



TMSCA MIDDLE SCHOOL SCIENCE TEST #2 © OCTOBER 27, 2018

GENERAL DIRECTIONS

1. About this test:
 - A. You will be given 40 minutes to take this test.
 - B. There are 50 problems on this test.
2. All answers must be written on the answer sheet/Scantron form/Chatsworth card provided. If you are using an answer sheet be sure to use **BLOCK CAPITAL LETTERS**. Clean erasures are necessary for accurate grading.
3. If using a Scantron answer form, be sure to correctly denote the number of problems not attempted.
4. You may write anywhere on the test itself. You must write only answers on the answer sheet.
5. You may use additional scratch paper provided by the contest director.
6. All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
7. On the back of this page is a copy of the periodic table of the elements as well as a list of some potentially useful information in answering the questions.
8. A simple scientific calculator with the following formulas is sufficient for the science contest: +, -, %, ^, log x, e^x, ln x, y^x, sin x, sin^{-x}, cos x, cos^{-x}, tan x, tan^{-x}, with scientific notation and degree/radian capability.
The calculator must be silent, hand-held and battery operated. The calculator cannot be a computer or cannot have built-in or stored functionality that provides scientific information and cannot have communication capability. If the calculator has memory, it must be cleared. Each student may bring one spare calculator. **NO GRAPHING CALCULATORS ARE PERMITTED.**
9. All answers within $\pm 5\%$ will be considered correct.
10. All problems answered correctly are worth **FIVE** points. **TWO** points will be deducted for all problems answered incorrectly. No points will be added or subtracted for problems not answered.
11. In case of ties, percent accuracy will be used as a tie breaker.

Periodic Table of the Elements																		1A	8A																
1																	2																		
H 1.01																	He 4.00																		
3A																		2A																	
3	4																	5	6	7	8	9	10												
Li 6.94	Be 9.01																	B 10.81	C 12.01	N 14.01	O 16.00	F 19.00	Ne 20.18												
11		12		3B		4B		5B		6B		7B		8B		1B		2B		13		14		15		16		17		18					
Na 22.99	Mg 24.31			3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																		
K 39.10	Ca 40.08	Sc 44.96	Ti 47.87	V 50.94	Cr 52.00	Mn 54.94	Fe 55.85	Co 58.93	Ni 58.69	Cu 63.55	Zn 65.38	Ga 69.72	Ge 72.64	As 74.92	Se 78.96	Br 79.90	Kr 83.80																		
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54																		
Rb 85.47	Sr 87.62	Y 88.91	Zr 91.22	Nb 92.91	Mo 95.94	Tc (98)	Ru 101.07	Rh 102.91	Pd 106.42	Ag 107.87	Cd 112.41	In 114.82	Sn 118.71	Sb 121.76	Te 127.60	I 126.90	Xe 131.29																		
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86																		
Cs 132.91	Ba 137.33	La 138.9	Hf 178.49	Ta 180.95	W 183.84	Re 186.21	Os 190.23	Ir 192.22	Pt 195.08	Au 196.97	Hg 200.59	Tl 204.38	Pb 207.20	Bi 208.98	Po (209)	At (210)	Rn (222)																		
87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118																		
Fr (223)	Ra (226)	Ac (227)	Rf (261)	Db (262)	Sg (266)	Bh (264)	Hs (277)	Mt (268)	Ds (281)	Rg (281)	Cn (285)	Nh (286)	Fl (289)	Mc (289)	Lv (293)	Ts (293)	Og (294)																		

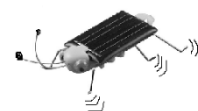
Specific heat of water = $4.18 \text{ J/g} \cdot ^\circ\text{C}$

