

**Physical Science (8th Grade) Sample Exam****Multiple-Choice Section**

- \_\_\_\_\_ 1) The system of measurement used by scientists around the world is the —
- A) international system of units  
B) English system of units  
C) common system of units  
D) standard system of units
- \_\_\_\_\_ 2) What does the acronym (term) "SI" stand for?
- A) Metric measurement  
B) International system of units  
C) Scientific investigation  
D) Significant figures
- \_\_\_\_\_ 3) Which one of the following is a derived unit?
- A) Wattage                      C) Speed  
B) Distance                      D) Temperature
- \_\_\_\_\_ 4) What is the basic SI unit used to measure length?
- A) Feet                              C) Kilogram  
B) Mole                              D) Meter
- \_\_\_\_\_ 5) Force is expressed in units of —
- A) m/s                              C)  $m/s^2$   
B)  $kg \times m^2$                       D)  $kg \times m/s^2$
- \_\_\_\_\_ 6) A "newton" is a unit of —
- A) temperature                      C) force  
B) momentum                      D) mass
- \_\_\_\_\_ 7) A force can be exerted by —
- A) a push                              C) a magnet  
B) a weight                              D) all of the above

- \_\_\_\_\_ 8) A boy bounces on the trampoline below with a force of 12 N.



Which one of the following statements *best* describes an action-reaction force pair in this situation?

- A) As the boy exerts a force of 12 N on the trampoline, the trampoline exerts a force of 12 N on the boy.
- B) As the boy exerts a force of 12 N on the trampoline, the trampoline magnifies the responding force on the boy.
- C) As the boy exerts a force of 12 N on the trampoline, the trampoline minimizes the responding force on the boy.
- D) The ground beneath the trampolines absorbs all the forces and all responding motion stops.
- \_\_\_\_\_ 9) At what temperature are both Celsius and Fahrenheit measure the same value?
- A)  $32^\circ$     B)  $-40^\circ$     C)  $-72^\circ$     D)  $0^\circ$
- \_\_\_\_\_ 10) What is  $50^\circ\text{C}$  converted to Fahrenheit?
- A)  $122^\circ\text{F}$     B)  $148^\circ\text{F}$     C)  $28^\circ\text{F}$     D)  $50^\circ\text{F}$
- \_\_\_\_\_ 11) What would a temperature change of 5 degrees on the Celsius scale be on the Kelvin scale?
- A) 5 K    B) 180 K    C) 278 K    D) 9 K

\_\_\_ 12) All of the following are graphical representations of organized data *except* —

- A) bar graphs                      C) equations  
B) pie charts                        D) line graphs

\_\_\_ 13) What is 20°C converted to Fahrenheit?

- A) 36°F    B) 7°F    C) 54°F    D) 68°F

\_\_\_ 14) When testing which objects are conductors or insulators in an electric circuit, the fifth-grade students discover that some objects are either conductors or insulators.



To represent their observations, they can best classify the objects in a —

- A) list                                      C) line graph  
B) pie graph                                D) chart

\_\_\_ 15) How do a Celsius and a Fahrenheit degree compare?

- A) A Celsius degree is  $\frac{7}{9}$  of a Fahrenheit degree.  
B) A Celsius degree is  $\frac{5}{9}$  of a Fahrenheit degree.  
C) A Celsius degree is  $\frac{9}{5}$  of a Fahrenheit degree.  
D) A Celsius degree is  $\frac{9}{7}$  of a Fahrenheit degree.

\_\_\_ 16) What is 13°C converted to Fahrenheit?

- A) 58.5°F    B) 55.4°F    C) 47.2°F    D) 23.4°F

\_\_\_ 17) The study of matter and energy is —

- A) Earth science  
B) physical science  
C) biology  
D) physical education

\_\_\_ 18) Inventions based on discoveries of pure science are examples of —

- A) experiments                      C) models  
B) physical science                D) applied science

\_\_\_ 19) All of the following are vector quantities, *except* —

- A) force                                      C) velocity  
B) acceleration                        D) mass

\_\_\_ 20) Which one of the following terms represents a vector quantity?

