

Vacation Assignment 2014

Physical Science Exam

I. Scientific Method

- You want to know if the temperature of water affects how quickly a cube of sugar will dissolve into the water. In a controlled experiment, what would be the dependent/responding variable?
 - the size of the sugar cubes
 - the amount of water used
 - the temperature of the water
 - the time it takes for the sugar cube to dissolve in the water

- The data table below shows the mass of an 800-gram block of ice as it melts to a 600-gram block of ice.

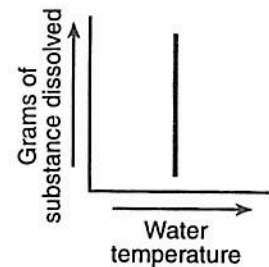
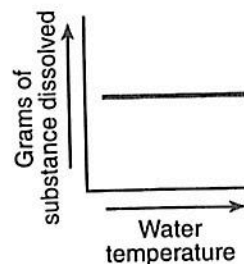
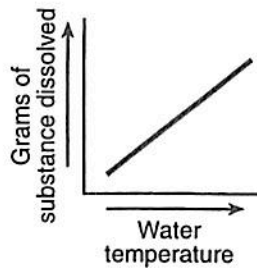
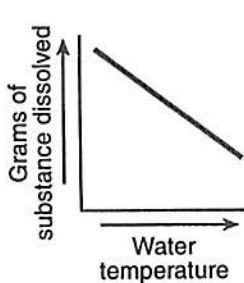
Data Table

Time (minutes)	Mass of Block of Ice (grams)
0	800
15	750
30	700
45	650
60	600

If the current rate of melting continues, how many more minutes will be required for the 600-gram block of ice to reach a mass of 400 grams?

- (a) 15 (c) 45
(b) 30 (d) 60

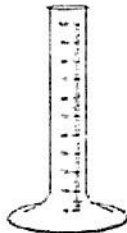
- Which graph shows that more grams of a substance can be dissolved in water as the water temperature increases?



II. Measurement

4. The tool below is used to measure

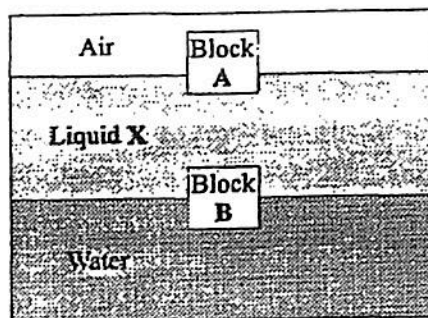
- a. Mass
- b. Volume
- c. Weight
- d. Length



5. The measurement of the force of gravity on an object is the object's

- a. mass
- b. volume
- c. weight
- d. density

6. The diagram below shows a beaker. In the beaker is some water, some liquid marked "Liquid X" and two solid blocks. Which of the four statements about the densities of the two liquids is correct?



- a. Liquid X must have a density less than the density of water
- b. Liquid X must have a density greater than the density of water
- c. Liquid X and water must have equal densities
- d. Liquid X must have a density less than the density of air

III. Intro to Matter

7. Particles of a solid

- a. are tightly packed together and stay in a fixed position.
- b. have no viscosity
- c. decrease in volume with increasing temperature
- d. are free to move within a container, but remain in close contact with one another

III. Intro to Matter

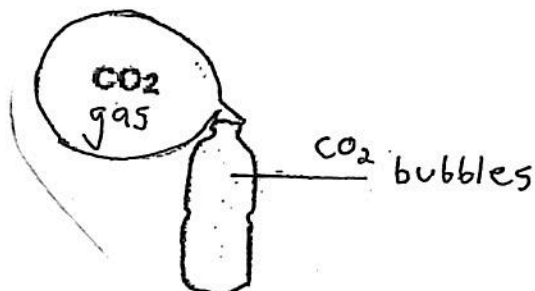
8. Particles of a solid
- are tightly packed together and stay in a fixed position.
 - have no viscosity
 - decrease in volume with increasing temperature
 - are free to move within a container, but remain in close contact with one another
9. All matter is made up of particles called _____.
- cells
 - molecules
 - atoms
 - compounds
10. Which of the particles has a positive charge?
- atom
 - proton
 - neutron
 - electron
11. The energy a substance has from the movement of its particles is called
- light energy
 - chemical energy
 - thermal energy
 - potential energy