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1. Where does cellular respiration take place?
 - A. endoplasmic reticulum
 - B. mitochondria
 - C. Golgi body
 - D. lungs
2. Students conducted a lab activity in which they chewed a simple cracker for 2 minutes before swallowing. They made observations in their lab journals. Which is not a science concept learned from the activity?
 - A. Chewing the cracker with teeth causes a physical change to the cracker.
 - B. The enzyme found in saliva dissolved the flour with a chemical change causing the cracker to taste “bitter”.
 - C. Digestion of food starts in the stomach with digestive enzymes.
 - D. The enzyme found in saliva converts starch to sugar during a chemical change causing the cracker to taste “sweet”.
3. The oceanic crust is composed mainly of which type of rock?
 - A. granite
 - B. slate
 - C. quartzite
 - D. basalt
4. Which of the following cells usually live the longest?
 - A. red blood cells
 - B. white blood cells
 - C. skin cells
 - D. liver cells
5. What is the SI unit to measure force?
 - A. kilogram
 - B. pounds
 - C. Newtons
 - D. Hertz
6. The Greek word “opthalmos” has helped to develop words such as ophthalmoscope and ophthalmometer. What does “opthalmos” mean?
 - A. ear
 - B. mouth
 - C. nose
 - D. eye
7. Which of the following would not be considered a testable hypothesis?
 - A. If I brush my teeth every day, then I will have no cavities.
 - B. If I add fertilizer to my tomato plants, then I will have bigger tomatoes.
 - C. If the universe was smaller, there would be fewer planets.
 - D. When there is less dissolved oxygen in the water, there are fewer fish.

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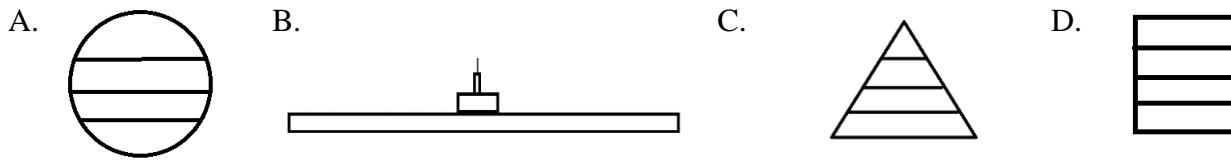
8. The Tropic of Capricorn is found at what?
- A. 23.5° S latitude
 - B. 23.5° N latitude
 - C. 0° latitude 0° longitude
 - D. 30° North of equator
9. Roger was experiencing a headache while fishing at his favorite pond. He remembered something that his Grandpa taught him. If you chew on some bark of a willow tree, your headache will go away. What is found in willow tree bark to help with pain?
- A. A chemical named cortisone
 - B. A chemical named salicin
 - C. A chemical named taxol
 - D. A chemical named caffeine
10. Which of the following shows evidence that a chemical reaction took place?
- A. Ice melting into a puddle of water
 - B. A poster changing color after exposure to the sun for a week.
 - C. Salt dissolving in a cup of water
 - D. Dry ice changing to gas after setting on counter for a few hours
11. What is one way you can tell the precise age of some types of fish?
- A. Count the growth rings on the scales
 - B. Measure the anterior dorsal fin
 - C. Check the condition of the caudal fin
 - D. Count the teeth on the lower jaw
12. The largest known volcano in our solar system is on what planet?
- A. Venus
 - B. Mars
 - C. Neptune
 - D. Earth
13. What is important to use when you need to compare stars, see relationships, and see their ages and stages all at the same time?
- A. Spectrometer
 - B. Hubble Space Telescope
 - C. Hertzsprung-Russell Diagram
 - D. Reflecting Telescope
14. Sammy bought a solar bug online. The solar bug has a small solar panel on its back and wire legs with a plastic body. When placed in the sun, the toy will vibrate and move across the floor. Which list below best explains how the energy is being transformed with the solar bug?
- A. light energy \rightarrow electrical energy \rightarrow mechanical energy \rightarrow kinetic energy
 - B. light energy \rightarrow potential energy \rightarrow heat energy \rightarrow vibration energy
 - C. electrical energy \rightarrow mechanical energy \rightarrow potential energy \rightarrow kinetic energy
 - D. mechanical energy \rightarrow light energy \rightarrow electrical energy \rightarrow kinetic energy