- A) force                                      C) distance  
B) power                                    D) work

\_\_\_ 21) What type of force is exerted by an object trying to return to its natural length?

- A) Elastic                                    C) Nuclear  
B) Centripetal                            D) Tension

**Question 22 refers to the following:**

A spring scale is pulled downward and the readings are recorded and then converted to kilograms.

Distance Pulled	Spring Scale Reading	Approximate Weight
2.0 cm	3.0 N	0.30 kg
3.0 cm	4.5 N	0.45 kg
4.0 cm	6.0 N	0.60 kg
5.0 cm	7.5 N	0.75 kg
6.0 cm	9.0 N	0.90 kg

\_\_\_ 22) If the spring is pulled to 8 cm, the force read on the spring scale should read —

- A) 10.5 N    B) 12.0 N    C) 11.0 N    D) 13.5 N

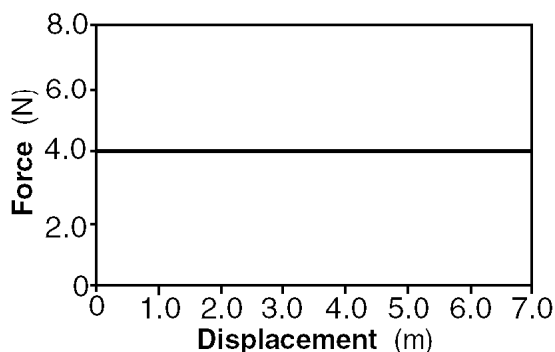
\_\_\_ 23) Newtons are the units of —

- A) power                      C) work  
B) weight                      D) friction

\_\_\_ 24) The product of one newton of force moving an object a distance of one meter is one —

- A) volt    B) power    C) joule    D) watt

\_\_\_ 25) The graph below shows the force exerted on a block as a function of the block's displacement in the direction of the force.



How much work did the force do in displacing the block 5.0 meters?

- A) 0 J    B) 0.80 J    C) 20. J    D) 4.0 J

\_\_\_ 30) A student wants to measure the density of several different liquids by measuring the volume of each liquid in a graduated cylinder and their masses on a balance. When she pours liquids *Q*, *R*, and *S* into one beaker, liquid *S* floats on top, and liquid *R* sinks to the bottom. She hypothesizes that liquid *T*, when added to the other three liquids, will sink to the bottom below liquid *R*.

Liquid	Color of Liquid	Mass (g)	Volume (mL)	Density (g/mL)
<i>Q</i>	Clear	10	10	1.0
<i>R</i>	Red	12	10	1.2
<i>S</i>	Blue	9	10	0.9
<i>T</i>	Clear	8	10	?

Is her hypothesis correct?

- A) Yes, liquid *T* is the densest and will float on top.  
B) Yes, liquid *T* is denser than liquid *S*.  
C) No, liquid *T* will float with the other clear liquid *Q*.  
D) No, liquid *T* is the least dense and will float on top.

\_\_\_ 26) Simple machines reduce effort at the expense of increasing —

- A) distance                      C) power  
B) work                              D) force

\_\_\_ 27) A device that does work with only a single movement is considered a(n) —

- A) resistance force  
B) simple machine  
C) ideal machine  
D) compound machine

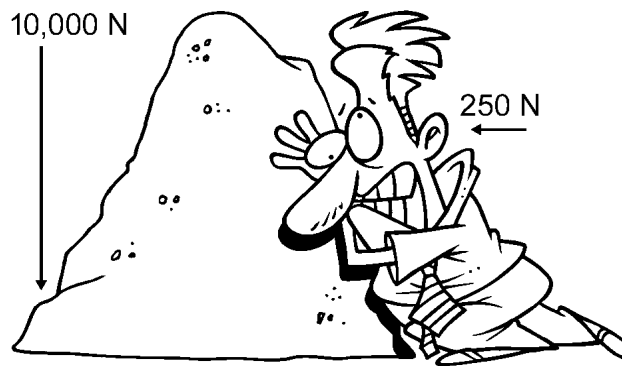
\_\_\_ 28) A system of fixed and moveable pulleys is called a(n) —

- A) ideal machine              C) simple machine  
B) complex machine        D) virtual machine

\_\_\_ 29) Which one of the following units are used to express mechanical advantage?