IV. Changes in Matter

12. Which is an example of a physical change followed by a chemical change?
- cutting wood then painting it green
 - putting gasoline in the car then starting the engine
 - taking ice cream out of the freezer then letting it melt
 - crushing a sugar cube then dissolving it in water

13. One way to increase the volume of the gas that is inside the balloon shown below is to

- a. Cool the gas in the balloon only
- b. Seal the top of the bottle
- c. Put the bottle in the freezer
- d. Increase the temperature in the bottle



14. A cold pack placed on a sport injury is an example of a(n)

- a. Endothermic reaction
- b. exothermic reaction
- c. physical change
- d. physical reaction

15. Melting and freezing are examples of what type of change?

- a. chemical changes
- b. physical changes
- c. both chemical and physical changes
- d. none of the above

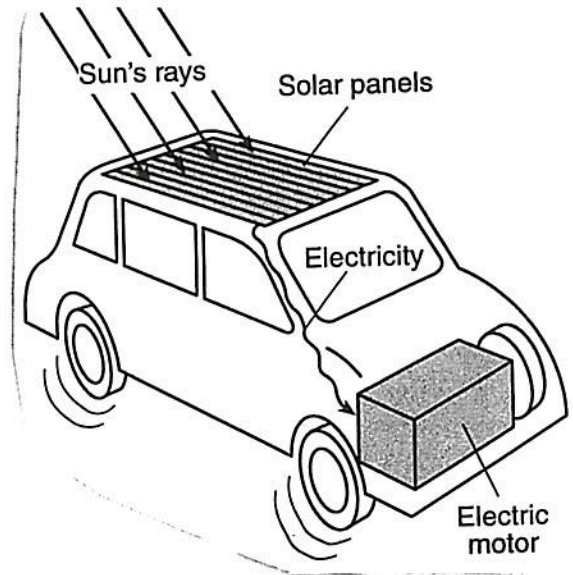
V. Energy

16. Which statement best describes the energy changes that occur while a child is riding on a sled down a steep, snow covered hill?

- a. Kinetic energy decreases and potential energy increases
- b. Kinetic energy increases and potential energy decreases
- c. Both potential energy and kinetic energy decrease
- d. Both potential energy and kinetic energy increase

17. What is the sequence of the energy transformations represented in the diagram of the moving car below?

- A mechanical → chemical → solar
- B solar → electrical → mechanical
- C mechanical → electrical → solar
- D solar → chemical → electrical



18. A pendulum set in motion eventually stops because

- a. the energy is destroyed.
- b. the kinetic energy and potential energy are balanced.
- c. friction converts the mechanical energy to thermal energy.
- d. the pendulum runs out of power.

19. The type of energy stored by fossil fuels such as coal is

- a. kinetic energy
- b. mechanical energy
- c. chemical potential energy
- d. electromagnetic energy

20. When you rub your hands together on a cold day, you use friction to convert

- a. mechanical energy to thermal energy
- b. thermal energy into nuclear energy
- c. nuclear energy into electrical energy
- d. electrical energy into electromagnetic energy
- e.

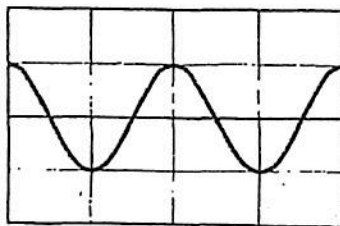
VI. Waves

21. The diagram below shows a pencil in a glass of water. When viewed from the side, the pencil appears to be broken. What causes this to happen?

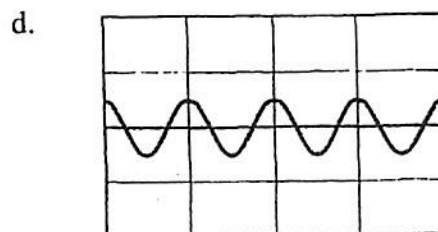
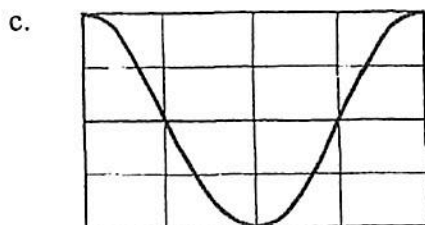
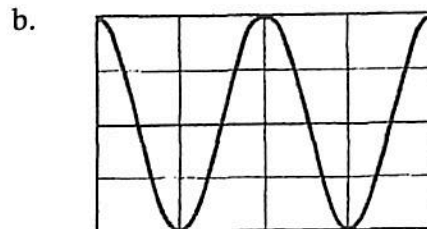
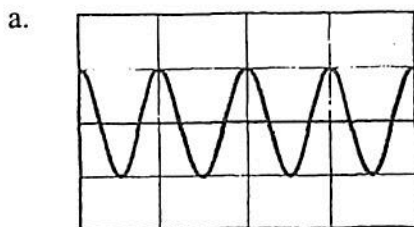
- a. absorption
- b. evaporation
- c. reflection
- d. refraction



