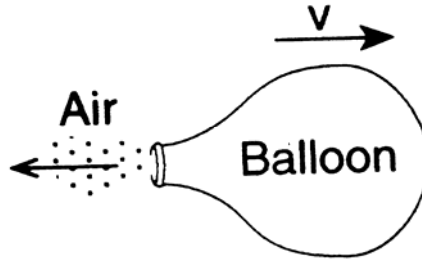


# Science Course Module IPC Pre/Post Assessment CONTENT-Answer Key

## MOTION: (Items: 1-8)

As illustrated in the figure below, an inflated balloon released from rest moves horizontally with velocity.

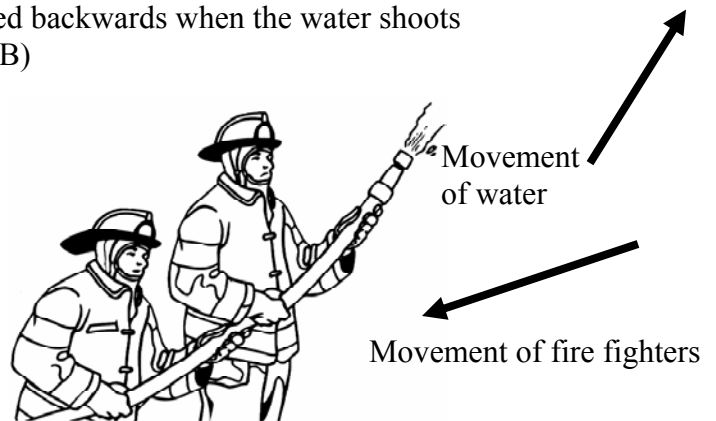


1. Which of the following most likely affected the velocity of the balloon?  
(TEKS 4B)

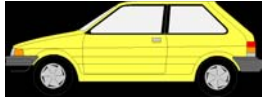
- A action-reaction\*
- B air resistance
- C gravitational attraction
- D rolling friction

2. Which of Newton's laws three laws of motion is best demonstrated as the fire fighters in the diagram are pushed backwards when the water shoots out (forward) of the hose? (TEKS 4B)

- A first
- B second
- C third\*
- D both A and B



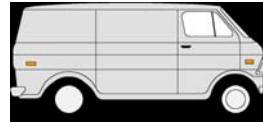
3. If all the objects below were moving in the same direction with the same velocity, which one would have the greatest momentum? (TEKS 4A)



**A**



**B\***



**C**



**D**

4. Calculate the velocity of a train if the mass is 4500 kilograms and the momentum is 879000 kg•m/sec. (TEKS 4A)

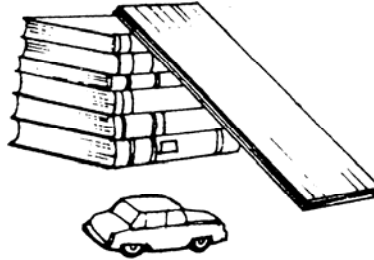
- A 195.3 m/sec\*
- B 8745 m/sec
- C 8835 m/sec
- D 39556 m/sec

5. Calculate the momentum of a person on her roller blades if she is traveling at a velocity of 5 m/sec and mass of 85 kilograms. (TEKS 4A)

- A 17 kg•m/sec
- B 80 kg•m/sec
- C 90 kg•m/sec
- D 425 kg•m/sec\*



Use the diagram and information below to answer questions # 6-7



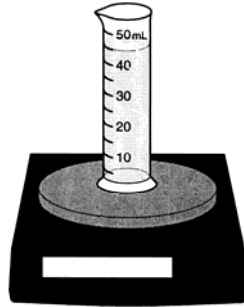
Some students conducted a laboratory investigation to determine if the height of a ramp affects the momentum of a toy car. They set up the experiment similar to the picture above. They used one book for trial 1, two books for trial 2, three books for trial 3, and 4 books for trial 4. Bellow are the data that were collected.