- A) Watts                              C) Newtons  
B) Amperes                          D) Joules

- \_\_\_ 31) Barney pushes the boulder below with 250 N of effort but cannot overcome the 10,000 N force of gravity acting upon it.



How much work has Barney done?

- A) 0 J  
B) 250 J  
C) 40 J  
D) Not enough information given.
- \_\_\_ 32) What is  $-15^{\circ}\text{C}$  converted to Fahrenheit?  
A)  $17^{\circ}\text{F}$  B)  $-27^{\circ}\text{F}$  C)  $5^{\circ}\text{F}$  D)  $24^{\circ}\text{F}$
- \_\_\_ 33) What is  $35^{\circ}\text{C}$  converted to Fahrenheit?  
A)  $63^{\circ}\text{F}$  B)  $67^{\circ}\text{F}$  C)  $102^{\circ}\text{F}$  D)  $95^{\circ}\text{F}$
- \_\_\_ 34) What is  $77^{\circ}\text{F}$  converted to Celsius?  
A)  $-25^{\circ}\text{C}$  B)  $-45^{\circ}\text{C}$  C)  $45^{\circ}\text{C}$  D)  $25^{\circ}\text{C}$
- \_\_\_ 35) What is  $212^{\circ}\text{F}$  converted to Celsius?  
A)  $100^{\circ}\text{C}$  B)  $180^{\circ}\text{C}$  C)  $90^{\circ}\text{C}$  D)  $86^{\circ}\text{C}$
- \_\_\_ 36) What is  $113^{\circ}\text{F}$  converted to Celsius?  
A)  $36^{\circ}\text{C}$  B)  $45^{\circ}\text{C}$  C)  $81^{\circ}\text{C}$  D)  $146^{\circ}\text{C}$
- \_\_\_ 37) What is  $5^{\circ}\text{F}$  converted to Celsius?  
A)  $41^{\circ}\text{C}$  B)  $-15^{\circ}\text{C}$  C)  $-27^{\circ}\text{C}$  D)  $-21^{\circ}\text{C}$
- \_\_\_ 38) What is  $0^{\circ}\text{F}$  converted to Celsius?  
A)  $-17.8^{\circ}\text{C}$  B)  $17.8^{\circ}\text{C}$  C)  $32^{\circ}\text{C}$  D)  $-32^{\circ}\text{C}$
- \_\_\_ 39) What is  $100^{\circ}\text{F}$  converted to Celsius?  
A)  $122.4^{\circ}\text{C}$  B)  $68^{\circ}\text{C}$  C)  $37.8^{\circ}\text{C}$  D)  $73.3^{\circ}\text{C}$
- \_\_\_ 40) Power equals work —  
A) divided by distance  
B) multiplied by distance  
C) multiplied by time  
D) divided by time
- \_\_\_ 41) The rate of change of work with respect to time is called —  
A) energy B) momentum C) power D) force
- \_\_\_ 42) Which one of the following terms represents a unit of power?  
A) Watt B) Joule C) Newton D) Hertz
- \_\_\_ 43) What is the SI unit for power?  
A)  $\frac{\text{Newton}}{\text{second}}$  B) Joule•second C) Newton•second D)  $\frac{\text{Joule}}{\text{second}}$

**True/False Section****Questions 44 through 51 refer to the following:**

Determine whether the underlined word or phrase makes each statement true or false. Write either **TRUE** or **FALSE** to indicate your answer. If the statement is false, write the word or term that makes the statement true.