22. Look at the picture of the wave below.



Which picture shows a wave with twice the amplitude and half the frequency?



23. Waves produced by earthquakes are called _____.

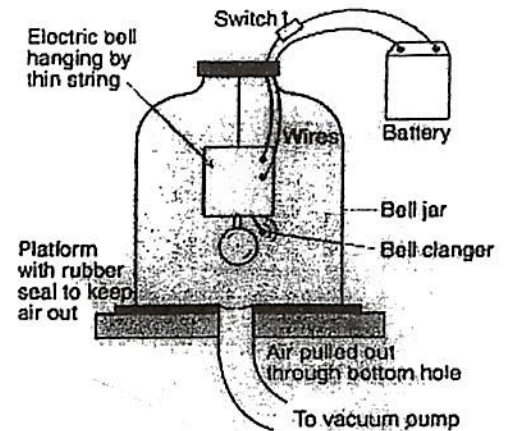
- a. standing waves
- b. transverse waves
- c. seismic waves
- d. longitudinal waves

VII. Sound and Light

24. As air is pumped out of the vacuum jar, the sound level of the ringing bell will decrease until it can no longer be heard.

This happens because air must be present in the jar in order for

- a. sound to be transferred
- b. electricity to flow through the wires
- c. the rubber to seal the jar
- d. the bell clanger to vibrate



25. What happens when light strikes a black object?

- a. blue light is reflected
- b. red light is reflected
- c. no light is reflected
- d. all light is reflected

26. When light strikes an object it will be _____.

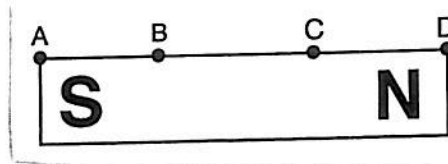
- a. refracted
- b. reflected
- c. absorbed
- d. none of the above

27. Clear glass, water, and air are examples of what kind of material?

- a. opaque
- b. fluid
- c. translucent
- d. transparent

VIII. Electricity and Magnetism

28. The diagram below shows a bar magnet. Points A, B, C, and D are located on the magnet.



Which position on the bar magnet would have the strongest attraction to the north pole of another bar magnet?

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

29. An example of an insulator is

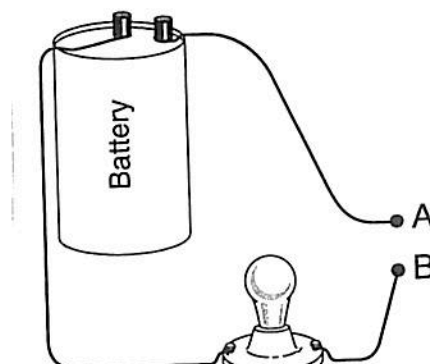
- a. rubber
- b. copper
- c. silver
- d. iron

30. Magnetic poles that are alike

- a. attract each other
- b. repel each other
- c. do not react to each other
- d. always point toward the earth

31. The diagram below shows an open/incomplete circuit. Which item would allow the bulb to light up if it were used to connect point A to point B?

