a. Horizontal unbalanced and vertical balanced
    b. Horizontal balanced and vertical unbalanced
    c. Both horizontal and vertical are balanced
    d. Both horizontal and vertical are unbalanced

12. Which line segments show the object is at rest?
    a. A and C
    b. E and F
    c. B and D
    d. C and E



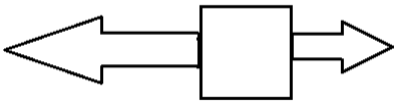
13. Earth would no longer have seasons if –
    a. Earth were to have longer revolutions around the sun
    b. Earth were to revolve in the opposite direction
    c. Earth was not tilted
    d. Earth was located farther away from the sun

14. Which of the objects would NOT demonstrate the motion due to unbalanced forces?

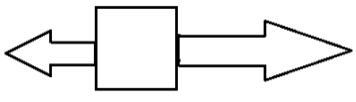
a.

c.

b.



d.



15. Correctly order the development of the cell theory based on the statements provided.

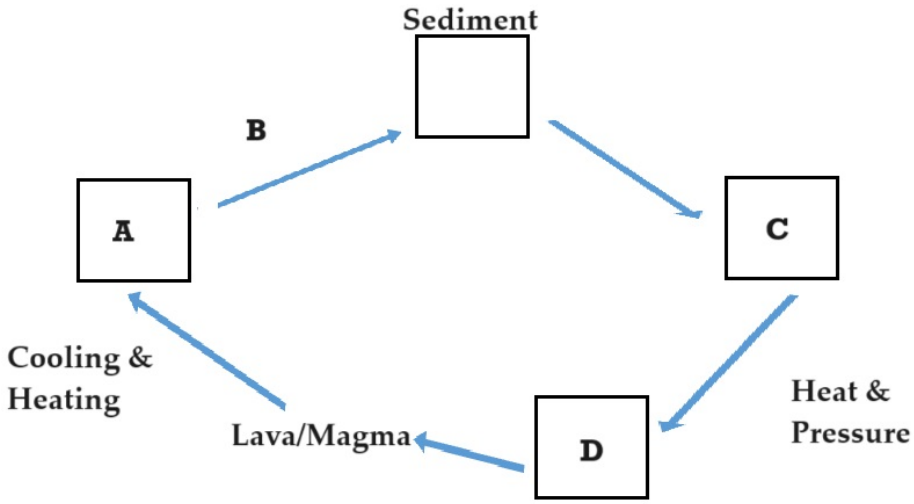
I. Hooke views corks cells in a microscope
II. Schleiden discovered cells in a plant
III. Schwann determined animal cells have cells
IV. Virchow stated cells come from existing cells

a. I, II, III, IV
b. II, I, IV, III
c. IV, III, II, I
d. III, I, II, IV

16. Outside of the solar system, a grouping of icy particles that orbits the sun is known as
    a. Asteroid belt
    b. Oort cloud
    c. Kuiper belt
    d. Milky way

17. Satellites are launched into orbit using rockets. Why doesn't the satellite continue moving straight into outer space?
    a. The gravity of the sun pushes it into orbit around the planet
    b. Friction causes it to orbit around the planet
    c. Earth's gravity pulls it into orbit around the planet
    d. The normal force pushes it into orbit around the planet

18. Which letter best represents an igneous rock?



a. A
b. B
c. C
d. D

19. The San Andres fault located in California is prone to earthquakes from which techtonic plate process?
    a. The sliding of the plates
    b. The melting of the plates
    c. The weathering of the plates
    d. The separating of the plates

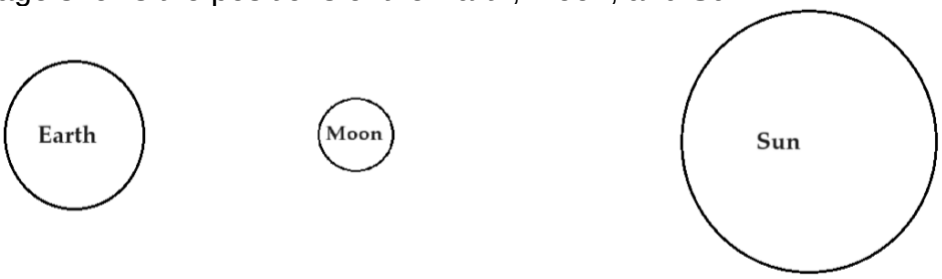
20. What is one key difference between the components of the biosphere and the geosphere?
    a. The biosphere includes abiotic components, while the geosphere includes biotic
    b. The biosphere includes biotic components, while the geosphere includes abiotic
    c. Both the biosphere and geosphere include biotic components
    d. Both the biosphere and geosphere only include abiotic components

21. Which would NOT be beneficial for groundwater?
    a. Reducing the use of fertilizers
    b. Proper disposal of chemicals
    c. Increasing the use of pesticides
    d. Pick up of animal waste