- \_\_\_ 44) Velocity, acceleration, and force are all vector quantities.
- \_\_\_ 45) Gears can be used to change the viscosity or turning force needed to move something.
- \_\_\_ 46) The proper metric units for force are newtons (N).
- \_\_\_ 47) A device used to measure force is a(n) balance.
- \_\_\_ 48) Scientific measurements are always made using the English measurement system.
- \_\_\_ 49) The International System of Measurement is based on the number 10.
- \_\_\_ 50) The metric system prefix for one million is "mega".
- \_\_\_ 51) Substances can achieve some interesting properties, such as superfluidity and superconductivity, as they approach absolute zero.
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**Fill-in-the-Blank Section**

- \_\_\_ 52) The standard system of scientific measurement is called the ? system.
- \_\_\_ 53) The field of ? explores new knowledge methodically through observations and experiments.
- \_\_\_ 54) A vector quantity has both magnitude and ? while a scalar has only magnitude.
- \_\_\_ 55) Newton is the SI unit for ?.
- \_\_\_ 56) Work occurs when a(n) ? acts on an object to stop it from moving.
- \_\_\_ 57) ? is the push or pull that opposes motion between two surfaces that are touching each other.
- \_\_\_ 58) ? provides the centripetal force needed to allow a car to turn a corner.

## Matching Section

Questions 59 through 66 refer to the following:

Select the type of graph from the list below that is *best* depicted by the given information. Some terms may be used more than once or not at all.

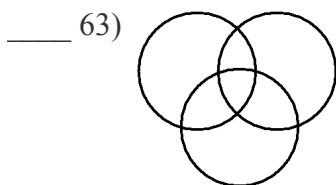
- (A) line graph
- (B) pie chart
- (C) bar graph
- (D) pictograph
- (E) concept map
- (F) Venn diagram
- (G) scatterplot

\_\_\_ 59) • Used to evaluate the relationship between two different continuous variables as an average of a trend

\_\_\_ 60) • Used to show the relationships of parts to the whole for a variable

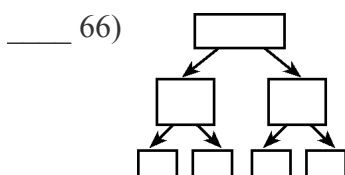
\_\_\_ 61) • Used to organize information in a way that shows relationships between ideas and the path connecting the ideas

\_\_\_ 62) • Used to illustrate statistical information using picture symbols



\_\_\_ 64) • Used to display quantitative data that changes over a period of time

\_\_\_ 65) • Used to compare the frequency of a category or characteristic with that of another category or characteristic



## Short Answer &amp; Extended Response Section

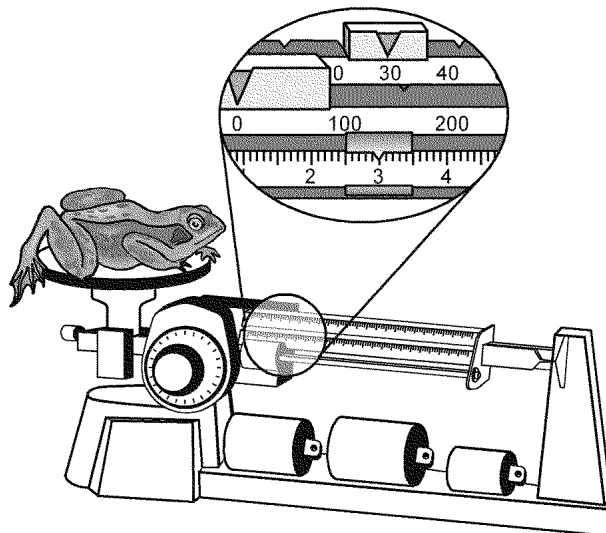
67)



Name *three* safety procedures the student in the diagram above has neglected to follow.

68) What is the metric system?

69) What is the mass of the frog below?



- 70) If a solid object has a mass of 140 g and a volume of  $40 \text{ cm}^3$ , what is the density of the object? [*Show all work.*]
- 71) (a) Write out what m/s means and explain what this unit is used to measure.  
(b) Why is this unit considered to be a derived unit?
- 72) Why do scientists use standard units of measure in their experiments and calculations? [*Explain.*]
- 73) You are given a small piece of quartz rock, a mass scale, some water, a meter stick, and a 100-mL graduated cylinder to work with in the lab. Your task is to find the volume of the rock. You may use any or all of the items given. Explain how you would find the volume of the rock.
- 74) One kilogram equals about 2.2 pounds. If a person measures 132 pounds, what is their mass in kilograms? [*Show all work.*]
- 75) A student collected the data shown below to determine experimentally the density of distilled water.
- Mass of graduated cylinder + distilled  $\text{H}_2\text{O}$  sample..... 163.7 g  
Mass of empty graduated cylinder..... 141.2 g  
Mass of distilled  $\text{H}_2\text{O}$  sample..... ? g  
Volume of distilled  $\text{H}_2\text{O}$  sample..... 33.0 mL
- (a) Use the given information to determine the mass of the distilled  $\text{H}_2\text{O}$  sample. [*Show all work.*]  
(b) Using your answer to *part (a)*, what is the density of the distilled water to the correct number of significant digits? [*Show all work.*]