<b>Trials</b>	<b>Mass of Car (kg)</b>	<b>Distance traveled (m)</b>	<b>Time to travel (sec)</b>	<b>Speed of car (m/sec)</b>
1	152	1.2	5.8	
2	152	1.2	4.6	
3	152	1.2	3.5	
4	152	1.2	2.7	

6. On which ramp did the car gain the greatest speed? (TEKS 4A)
  - A 1
  - B 2
  - C 3
  - D 4\*
  
7. On which ramp did the car gain the least momentum? (TEKS 4A)
  - A 1\*
  - B 2
  - C 3
  - D 4
  
8. Which statement best supports the relationship between mass and momentum? (TEKS 4A)
  - A As the mass increases, the momentum decreases.
  - B As the mass increases, the momentum is not affected.
  - C As the mass decreases, the momentum decreases.\*
  - D There is no relationship between mass and momentum.



## Properties of Matter: (Items 9-17)



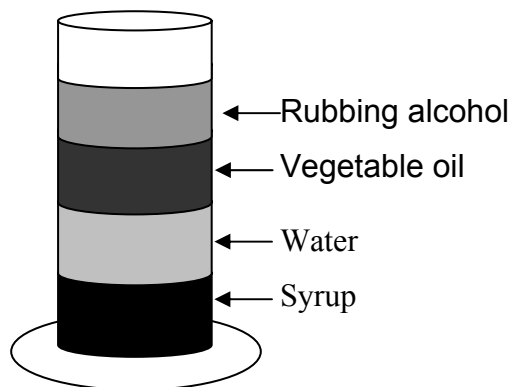
9. A student pours a liquid into the a graduated cylinder and places it on the scale. The empty graduated cylinder has a mass of **52 grams**. The student measures the mass of a graduated cylinder with the liquid as **87.76 grams**. According to the student's measurement of volume above, what is the density of the liquid in grams per millimeter? Record and bubble in your answer. (TEKS 7A)

			0	●	7	9	
0	0	0	0				
1	1	1	1				
2	2	2	2				
3	3	3	3				
4	4	4	4				
5	5	5	5				
6	6	6	6				
7	7	7	7				
8	8	8	8				
9	9	9	9				
0	0	0	0				

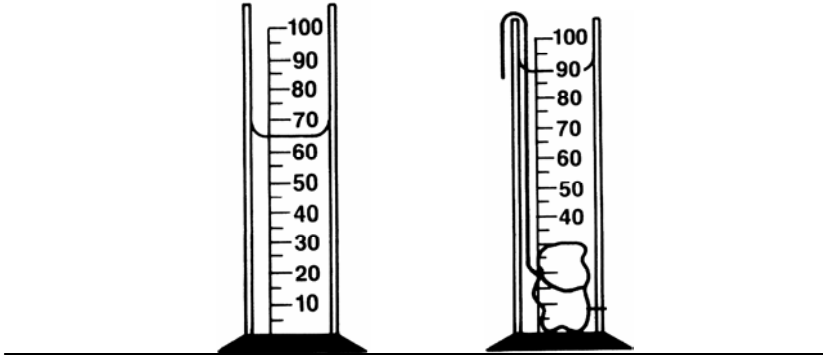


10. A student pours four different liquids into a graduated cylinder. Which property is responsible for the layered arrangement of the liquids in the graduated cylinder?  
(7A)

- A buoyancy
- B color
- C density\*
- D viscosity



A student found a rock on the way to school. The mass of the rock is measured to be **36.4 grams**. The graduated cylinders represent the before and after the rock is added to the water to determine the volume of the rock.