22. All of the following are ways that conservation can help manage air resources EXCEPT –
    a. Limit the amount of burning outdoors
    b. Using energy efficient appliances
    c. Using more wind turbines to generate electricity
    d. Making multiple trips to town in a car

23. Some ocean organisms photosynthesize. During this process, these organisms produce a necessary substance for humans. Which substances do humans most rely on?
    a. Nitrogen
    b. Carbon dioxide
    c. Oxygen
    d. Hydrogen

24. The image shows the positions of the Earth, Moon, and Sun.

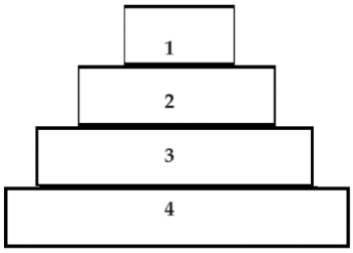


A ___ tide is best represented in this image. When this occurs, there will be a ___ gravitational pull on the ocean tides.
    a. Spring; lower
    b. Spring; greater
    c. Neap; lower
    d. Neap; greater

25. Which body system is responsible for communicating using hormones?
    a. Endocrine
    b. Nervous
    c. Digestive
    d. Immune

26. Which of the following is NOT done to help decrease malnutrition in children worldwide?
    a. Decrease the access to electricity
    b. Increase the access to clean water
    c. Provided educational pamphlets in people's native language
    d. Increase access to healthcare

27. At which level would you find the least amount of energy?
    a. Primary consumers
    b. Secondary consumers
    c. Tertiary consumers
    d. Producers



28. Students are creating a model of a plant. Yarn is used for the roots, straws are used for the stems, and cotton swatches are used for the leaves.
    Which best describes how these materials can model the hierarchical levels between organs and the whole plant?
    a. Yarn, straws, and cotton are all used to support the organs in the plant
    b. Yarn, straws, and cotton are used to illustrate the cells of the plant
    c. Yarn, straws, and cotton are used to illustrate how organs comprise a cell
    d. Yarn, straws, and cotton are used to show how organs combine to form different systems in a plant

29. Advancements in which tool enabled scientists to develop the cell theory?
    a. Magnifying lens
    b. Telescope
    c. Microscope
    d. Phone

30. Plants have more than one cell, and each cell has a nucleus. Which terms can best be used to classify the characteristics of these organisms?
    a. Prokaryotic and autotrophic
    b. Eukaryotic and unicellular
    c. Heterotrophic and prokaryotic
    d. Multicellular and eukaryotic

31. Some butterflies have longer wings, which maybe a survival advantage in –
    a. Migration
    b. Windy coastal regions
    c. Species with short life spans
    d. Pollination

32. What type of heat transfer is most likely occurring at position C while the pot is sitting directly on the flame burner?
    a. Conduction
    b. Convection
    c. Radiation
    d. Thermal

33. Which analogy best represents the function of the cell membrane within a cell compared to a house?
    a. Similar to a bookshelf because it contains reference information
    b. Similar to a door because it allows things to go in and out
    c. Similar to a light because it provides radiant energy
    d. Similar to a bathtub because it can hold water

34. Brown eyes are dominant to blue eyes. The female parent of an offspring is heterozygous, while the male parent is homozygous recessive. Can the male parent pass the allele for brown eyes to the offspring? Select the best answer.
    a. Yes, there is a 100% chance
    b. Yes, there is a 50% chance
    c. Yes, there is a 25% chance
    d. No, there is a 0% chance

- O_2
- CO_2
- H_2O
- Br_2
- C
- NH_4

35. How many of the substances listed are elements?
    a. 1
    b. 3
    c. 4
    d. 6

36. Students conducted a pH test of an unknown substance. The pH was determined to be 5. Is this substance an acid or base, and what other properties should it have?
    a. It is an acid and would feel sticky
    b. It is a base and would feel slippery
    c. It is an acid and would feel slippery
    d. It is a base and would feel sticky

37. What atoms are present in this equation?

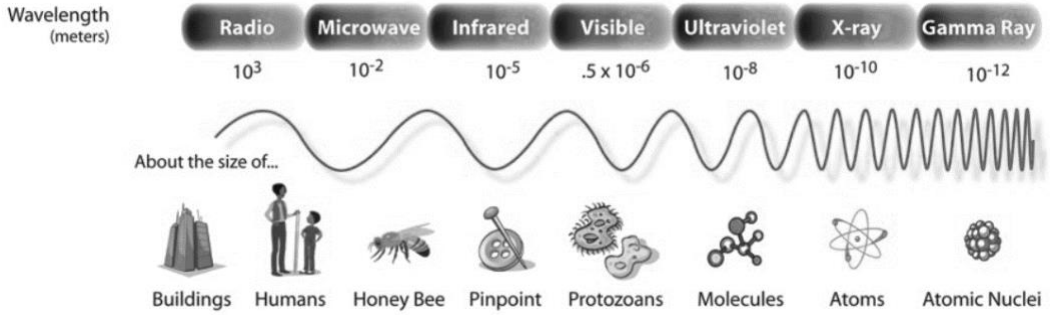
$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

    a. Glucose, oxygen, carbon dioxide, and water
    b. Oxygen, carbon dioxide, water
    c. Carbon, hydrogen, oxygen
    d. Carbon, oxygen, sugar