**Question 76 refers to the following:**

Based on the rules below, identify the number of significant figures shown in the given number and underline them.

**Rules of Significant Figures:**

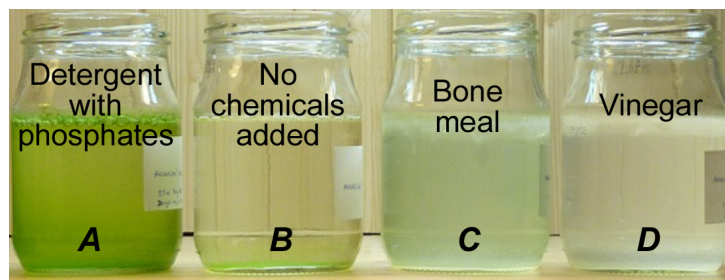
- (1) All non-zero numbers ARE significant.
- (2) Zeros between two non-zero digits ARE significant.
- (3) Leading zeros are NOT significant. They're nothing more than "place holders."
- (4) Trailing zeros to the right of the decimal ARE significant.
- (5) Trailing zeros in a whole number with the decimal shown ARE significant.
- (6) Trailing zeros in a whole number with no decimal shown are NOT significant.
- (7) Exact numbers have an INFINITE number of significant figures.
- (8) For a number in scientific notation:  $N \times 10^x$ , all digits comprising  $N$  ARE significant and "10" and "x" are NOT significant.

76) 0.034

**Questions 77 through 83 refer to the following:**

A science class set up an experiment to study the effect of different chemicals on algae growth. A sample of pond water was collected and divided evenly into four jars. The jars all sat on the same windowsill, exposed to sunlight for one week. A sample of water was taken from each jar and viewed under a microscope.

Next, detergent, vinegar, and bone meal were added to different jars, and then placed on the window sill for 2 weeks more. Samples were then taken from each jar and again observed under a microscope.



77) The *main* purpose of the microscope in this experiment is to observe the —

- |  |   |
|--|---|
| A) algae growth or decline in a sample | C) saturation of the chemical into the pond water |
| B) water color changes in a sample     | D) temperature change of a sample                 |

78) Which one of the jars acts as the control for this experiment?

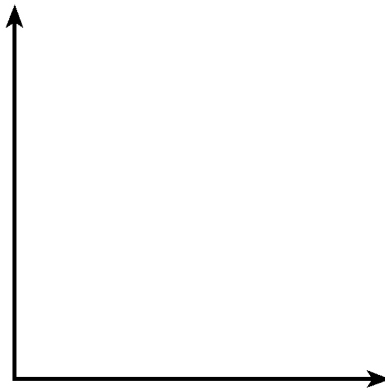
- |      |      |      |      |
|------|------|------|------|
| A) A | B) B | C) C | D) D |
|------|------|------|------|

79) What is the manipulated variable in this experiment?

- |                                  |                           |
|----------------------------------|---------------------------|
| A) Color of the pond water       | C) Amount of algae change |
| B) Temperature of the pond water | D) Type of chemical added |

- 80) What is the responding variable in this experiment?
- 81) What is the purpose of viewing the samples of pond water under a microscope after 1 week and before adding the chemicals?
- 82) Two weeks after the chemicals were added to the jars, jar *D* appeared to be clearer than jar *B*. Formulate an inference about the algae growth in jar *B*.

- 83) After the completion of the experiment, the students were asked to graph their results on the grid below.



- (a) Name the graph and label the axes.
- (b) What type of graph would *best* display the data from this experiment?
- 84) Explain the difference between science and technology.