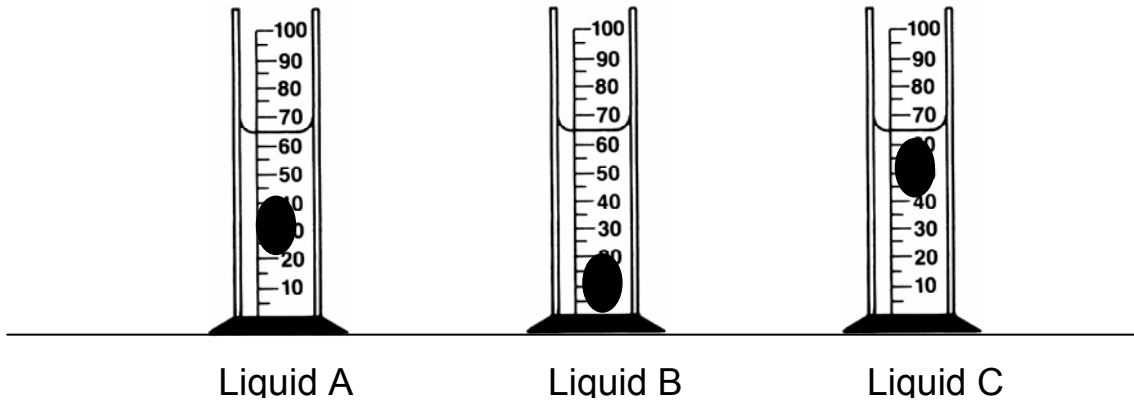


11. Based on the information provided above, what is the density of the rock? (TEK 7A)

- A 0.4 g/mL
- B 0.56 g/mL
- C 1.04 g/mL
- D 1.46 g/mL\*



Use the diagrams below to answer question # 12



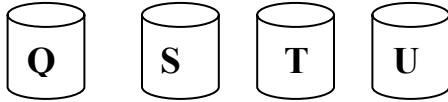
12. A student is conducting an investigation to observe how a solid object behaves in three different liquids. Equal amounts of three different liquids are placed in a graduated cylinder and the same solid is lowered in each liquid. Based on the diagrams, liquid C is \_\_\_\_\_ . – (TEK 7A)

- A denser than liquid A\*
- B less dense than liquid A
- C denser than liquid B
- D denser than liquids A and B

Use the following information to answer questions # 13 - 17



A group of students experimented to determine which liquid, dishwashing liquid, water, oil, or rubbing alcohol, would have the highest viscosity. They used 20 mL of each liquid. Their results are in the table below.



	<b>Liquids</b>	<b>Flow Time (sec)</b>
Q	Dishwashing liquid	52
S	Water	11
T	Oil	36
U	Rubbing alcohol	6

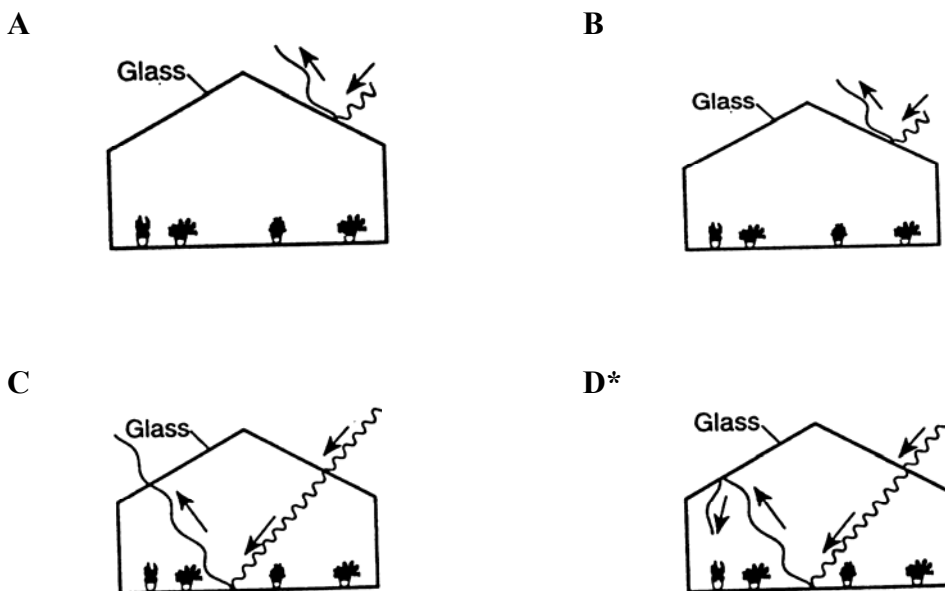
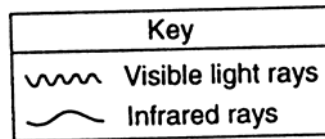
13. Which of the following liquids is the most viscous? ( TEKS 7A)
- A dishwashing liquid\*
  - B water
  - C oil
  - D rubbing alcohol
14. What is the independent variable in their experiment? (TEKS 2A)
- A flow time
  - B volume of liquid
  - C type of liquid\*
  - D color of liquid
15. What is the dependent variable in their experiment? (TEKS 2A)
- A flow time\*
  - B volume of the liquid
  - C type of liquid
  - D color of the liquid