15. Words that start with the prefix “cardi” implies relation to which organ?
- A. heart B. lung C. stomach D. liver
16. Which of the following cloud words are correctly matched?
- A. Stratus: sheet-like, Cirrus: wispy, Cumulus: puffy, Nimbo: rain,
B. Stratus: wavy, Cirrus: wispy, Cumulus: puffy, Nimbo: rain
C. Stratus: sheet-like, Cirrus: puffy, Cumulus: wispy, Nimbo: rain
D. Stratus: rain, Cirrus: sheet-like, Cumulus: wavy, Nimbo: wispy
17. Which of the following statements about wind is incorrect?
- A. Wind moves from areas of low pressure to areas of high pressure
B. Wind is named from the direction it blows from, not to.
C. Wind is caused by the uneven heating of the Earth’s surface by the sun.
D. Wind is measured by an instrument called an anemometer.
18. The name for the group of amphibians without legs are called what?
- A. newts
B. snakes
C. caecilians
D. salamanders
19. Calculate the concentration of a solution in which 28 g of salt is dissolved into 500 mL of water.
- A. 14,000 mL/g
B. 17.86 g/mL
C. 472 mL/g
D. 0.056 g/mL
20. What is the atomic mass for Gold?
- A. 79 B. 31 C. 197 D. 32
21. The Hawaiian volcano, Mauna Loa, has low, gently-sloped sides and usually has slow, gentle eruptions. What type of volcano is Mauna Loa?
- A. cinder cone B. shield C. composite D. basaltic
22. The Law of Conservation of Energy states that energy _____.
- A. can be conserved if all types of energy are utilized.
B. can be created by taking mass and converting it to energy.
C. can be destroyed when the mass is more than the volume.
D. can neither be created or destroyed, it just changes form.

23. One researcher decided to test the hypothesis that e-cigarette vapors cause wounds to not heal correctly. Fibroblasts are part of connective tissue, but when an injury occurs they come to the rescue to help heal the wound. The researcher grew lung tissue fibroblasts in Petri dishes to test. He simulated an injury and then exposed the cells to e-cigarette vapors. He recorded whether or not the wound healed correctly. What is the dependent variable in this experiment?
- A. The exposure to e-cigarette vapors
 - B. The wound healing properly or not
 - C. The growing of the fibroblasts
 - D. The recording of the wounds
- 
24. Most all of the immovable joints in the human skeleton are found where?
- A. The backbone
 - B. The feet
 - C. The cranium
 - D. The hip bones
25. What do some scientists feel are the results of the Chicxulub asteroid collision?
- A. Extinction of the dinosaurs
 - B. Darkened skies
 - C. Towering tsunami
 - D. All of the above
26. Who was the first American to go into space on May 5, 1961?
- A. Neil Armstrong
 - B. Alan B Shepard
 - C. Buzz Aldrin
 - D. John Glenn
27. Friction is a force that would be considered what?
- A. harmful to the world of automobiles
 - B. useful to the world of automobiles
 - C. Both A and B
 - D. Neither A or B
28. Words that start with the prefix “hepat” implies relation with what organ?
- A. heart
 - B. lung
 - C. kidney
 - D. liver
29. How many electrons does an atom of Calcium have?
- A. 40
 - B. 27
 - C. 20
 - D. 17

30. Which diagram below best displays the trophic levels and the energy relationships, with bottom showing producers, consumers, and so on?