38. What happens to the acceleration of an object if the force remains constant but the mass of the object was to decrease?
    a. The acceleration will decrease
    b. The acceleration will increase
    c. The acceleration remains constant
    d. None of the above

39. Which of Newton's Laws of Motion best explains why you hit the right side of the seat when a car turns rapidly to the right?
    a. The law of universal gravitation
    b. Newton's second law
    c. Newton's third law
    d. Law of Inertia

40. Identify how the amplitude changes as the wavelength decreases on the electromagnetic spectrum.



    a. The amplitude increases
    b. The amplitude decreases
    c. The amplitude remains constant
    d. The amplitude will fluctuate

41. Which is used in the medical field because the wave can pass through certain human body parts?
    a. Infrared waves
    b. Radio waves
    c. Microwaves
    d. X-rays

42. Which is matched with its correct description?
    a. Main sequence: stage of a star that is stable
    b. Black hole: a protostar created from a nebula
    c. Supernova: a collapsed core of a super giant
    d. Quasar: the beginning stage of all stars

43. Based on the description, identify the type of galaxy movement.
    - *Applies to objects that are moving towards us*
    - *The wavelength becomes shorter*

    a. Redshift
    b. Blueshift
    c. Redshift and blueshift
    d. None of the above

44. What type of climate best describes people who live near Big Bend National Park?
    a. Cooler temperatures year-round and less precipitation
    b. Warmer temperatures year-round and more precipitation
    c. Cooler temperatures in the summer, warmer in the winter, and more precipitation
    d. Cooler temperatures in the winter, warmer in the summer, and less precipitation

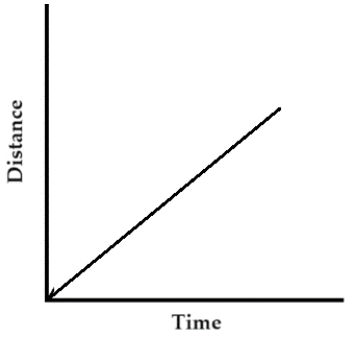
45. The water cycle is –
    a. nature's way of increasing the amount of available water
    b. nature's way of neutralizing acid rain
    c. nature's way of recycling water
    d. nature's way of removing water

46. How would you describe the acceleration of the object based on the data provided?

Time (s)	Position (m)	Velocity (m/s)
0	0	7
1	7	7
2	14	7
3	21	7
4	28	7

    a. Initial positive acceleration, and then the acceleration is zero
    b. Initial acceleration is zero, and then the acceleration remains the same
    c. Initial acceleration is negative, and then the acceleration is positive
    d. Initial acceleration is zero, and then the acceleration is positive

47. What does the slope of the line represent about the motion of an object?
    a. The object is accelerating
    b. The object is decelerating
    c. The object moves at a constant speed
    d. The object is stationary



Position of Pendulum	Potential Energy (J)	Kinetic Energy (J)	Total Energy (J)
A	77.1	22.9	100
B	62.5	37.5	100
C	53.7	**?**	100

48. Determine the kinetic energy of the pendulum at position C.
    a. 153.7
    b. 46.3
    c. 60.4
    d. 93.3

49. Thomson's atomic model successfully explained the atom's overall neutrality. In 1904, Thomson developed what became known as the "plum pudding" model. In Thomson's plum pudding model of the atom, the electrons were embedded in a uniform sphere of positive charge, like blueberries stuck in a muffin. Which model best matches what Dalton described?
    a. Electrons orbiting the nucleus in energy levels
    b. Electron clouds orbiting a nucleus of the atom
    c. Atoms as small, solid balls
    d. A positive matrix with electrons embedded within

50. Human activity, such as deforestation, is affecting the carbon cycle. How has this activity interrupted the carbon cycle?
    a. Allows a buildup of carbon in our atmosphere.
    b. Does not cause any harm to the carbon cycle.
    c. Increase of leaves growing on trees.
    d. Does not harm ecosystems.

UNIVERSITY INTERSCHOLASTIC LEAGUE
2024-2025 SCIENCE
SPRING TEST

Answer Key

1. C
2. B
3. D
4. D
5. C
6. A
7. D
8. C
9. A
10. D
11. B
12. C
13. C
14. A
15. B
16. B
17. C
18. A
19. A
20. B
21. C
22. D
23. C
24. B
25. A
26. A
27. C
28. D
29. C
30. D
31. A
32. A
33. B
34. D
35. B
36. A
37. C
38. B
39. D
40. C
41. D
42. A
43. B
44. D
45. C
46. A
47. C
48. B
49. D
50. A