CONTESTANT ID #: _____

GRADE LEVEL :_____

Place Contestant ID label here BEFORE Contest Begins

PSIA

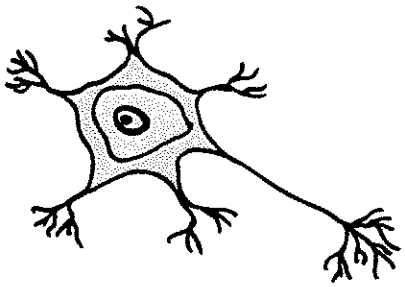
25 YEARS

Inspiring Student Achievement

Science

State Contest

Grades 6-8



2022

FINAL SCORE: _____

(Please do not open test until the signal is given to begin.)

2022 PSIA State Science Contest

(1) In science, succession is the series of predictable changes that occur over time in
A) a community.
B) a food chain.
C) a government.
D) a species.
E) an organism.

(2) What are mountains called formed from compressional stress when two continental plates collide?
A) volcanic mountains
B) episodic mountains
C) plutonic mountains
D) folded mountains
E) fault-block mountains

(3) Which of the following is an example of a compound machine?
A) hammer
B) crowbar
C) bicycle
D) screwdriver
E) ramp

(4) Which of the following substances does **not** exist as a diatomic molecule?
A) oxygen
B) water
C) nitrogen
D) hydrogen
E) iodine

(5) Which type of compound can conduct an electric current when it is dissolved in water?
A) all do
B) covalent
C) organic
D) ionic
E) metallic

(6) What is the soupy mixture of food, enzymes, and acids in your stomach called?
A) chlorophyll
B) urea
C) vitamins
D) villi
E) chyme

(7) What is the largest lymph organ?
A) lymph node
B) spleen
C) thymus
D) tonsil
E) ankle

(8) What factor determines the amount of solar energy an area receives?
A) longitude
B) latitude
C) mountains
D) ocean currents
E) wind patterns

(9) If wind speeds in a storm are clocked more than 200 mph, this is most likely a measurement within a
A) tsunami.
B) tornado.
C) hurricane.
D) microburst.
E) typical thunderstorm.

(10) S-waves produced by earthquakes, do not travel through the Earth's
A) asthenosphere.
B) mantle.
C) lithosphere.
D) crust.
E) outer core.

(11) An automobile traveling at 120 kilometers per hour has how many more times the kinetic energy than the same vehicle traveling at 40 kilometers per hour?
A) 3 times
B) one-ninth times
C) 9 times
D) one-third times
E) 80 times

(12) The spines of cacti are a modification of what plant structure?
A) phloem
B) roots
C) stomata
D) leaf
E) xylem

(13) How many times does the Moon appear as half-full during a single lunar cycle?
A) 2
B) 4
C) 6
D) 12
E) 24

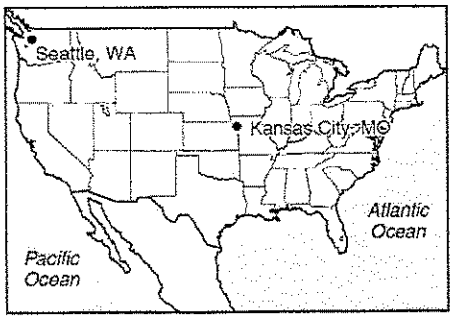
(14) Which of the following is true of the Hawaiian chain of islands?
A) All the islands have approximately the same age.
B) They are the northernmost chain of islands on Earth.
C) They show increasing age from the northwest to the southeast.
D) They are thought to be the result of the lithosphere moving over a hot spot.
E) They represent what could happen when plates interact at a convergent boundary.

(15) The table below shows the approximate wavelengths of violet and red colors. What range of wavelengths is visible to human eyes?

Color	Wavelength
Violet	400 nanometers
Red	700 nanometers

A) less than 400 nm
B) more than 700 nm
C) exactly at 400 nm and 700 nm
D) more than 400 nm and less than 700 nm
E) more than 700 nm and less than 400 nm

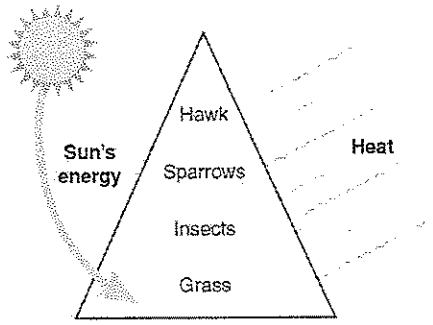
(16) The map below shows the locations of Seattle, Washington, and Kansas City, Missouri. Which statement **best** explains why Seattle has warmer winters and cooler summers than Kansas City?