- a. a glass rod
- b. a metal nail
- c. a plastic comb
- d. a paper cu



IX. Forces

32. In physical science a push or a pull is an example of a(n)

- a. force
- b. acceleration
- c. inertia
- d. motion

33. When two equal forces act on the same object in opposite directions, the net force is

- a. smaller than either force
- b. equal to each of the forces
- c. zero
- d. greater than either force

34. The force that pulls falling objects toward Earth is called

- a. gravity
- b. friction
- c. acceleration
- d. inertia

35. Which action results in no work being done on a object?

- a. lifting the object from the floor to the ceiling
- b. pushing a lawnmower across the yard
- c. holding an object stationary above the ground
- d. pulling a wagon down the hallway

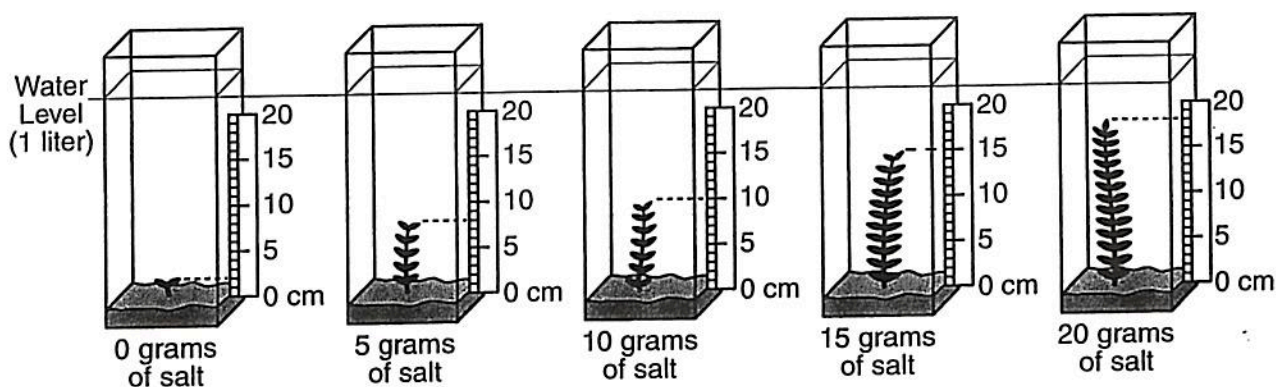
36. Forces can be added together only if they are

- a. acting on the same object in the same direction
- b. balanced forces acting in opposite directions
- c. unaffected by gravity
- d. unaffected by friction

Physical Science Exam – Constructed Response

I. Intro to Science

Saltwater plants of the same species were grown in soil in separate containers with 1 liter of water. All of the plants were the same height at the beginning of the experiment. Different amounts of salt were dissolved in each container as shown in the diagrams. All other conditions were held constant. Measurements for the final height of each plant are provided.

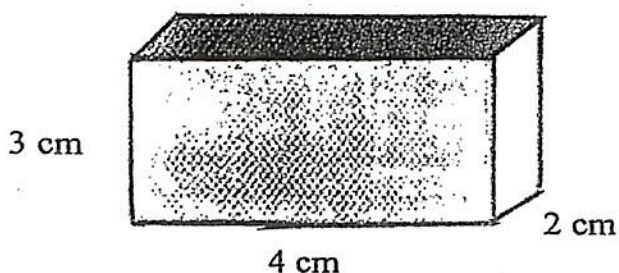


Use the information from the student's experiment to construct a line graph on the answer sheet provided.

1. Use an **X** to plot the final height of each plant at the end of the experiment. (1 point)
2. Connect the **X**'s with a solid line. (1 point)
3. What is the independent variable in the above experiment? (1 point)
4. What is the dependent variable in the above experiment? (1 point)

II. Measurement

The diagram below shows a regular solid.



$$D = \frac{M}{V}$$

5. If the object's mass was 150g, what would be its density to the nearest tenth? (Don't forget to include units) (2 points)

III. Intro to Matter

Use the Periodic Table of Elements to answer the following questions.

Periodic Table of the Elements

1 H 1.00794																		1 H 1.00794	2 He 4.002602
3 Li 6.941	4 Be 9.012182											5 B 10.811	6 C 12.0107	7 N 14.00674	8 O 15.9994	9 F 18.9984032	10 Ne 20.1797		
11 Na 22.989770	12 Mg 24.3050											13 Al 26.981538	14 Si 28.0855	15 P 30.973761	16 S 32.066	17 Cl 35.4527	18 Ar 39.948		
19 K 39.0983	20 Ca 40.078	21 Sc 44.955910	22 Ti 47.867	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938049	26 Fe 55.845	27 Co 58.933200	28 Ni 58.6934	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.904	36 Kr 83.80		
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.90550	46 Pd 106.42	47 Ag 107.8682	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.760	52 Te 127.60	53 I 126.90447	54 Xe 131.29		
55 Cs 132.90545	56 Ba 137.327	57 La 138.9055	72 Hf 178.49	73 Ta 180.9479	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.217	78 Pt 195.078	79 Au 196.96655	80 Hg 200.59	81 Tl 204.3833	82 Pb 207.2	83 Bi 208.98038	84 Po (209)	85 At (210)	86 Rn (222)		
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 (269)	111 (272)	112 (277)		114 (289) (287)		116 (289)		118 (293)		