16. Which variable is held constant in their experiment? (TEKS 2A)
- A time to flow
  - B volume of substance\*
  - C kind of substance
  - D color of substance
17. Cars use oil to lubricate the moving parts of the engine. Thicker oils are used during warmer weather because the increase in temperature causes which of the following? (TEKS 7A)
- A an increase in viscosity of the oil
  - B an increase in the density of the oil
  - C a decrease in the viscosity of the oil\*
  - D. a decrease in the buoyancy of the oil

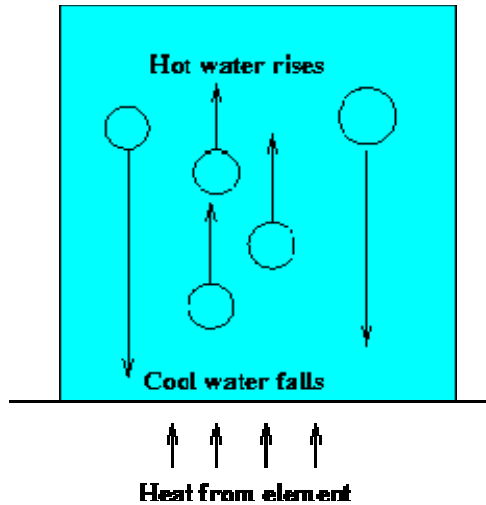
**ENERGY TRANSFORMATIONS: (Items 18 – 23)**

18. Which diagram below best shows how air inside a greenhouse warms as a result of energy from the sun? (TEKS 6B)



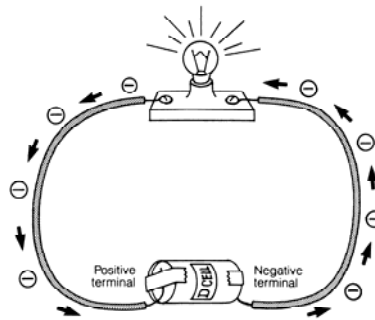
19. Why does a solution of NaCl conduct electricity? (TEKS 5E)
- A It contains ions\*
  - B It contains free protons
  - C It contains free neutrons
  - D It contains crystals
20. The ability of a material to conduct an electric current is dependent on which of the following? (TEKS 5E)
- A The shape of the crystals
  - B The number of electrons
  - C The presence of charged particles and their ability to move\*
  - D The presence of covalent bonds
21. Two students were investigating electric circuits. They noticed that when a light bulb in a strand of several bulb burns out the other bulbs in the strand remain lit. Which of the following statement about the circuit containing the strand of light bulbs is correct? (TEKS 6F)
- A The circuit is wired in series.
  - B The circuit is wired in parallel.\*
  - C Only one path is available for current in the circuit.
  - D Electric charges continue to flow through the burned out bulb.





22. Which method of heat transfer is illustrated in the diagram above? (TEKS 6B)

- A Conduction
- B Convection\*
- C Radiation
- D Vaporization



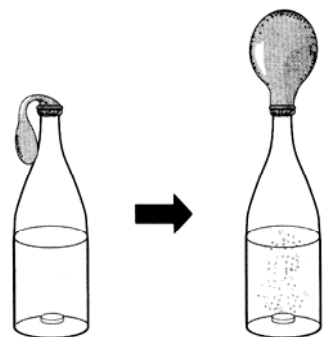
23. The electrical circuit in the diagram above is an example of which of the following? (TEKS 6F)

- A a direct current.\*
- B an alternating current.
- C a series current.
- D a parallel current.



## CHANGES IN MATTER: (Items 24 – 34)

24. Which of the following is an example of a physical change? (TEKS 8A)
- A wood burning
  - B ice melting\*
  - C sodium reacting with water
  - D iron rusting
25. During a laboratory investigation, a student combined three chemicals in a plastic bag. After mixing the chemicals for a minute, they noticed the bag increased in size and it felt very warm. Without knowing the chemical formulas, the increase in temperature is an example of which of the following?
- A endergonic reaction
  - B exergonic reaction\*
  - C single replacement reaction
  - D double replacement reaction
26. Which of the following is evidence of a chemical change? (TEKS 8A)
- A the liquid evaporated
  - B the solid expanded
  - C a gas is produced\*
  - D the density changed
27. During a simple laboratory investigation, an IPC student combined two chemicals in a test tube. The student felt the test tube and it felt very cool. The decrease in temperature is an example of which of the following? (TEKS 8B)
- A endergonic reaction\*
  - B exergonic reaction
  - C single replacement reaction
  - D double replacement reaction
28. A student places a seltzer tablet in a bottle with water and places a balloon on top. After a few minutes the student records observations. The student notices the temperature of the water decreased. Which of the following is an observation of a chemical change in matter? (TEKS 8A)
- A the tablet dissolved
  - B a gas was produced\*
  - C the amount of water increased
  - D the temperature of the water increased