A) Seattle is closer to an ocean.
B) Seattle is located at a higher latitude.
C) Seattle is located at a higher longitude.
D) Seattle is located near an active volcano.
E) Seattle has longer summer days and shorter winter days.

(17) Which statement **best** explains why wood is considered a renewable energy resource and coal is not?
A) Wood is denser than coal.
B) Wood is easier to find than coal.
C) Wood has less carbon per unit mass than coal.
D) Wood grows more quickly than coal forms.
E) Wood has less stored energy per unit mass than coal.

(18) The pyramid below shows how energy changes forms and is transferred in a food chain. Which statement explains why less energy is available as it is transferred through each step of the food chain?



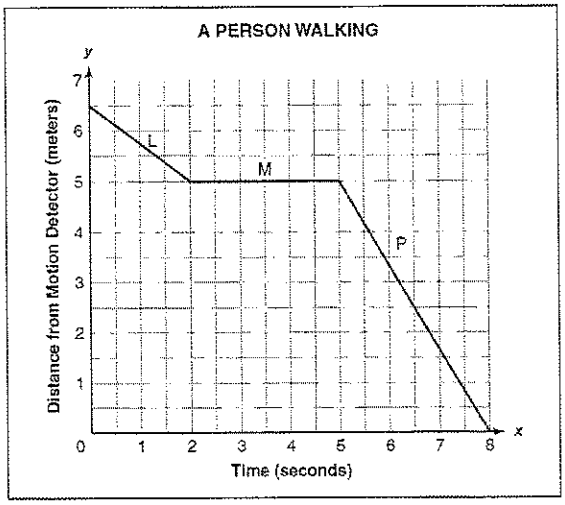
A) Heat is added at each level.
B) Energy is added at each level.
C) Organisms at each level use some of the energy.
D) The higher levels do not need as much energy.
E) Organisms at lower levels destroy some of the energy.

(19) Which two characteristics affect a planet's gravitational attraction to the Sun?
A) mass and volume
B) volume and length of day
C) distance from the Sun and mass
D) length of day and distance from the Sun
E) mass and magnetic field strength

(20) Where are most active volcanos located?
A) along the equator
B) in the middle of oceans
C) at the center of continents
D) on tectonic plate boundaries
E) along the shores of peninsulas

(21) The International Space Station normally circles the Earth once every 90 minutes. Its average distance above the Earth's surface is approximately
A) 250 miles.
B) 500 miles.
C) 1000 miles.
D) 2000 miles.
E) 22,500 miles.

(22) Students measured the movement of a person with a motion detector. Their data is shown on the graph below. Based on this data:



A) The person was walking at an average speed of 3.25 meter/sec away from the motion detector between 0 and 2 seconds.
B) The person was walking at an average speed of 1.67 meter/sec away from the motion detector between 2 and 5 seconds.
C) The person was walking at an average speed of 1.60 meter/sec away from the motion detector between 5 and 8 seconds.
D) The person was walking at an average speed of 0.75 meter/sec towards the motion detector between 0 and 2 seconds.
E) The person was walking at an average speed of 0.625 meter/sec away from the motion detector between 5 and 8 seconds.

(23) Dams benefit humans by controlling floods. Dams sometimes negatively affect the natural environment. Which statement **best** describes a negative consequence of building a dam on a river?
A) Moving water produces electricity.
B) Life cycles of some fish are disrupted.
C) Small fish are trapped for fish farming.
D) Small fish become bigger because of concrete in dams.
E) Large concrete structures are unsightly.

(24) Noah throws a rock straight up. After the rock leaves his hand
A) its momentum increases.
B) its acceleration decreases.
C) its kinetic energy increases.
D) its potential energy decreases.
E) total energy remains constant.

(25) Wesley prepared six mixtures in glass beakers, as indicated in the data table below. Each beaker was tightly covered, labeled, and left undisturbed for several days. After several days, Wesley observed that the gray iron filings in Mixture 4 had turned red. The color change in Mixture 4 indicates that

Mixture	Substance Combined
1	100 grams sand and 50 grams iron filings
2	100 grams sand and 50 grams salt
3	100 grams sand and 50 grams water
4	100 grams water and 50 grams iron filings
5	100 grams water and 50 grams salt
6	100 grams salt and 50 grams iron filings

A) a precipitate formed.
B) gases were produced.
C) the iron filings evaporated.
D) a chemical reaction occurred.
E) each beaker cover was not tight.