(1 point each)

6. The number of neutrons in the nucleus of a Beryllium (Be) atom is

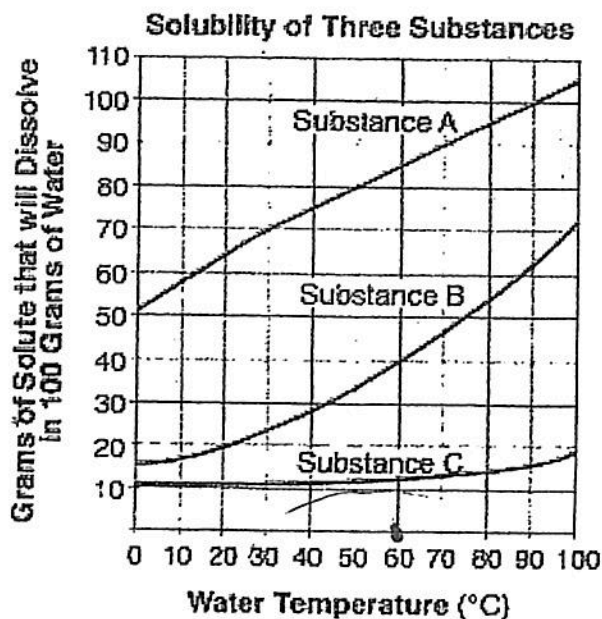
- a. 2
- b. 4
- c. 5
- d. 9

7. The number of electrons in a Nitrogen (N) atom is

- a. 2
- b. 7
- c. 14
- d. 15

IV. Changes in Matter

The graph below shows the solubility of three substances. Use the graph to answer the following questions.

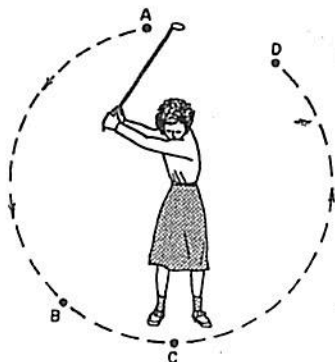


(1 point each)

8. How much of Substance A will dissolve in 100 grams of water at 50°C?
9. At what temperature will 20 grams of substance B dissolve?

V. Energy

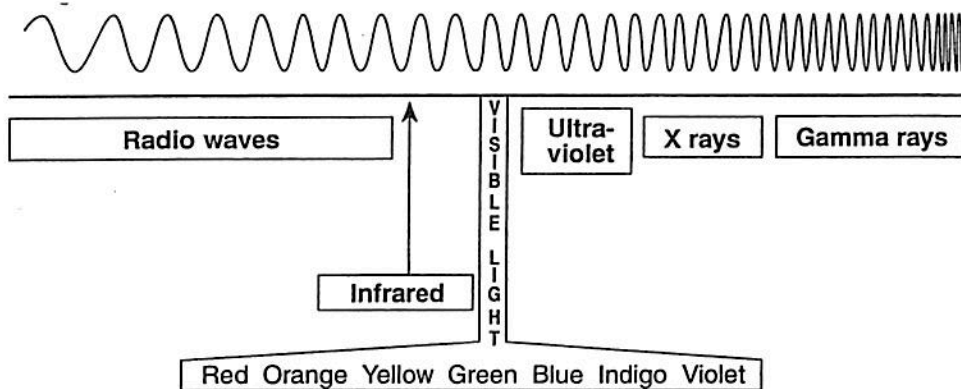
The diagram below shows a person swinging a golf club from point A to point D.



10. At which point is the kinetic energy of the golf club the greatest?
11. What happens to the potential energy as the golf club moves from point A to point B?

VI. Waves

The diagram below shows the relative wavelengths for several types of electromagnetic energy.