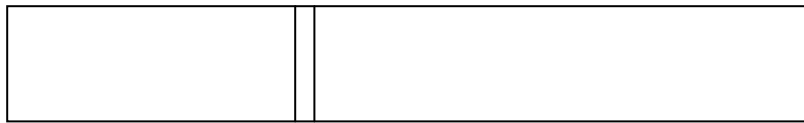
Each element emits specific spectra of lines. Below are four examples of the line spectra of four common elements. A combination of elements produces a combination of spectral lines as pictured in example X.



Hydrogen



Helium



Sodium



Calcium

29. Examine the spectral lines in the samples above. Predict which elements produced the spectral lines in sample X. (TEKS 7C)



**X**

- A helium and sodium
- B helium and hydrogen
- C calcium and helium
- D sodium and hydrogen\*

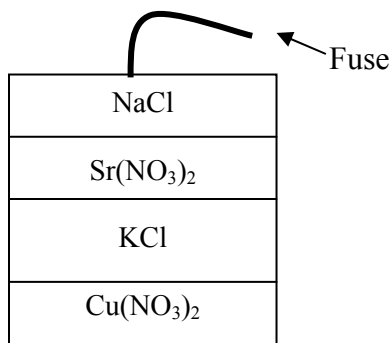


Use the table below to answer question #30.

Compound Name	Formula	Color
sodium chloride	NaCl	Orange
copper (II) nitrate	$\text{Cu}(\text{NO}_3)_2$	Green
copper (II) sulfate	$\text{CuSO}_4$	Blue
iron (III) nitrate	$\text{Fe}(\text{NO}_3)_3$	Yellow
potassium chloride	KCl	Purple
strontium nitrate	$\text{Sr}(\text{NO}_3)_2$	Red

30. A special effects person wants to construct fireworks that burn red, then yellow, and finally blue. What sequence of chemicals are needed to construct the fireworks? (TEKS 7C)

- A NaCl,  $\text{CuSO}_4$ , KCl
- B  $\text{CuSO}_4$ ,  $\text{Fe}(\text{NO}_3)_2$ , KCl
- C  $\text{Sr}(\text{NO}_3)_2$ ,  $\text{Fe}(\text{NO}_3)_2$ ,  $\text{CuSO}_4^*$
- D KCl, NaCl,  $\text{CuSO}_4$ ,  $\text{Sr}(\text{NO}_3)_2$

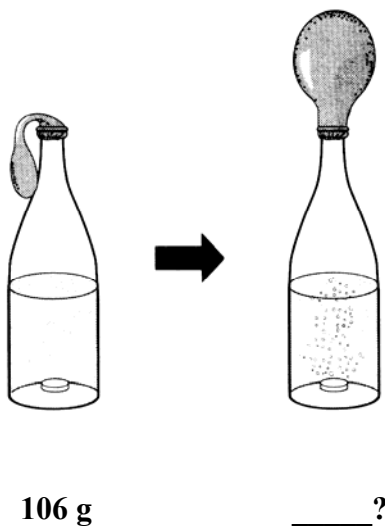


31. Analyze the fireworks diagram above. Predict the color sequence that would be observed once the fuse was ignited. (TEKS 7C)

- A blue, orange, red, purple
- B orange, red, purple, green\*
- C red, purple, green, orange
- D purple, orange, red, green