(26) What organism acts as the vector of malaria in humans?
A) Horse fly
B) Tsetse fly
C) Cockroach
D) Kissing bug
E) *Anopheles* mosquito

(27) What gland, located in the area beneath the sternum, is essential for a fully functional immune system?
A) pineal gland
B) vas deferens
C) thymus
D) hippocampus
E) pituitary gland

(28) Tsunamis, when seen in the deep ocean far from land, typically are about how much in amplitude?
A) 1 foot
B) 20 feet
C) 50 feet
D) 100 feet
E) 1000 feet

(29) If you shine unpolarized light through a polarizing filter, the light that exits the filter is
A) half as intense.
B) twice as intense.
C) equally as intense.
D) scattered in all directions.
E) dispersed into many colors.

(30) What type of reaction absorbs energy?
A) exothermic
B) endothermic
C) dialysis
D) dissociation
E) alpha

(31) What voltage would drive 4 amps of current through a resistance of 12 ohms?
A) one-third Volt
B) 3 Volts
C) 8 Volts
D) 16 Volts
E) 48 Volts

(32) The general paths of storm systems that travel across the continental United States are primarily driven by
A) the jet stream.
B) mountains.
C) ocean currents.
D) humidity.
E) local winds.

(33) Babies cannot walk well. As they grow older, which of the following parts of their nervous systems will interact with their muscles, allowing for increased coordination?
A) autonomic
B) somatic
C) non-sympathetic
D) sympathetic
E) parasympathetic

(34) When you have the flu, what part of the nervous system is responsible for elevating your body temperature?
A) pons
B) brain stem
C) hypothalamus
D) medulla oblongata
E) hippocampus

(35) Young frogs do not resemble adult frogs. Which term is given to this pattern of development in frogs?
A) cloning
B) metamorphosis
C) asexual reproduction
D) biological adaptation
E) asymmetric morphosis

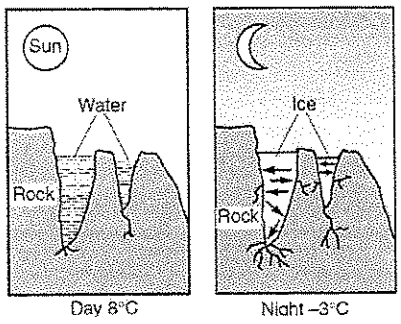
(36) Which statement describes how a single-celled organism helps make a food product?
A) Yeast changes carbohydrates into carbon dioxide to make dough rise.
B) Fungi release a chemical that keeps bacteria colonies from growing larger.
C) Bacteria eat oil spilled in rivers and change it into less dangerous compounds.
D) Viruses that cause diseases are weakened and used to make vaccines.
E) Students learn how to cook pancakes to feed themselves.

(37) Deforestation is the removal of naturally occurring forests. These forests are cleared to provide land for farms or buildings. Some scientists want to reduce the amount of deforestation. How would reducing deforestation affect global warming?
A) It would prevent farmers from planting renewable biofuels that would have reduced global warming.
B) It would increase the amount of methane in the atmosphere and therefore reduce global warming.
C) It would decrease the amount of carbon dioxide reaching the atmosphere, reducing global warming.
D) It would increase the amount of oxygen released into the atmosphere, which would bond together and create ozone, increasing global warming.
E) It would prevent destruction of animal homes, allowing these animals to survive and breathe in oxygen that would otherwise increase global warming.

(38) Weather forecasts are more accurate today than in the past due to
A) plate tectonics.
B) global warming.
C) air-quality control.
D) younger meteorologists.
E) more weather satellites with better sensors.

(39) Rocks are classified as igneous, metamorphic, or sedimentary according to
A) their color.
B) their shape.
C) their density.
D) how they are formed.
E) the minerals they contain.

(40) The diagrams below show a natural process that weathers rock. Which statement below best explains why this process results in weathering?



A) Frozen water acts as a solute.
B) Rocks expand during the night.
C) Water expands when it freezes.
D) Frozen water dissolves most types of rocks.
E) The mass of water increases when it freezes.

(41) Many cells have a nucleus that contains chromosomes. These chromosomes carry genes that are composed of
A) gametes.
B) hormones.
C) DNA molecules.
D) water and minerals.
E) undigested food molecules.

(42) Although change in multicellular species usually takes thousands of years, some species of bacteria undergo major changes in just a few years. One reason for this difference is that these bacteria
A) are energetic.
B) are microscopic.
C) do not contain DNA.
D) reproduce very quickly.
E) cause infectious diseases.

