



TMSCA MIDDLE SCHOOL SCIENCE TEST #1 © OCTOBER 20, 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																			
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		Al 26.98		Si 28.09		P 30.97		S 32.07		Cl 35.45		Ar 39.95					
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 = $4.18 \text{ J/g} \cdot ^\circ\text{C}$

2018 – 2019 TMSCA Middle School Science Test # 1

- Complete this analogy: skin is to epithelial tissue as brain is to _____ tissue.
A. muscular B. connective C. nervous D. blood
- An atom contains 12 neutrons and has an atomic mass of 23. What element is this?
A. Calcium B. Vanadium C. Chlorine D. Sodium
- Edmund found an irregular shaped rock and wanted to find the density of the rock. He measured the mass to be 80 g. When he placed the rock in a graduated cylinder filled to the 50 ML mark, the water level rose to 80.2 mL. Which mineral in this chart has the closest density to Edmund's rock?

DENSITY CHART

**ALL DENSITIES ARE IN
GRAMS PER CUBIC CENTIMETER**


DENSITY	MINERAL
2 . 16	halite
2 . 32	gyp sum
2 . 65	quartz
2 . 72	calcite
3 . 18	fluorite

- halite
 - calcite
 - quartz
 - fluorite
- An instrument that is used to measure the magnitude of an earthquake is called a what?
A. seismic scale
B. seismograph
C. epicenter
D. barometer
 - Which Ecoregion of Texas listed below receives the most amount of annual rainfall?
A. Edward's Plateau
B. Rolling Plains
C. Pineywoods
D. Trans Pecos
 - This chart shows the speed of sound through different mediums; however, there is a mistake. What is the mistake? (cannot be true)

Material	m/s
Steel	5200
Silver	3650
Air	4012
Water	1520

- steel 5200
- air 4012
- water 1520
- all are correct

7. The prefix “dendr” helps one to discover that dendrophobia means fear of what?
A. power B. trees C. horses D. skulls
8. During Josie’s science project, she kept a journal and recorded observations of the plants she was growing. She wrote down information on the leaves, the color of the leaves, any specific smells emitted, direction of growth, and more. She also measured the height of the plant every day. Which of the following is example of a qualitative observation that Josie made?
A. height of the plant in cm
B. number of leaves
C. number of days before sprouting
D. color of the leaves
9. In the microbiology lab, the researcher was starting an experiment that involved growing a particular strain of bacteria. She didn’t want to contaminate the materials with any unwanted bacteria, so she made sure to use what tool to sterilize her lab instruments before starting the experiment?
A. Petri dish
B. stereoscope
C. spectrometer
D. autoclave
10. When exploring the deep sea, a scientist team found an unusual object. When making initial observations of the object, they noticed that it was made of cells. What does this tell them about the object?
A. It came from inorganic material.
B. It came from a living organism.
C. It is a type of mineral.
D. It is not a living organism.
11. When a structure of a living thing is buried in sediment and then dissolved by underground water with only the shape and surface markings appearing, what type of fossil is created?
A. a mold
B. a cast
C. an impression
D. track
12. A shark has a cartilaginous skeleton. Cartilage is flexible and durable. What part of a human is made of cartilage?
A. the patella
B. the skull
C. the clavicle
D. the nose
13. A measure of 2 mechanical horsepower would equal how many watts?
A. 1,492 W
B. 3,000 W
C. 746 W
D. 373 W

14. Weather on Earth takes place in what layer of the atmosphere?
- A. stratosphere
 - B. ionosphere
 - C. mesosphere
 - D. troposphere
15. Solar winds from the sun including solar flares can cause disturbances in which of the following?
- A. satellites, spacecraft, and the Earth's electric-power grid
 - B. astronauts in space, technology on Earth
 - C. earthquakes, tsunamis, hurricanes, volcanos
 - D. both A and B
16. Words that start with the prefix "pulmo" implies relations to which organ?
- A. heart
 - B. lung
 - C. stomach
 - D. liver
17. On a rare occasion, you might see a type of arcus cloud that is associated with thunderstorms and is found low to the horizon. It looks sort of like a long tube and is caused by cooler air lifting warm moist air. It is not attached to the base cloud. What is this type of cloud called?
- A. shelf cloud
 - B. cumulus
 - C. lenticular cloud
 - D. roll cloud
- 
18. Cane toads were brought to Australia from South America to eat beetles that were destroying the sugarcane fields. The cane toads did very well and had very few predators. Their populations skyrocketed in Northern Australia. The Cane toad in Australia would now be best known as an example of what?
- A. An alien organism
 - B. An exotic species
 - C. A native species
 - D. An invasive species
19. The Earth is tilted on its axis how many degrees?
- A. 30
 - B. 15
 - C. 45
 - D. 23.5
20. In biology, DNA is an extremely important molecule. What does DNA stand for?
- A. deadly nut allergy
 - B. deoxyribonucleic alkali
 - C. distinctive nucleic acid
 - D. deoxyribonucleic acid
21. Gluten is a term that you hear in the news recently. What is gluten?
- A. Gluten is a chemical found fat products.
 - B. Gluten is a sugar related substance that causes problems for certain people.
 - C. Gluten is a lipid that can cause digestive problems.
 - D. Gluten is a family of proteins found in grains like wheat, spelt, rye, and barley.

22. What part of an atom is electrically positive?

- A. neutron B. electron C. proton D. nucleus

23. When the moon is between the Earth and the sun, which of these is possible on Earth?

- A. neap tides
B. lunar eclipse
C. solar eclipse
D. full moon phase

24. Cells come in all sizes and shapes. What is the longest cell in the human body?

- A. blood cells B. skin cells C. muscle cells D. nerve cells

25. When Mendeleev first developed his periodic table, he left many places blank or put a dash in the spot because he realized that there were what?