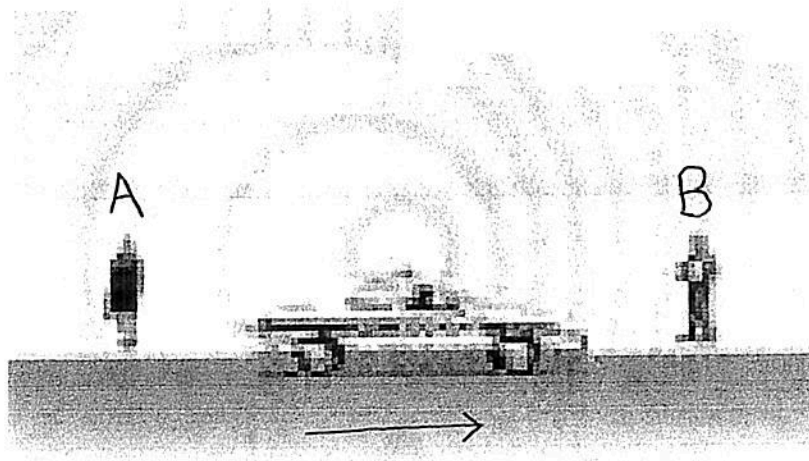


12. Which type of electromagnetic energy has a shorter wavelength than x-ray waves? (1 point)

13. Which type of electromagnetic energy has the highest frequency? (1 point)

VII. Sound and Light

In the diagram the police car is traveling towards person B.



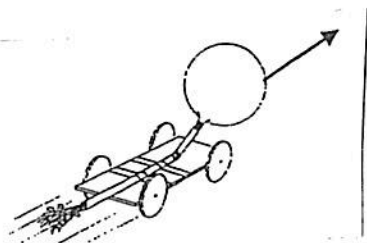
14. Which person hears a higher pitch due to the Doppler Effect? (2 points)

VIII. Electricity and Magnetism

15. Explain why a balloon will stick to the wall after it is rubbed on someone's hair.

IX. Forces

A student made a vehicle to demonstrate one of Newton's laws of motion using a straw, a balloon, a piece of wood, and 4 wheels. She nailed four wheels onto the side of a piece of wood and then attached a balloon to a straw. Finally, she taped the straw to the cardboard on wheels.



16. Which of Newton's laws of Motion did the student demonstrate? (1 point)

17. Explain why the vehicle moved forward. (1 point)



Name: _____

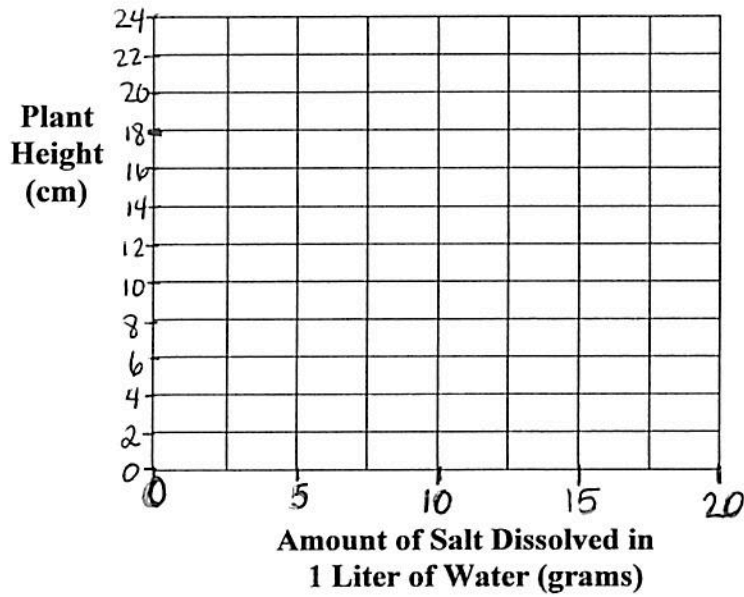
Score: _____

28

Physical Science Exam-Constructed Response (28 points)

I. Intro to Science

**Saltwater Plant Growth
and Amount of Salt**



3. _____

4. _____

II. Measurement

5. _____

III. Intro to Matter

6. _____

7. _____

IV. Changes in Matter

8. _____

9. _____

V. Energy

10. _____

11. _____

VI. Waves

12. _____

13. _____

VII. Light and Sound

14. _____

VIII. Electricity and Magnetism

15. _____

IX. Forces

16. _____

17. _____