(43) Chloroplasts are organelles that are found in plant cells. Some plant tissue contains cells with large numbers of chloroplasts, while other tissue contains few chloroplasts. Which type of plant tissue contains cells with many chloroplasts?
A) root, because chloroplasts are needed for water uptake
B) stem, because chloroplasts are needed for plant growth
C) leaf, because chloroplasts are needed for photosynthesis
D) flower, because chloroplasts are needed for reproduction
E) pistil because chromatids are needed for asexual reproduction

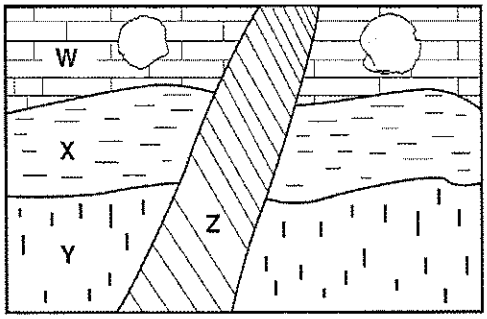
(44) Which statement **best** explains why summer days are warmer than winter days in Texas?
A) Earth's northern hemisphere is tilted toward the Sun during the summer.
B) There are not as many clouds during the winter days.
C) The Sun is closer to Earth in the summer than in the winter.
D) The Sun has more sunspots in the summer than in the winter.
E) Earth's western hemisphere is tilted toward the Sun during the summer.

(45) Which occurs because of the rotation of Earth about its own axis?
A) the water cycle
B) the nitrogen cycle
C) seasons of the year
D) sunrises and sunsets
E) global climate changes

(46) What is one way to help slow down or stop the greenhouse effect?

A) find new uses for methane as a fuel
B) clean up the litter in neighborhoods
C) find new coal resources in the earth
D) clean up the water pollution in local lakes
E) walk or ride a bike instead of driving a car

(47) The diagram below shows a cross section of different rock layers. Which conclusion correctly describes the **youngest** rock layer in the diagram?



A) Layer **X** is the youngest because it is the middle layer of sedimentary rock.
B) Layer **Y** is the youngest because it is the bottom layer of sedimentary rock.
C) Layer **Y** is the youngest because it is the layer that the highest radioactive readings.
D) Layer **W** is the youngest because it is the top layer of sedimentary rock and the only layer that contains fossils.
E) Layer **Z** is the youngest because it was once molten rock that moved through all three layers of sedimentary rock.

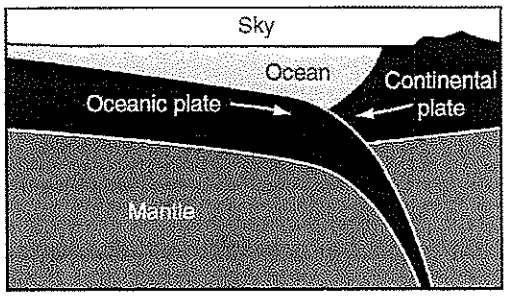
(48) The table below lists major changes in early human development. Which sequence is the correct order of events in early human development?

Events in Early Human Development

Letter ID	Event
P	There are only 32 cells present.
Q	The heart is pumping and the nervous system begins to form.
R	Fertilization takes place.
S	The baby's eyes are open and fingernails and toenails are present.

A) P, R, Q. S
B) R, Q, P, S
C) P, S, R, Q
D) R, P, Q, S
E) P, R, S, Q

(49) The diagram below shows two of Earth's plates interacting with each other. Which prediction does the information in the diagram **best** support?



A) Both plates will slide into the ocean as they collide.
B) Both plates will bounce off each other as they collide.
C) A mid-ocean ridge will form as the plates move apart.
D) The ocean will become larger as the plates move apart.
E) A volcanic mountain range will form as one plate moves under the other.

(50) New sea stars can grow from pieces of a sea star that is torn apart. How are sea stars produced this way different from sea stars produced by sexual reproduction?

A) New sea stars grown from pieces cannot reproduce.
B) New sea stars grown from pieces will lack arms to mate with.
C) New sea stars grown from pieces are genetically identical.
D) New sea stars grown from pieces are genetically different.
E) New sea stars grown from pieces can regrow new organs but not new arms.

PSIA
25 YEARS
Inspiring Student Achievement

Science

State Contest

Contestant Answer Sheet

***GRADERS:** Write scores and initial.*

Score 1: _____ Score 3: _____

Score 2: _____ FINAL: _____

Contestant ID: _____ Grade Level: _____

INSTRUCTIONS: Place the PRINTED CAPITAL letter of each answer choice (A, B, C, D, or E) in the blank corresponding to the test item number. SCORING: +5 for each correct answer; –2 for each incorrect answer; no deduction for skipped or unanswered items. Visible erasures and mark-outs constitute a 2-point deduction ONLY if a correct answer is not written in the answer space.

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

PSIA
25 YEARS
Inspiring Student Achievement

Science

State 2022

ANSWER KEY

REMINDERS: PRINTED CAPITAL letters only. SCORING: +5 for each correct answer; –2 for each incorrect answer; no deduction for skipped or unanswered items. Visible erasures and mark-outs constitute a 2-point deduction ONLY if a correct answer is not written in the answer space.

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