- A. elements with names too long to fit in his chart
B. elements with valence electrons that were positively charged
C. undiscovered elements that should go in that spot
D. elements with atomic weights which were unrecognizable

26. Which of these has the most effect on the climate of a country?

- A. population
B. distance from the equator
C. biodiversity
D. soil type

27. Unbalanced forces cause what?

- A. work
B. equilibrium
C. energy
D. acceleration

28. The word “rhinitis” starts with the prefix “rhin”. This happens when there is an irritation or inflammation of what part of the body?

- A. ear B. mouth C. nose D. back

29. A scientist that focuses on separating materials into their parts or elements is called what?

- A. Cytologist
B. Epidemiologist
C. Ethologist
D. Analytical chemist

30. What is missing in this Punnett square?

- A. BB B. bb C. Bb D. bB

		Maternal	
		B	b
Paternal	B	BB	
	b	Bb	bb

31. Who was the first woman to receive the Nobel Prize (1903)?
- A. Caroline Herschel
 - B. Barbara McClintock
 - C. Rosalind Franklin
 - D. Marie Curie
32. Leo was using an instrument to measure relative humidity. As part of the procedure, he would swirl the instrument around in a circle above his head. What instrument was he using?
- A. anemometer
 - B. sling psychrometer
 - C. hydrometer
 - D. dry bulb barometer
33. What structure on the underside of leaf allows for the exchange of gases?
- A. phloem
 - B. xylem
 - C. cambium
 - D. stomata
34. What element makes up about 21% of the Earth's atmosphere?
- A. Oxygen
 - B. Nitrogen
 - C. Hydrogen
 - D. Helium
35. Destiny's class was learning about Newton's Laws of Motion. They were launching rockets that they built in class. Destiny learned exhaust flow pushes in one direction and then the engine pushes in the opposite direction. Which law of motion does this represent?
- A. Newton's first law
 - B. Newton's second law
 - C. Newton's third law
 - D. None of the above
36. Earthquakes are natural occurrences that can cause what feels like violent shaking of the Earth's crust. Which of the following statements about Earthquakes is considered true?
- A. The place in the Earth's crust where the pressure was released is called the hypocenter.
 - B. The spot on Earth's surface directly above the epicenter is the fault zone.
 - C. Secondary waves from the earthquake move up and down like ripples across a pond.
 - D. Primary waves move land from side to side and only travel through solids.
37. Which two animals are examples of neoteny?
- A. crocodile and alligator
 - B. cow and egret
 - C. olm and axolotl
 - D. tadpole and minnow
38. Which statement about calcium is not true?
- A. Calcium has an atomic number of 20.
 - B. Calcium's atomic mass is 40.08.
 - C. The chemical symbol for Calcium is "Ca"
 - D. Calcium is a member of Period 3.

39. The NOAA organization is important in keeping people informed about hurricane dangers. What does NOAA stand for?
- A. Nationwide Organization of Atmosphere Administration
 - B. National Oceanic and Atmospheric Administration
 - C. New Organization of American Atmosphere
 - D. National Ocean Advancement Association
40. A polysaccharide is a carbohydrate with a molecule made up of several sugar molecules bonded together. What does the prefix “poly” mean?
- A. once
 - B. twice
 - C. many
 - D. few
41. For the last 5 days, the weather in St. Louis has been overcast with continuous rain. What type of front is most likely in St. Louis?
- A. cold front
 - B. warm front
 - C. occluded front
 - D. stationary front
42. Looking at a cell under a microscope you see the chromosomes lined up along the equator of the cell. What phase of mitosis are you viewing?
- A. prophase
 - B. metaphase
 - C. interphase
 - D. anaphase
43. On the pH scale, a solution with the measure of 2 is how many times more acidic than one with a pH of 6?
- A. 10
 - B. 100
 - C. 1000
 - D. 10000
44. The moon rotates as it revolves around the Earth just enough to do what?
- A. rotate 8 times before the month is over
 - B. keep the same side of the moon always facing Earth
 - C. create enough gravity to keep moon in place
 - D. cause craters to form on both sides
45. Which of the following is not considered a simple machine, but is a compound machine?
- A. inclined plane
 - B. screw
 - C. pulley
 - D. scissors

46. The prefix “osteo” means what as in the word osteoporosis?
- A. bone B. water C. holes D. weak
47. Which of the following would be a reasonable density for the Earth’s core?
- A. 1.0 g/cm^3
B. 11.0 g/cm^3
C. 111.0 g/cm^3
D. 1111.0 g/cm^3
48. Mark and Scott Kelly were both astronauts for NASA and are also identical twins. NASA conducted an experiment with Scott Kelly spending about a year on the International Space Station, while his brother, Mark, stayed on Earth. Afterwards, their DNA was compared for differences. What would the presence or absence of microgravity be in this experiment?
- A. dependent variable
B. independent variable
C. controlled variable
D. hypothesis
49. During cytokinesis in animal cells, the cell is pinched in half by what?
- A. spindle fibers
B. centrioles
C. belt of protein threads
D. vesicles
50. Isotopes of an element have which of the following?
- A. Same number of protons, but different number of electrons.
B. Same number of neutrons, but different number of protons.
C. Same number of electrons, but different number of protons
D. Same number of protons, but different number of neutrons

2018 - 2019 TMSCA Middle School Science Test # 1 - Key

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