31. What coefficients would make this chemical equation balanced?



- A. 2,2,1
- B. 1,1,2
- C. 1,1,1
- D. 3,3,2

32. What mammal has been credited for helping to store water and recharging aquifers by slowing down water flow?

- A. wolves
- B. bears
- C. beavers
- D. river otters

33. What rodent is considered a keystone species for the prairie ecosystem?

- A. kangaroo rat
- B. bison
- C. prairie dog
- D. eastern cottontail

34. Most scientists believe that the movement of the Earth's tectonic plates is caused by what?

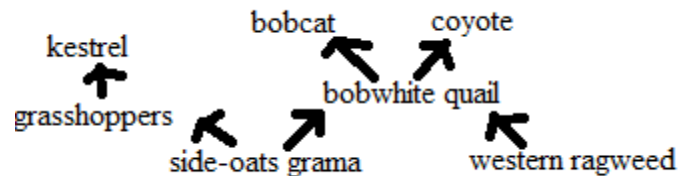
- A. subduction
- B. mantle convection currents
- C. earthquakes
- D. rotation

35. Most absorption of food nutrients takes place in what place?

- A. mouth
- B. esophagus
- C. stomach
- D. small intestine

36. In this food web, what is a reasonable prediction that would occur if all the primary consumers disappeared?

- A. the secondary consumers population were decrease
- B. the secondary consumers population would increase
- C. the producers were decrease
- D. nothing would change



37. Complete this analogy: moon is to Earth as Io is to _____.

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

38. Which statement about oxygen is true?
- A. Air has more oxygen than water at the same temperature.
 - B. Oxygen is the 9th element on the Periodic Table.
 - C. Oxygen has an atomic mass of 8.
 - D. Oxygen makes up 30% of Earth's atmosphere.
39. What type of muscle is cardiac muscle?
- A. voluntary
 - B. involuntary
 - C. lung
 - D. striated
40. Which of these show a correct order from most recent period to oldest on the Geologic Time Scale?
- A. Tertiary, Cretaceous, Jurassic, Triassic, Permian
 - B. Permian, Cretaceous, Tertiary, Triassic, Jurassic
 - C. Jurassic, Triassic, Permian, Tertiary, Cretaceous
 - D. Triassic, Permian, Jurassic, Cretaceous, Tertiary
41. Group 7A on the Periodic Table is made up of elements called what?
- A. noble gases
 - B. halogens
 - C. alkali metals
 - D. alkali Earth metals
42. Red blood cells live about how many days before they die and then parts are recycled?
- A. 2 years
 - B. 120 days
 - C. 20 days
 - D. 1 month
43. Which scientist below made contributions to the science of physics?
- A. Alfred Wegener
 - B. Albert Einstein
 - C. Gregor Mendel
 - D. Mario Molina
44. A student was conducting an experiment to find out the temperature change when a cow liver is placed in hydrogen peroxide. She used a probe to record the temperature every 5 seconds for 10 minutes. What variable is considered dependent?
- A. the cow liver
 - B. The time
 - C. The probe
 - D. The temperature

45. What does the prefix “sapr” mean such as in the word “saprophyte?”

- A. teeth B. rotten C. plants D. eats

46. One of the earliest creators of the Periodic Table was Russian chemist named what?

- A. Yuri Gagarin
B. Dimitri Mendeleev
C. Nicolay Semenov
D. Vladimir Putin

47. A scientist that studies the atmosphere and conditions is called a what?

- A. climatologist
B. botanist
C. cytologist
D. meteorologist

48. What connects the bone to bone in human joints?

- A. tendons
B. ligaments
C. cartilage
D. nothing

49. This type of cloud forms usually around the same time as a storm. Interestingly enough, these are formed from sinking air instead of rising air. What type of cloud is this?

- A. Lenticular
B. Kelvin-Helmholtz
C. Mammatus
D. Cirrus



50. One of the missions of the Parker Space Probe visiting the sun is to take observations to see why there is such a difference between the corona’s temperature and the surface of the sun’s temperature. What is the difference in these temperatures?

- A. The sun’s surface is much hotter. It is 2 million degrees F, while the corona is only 10,000 degrees F.
B. The corona is much hotter. It is 2 million degrees F, while the sun’s surface is only 10,000 degrees F.
C. The corona is much cooler than the sun’s surface, at 10,000 degrees F because is cooled by the solar winds.
D. The sun’s surface is slightly cooler than the corona because of the solar flares and prominences.

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