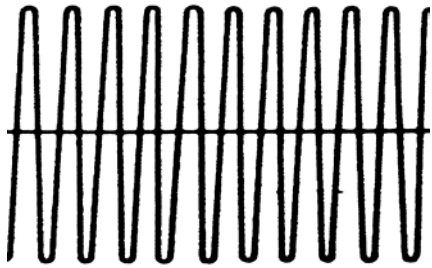
32. During a laboratory investigation, a student combined three chemicals in a plastic Ziploc bag. After mixing the chemicals for a minute, she noticed the bag increased in size and it felt very warm. Without knowing the chemicals mixed, this is an example of which of the following? (TEKS 8A)
- A physical change
  - B chemical change\*
  - C single replacement reaction
  - D double replacement reaction
33. Which piece of evidence best indicates a reaction took place? (TEKS 8A)
- A a liquid is produced
  - B a gas is produced\*
  - C the density of the liquid changes
  - D the density of the solid changes
34. Two students conducted an experiment to measure the amount of gas produced by an Alka-Seltzer tablet in water. After putting the system together, they measured the mass of the apparatus and Alka-Seltzer tablet. After they dropped the Alka-Seltzer tablet in the bottle a reaction took place and a gas was produced. Predict the mass of the apparatus after the reaction took place. (TEKS 8C)



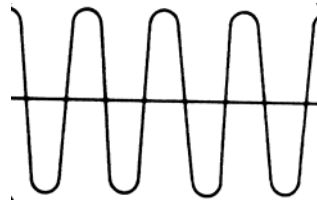
- A 63 g
- B 96 g
- C 106 g\*
- D 156 g



**WAVES: (Items 35 – 41)**



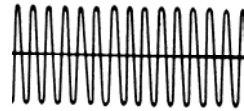
Wave I



Wave II



Wave III



Wave IV

35. Which wave would be associated with the loudest sound? (TEKS 5D)
- A I\*
  - B II
  - C III
  - D IV
36. Which wave would be associated with the highest pitched sound? (TEKS 5D)
- A I
  - B II
  - C III
  - D IV\*
37. A sound wave is different from a light wave, because a sound wave is ... (TEKS 5A)
- A transverse and a light wave is longitudinal.
  - B not capable of traveling through a vacuum.\*
  - C not capable of diffracting and a light wave is.
  - D capable of existing with a variety of frequencies and a light wave has a single frequency.



38. A sound wave is a pressure wave; regions of high (compressions) and low pressure (rarefactions) are established as the result of the vibrations of the sound source. Which of the following statements explains why compressions and rarefactions result? (TEKS 5A)
- A Sound waves are denser than air and therefore have more inertia, which causes the bunching up of sound.
  - B Sound waves have a speed which is dependent only upon the properties of the medium.
  - C Sound is like all waves; it is able to bend into the regions of space behind obstacles.
  - D Sound waves vibrate in a back-and-forth, longitudinal manner.\*
39. One tuning fork is struck and placed next to an identical fork. The two forks do not touch. The second tuning fork begins to vibrate as a result of which of the following? (TEKS 5A)
- A interference
  - B the Doppler effect
  - C resonance\*
  - D standing wave



## Solution Chemistry: (Items 40-45)

Use the information in the table below to answer questions # 40 - 41

A group of students conducted an experiment to test the dissolving rate of different substances in water. They obtained 5 grams of four different solutes, four identical glasses, and 50 mL of water for each solute, which were at room temperature.

Substance	Mass of Solute (g)	Volume of Water (mL)	Time to Dissolve (sec)
Washing powder	5	50	56
Sugar	5	50	15
Salt	5	50	18
Baking soda	5	50	22

40. According to the data collected, which substance has the fastest dissolving rate? (TEKS 9D)
- A washing powder
  - B sugar\*
  - C baking soda
  - D salt
41. Which of the following factors contributed to the dissolving rate of the solute? (TEKS 9E)
- A mass of the solute
  - B volume of the solvent
  - C temperature of the apparatus
  - D chemical composition of the solute\*

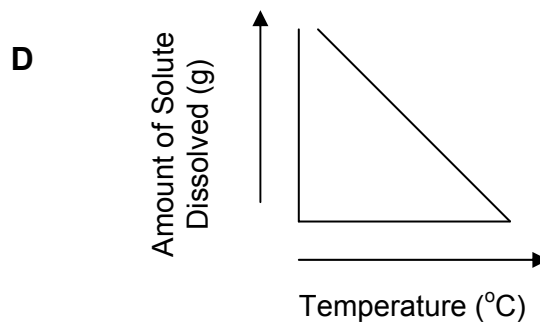
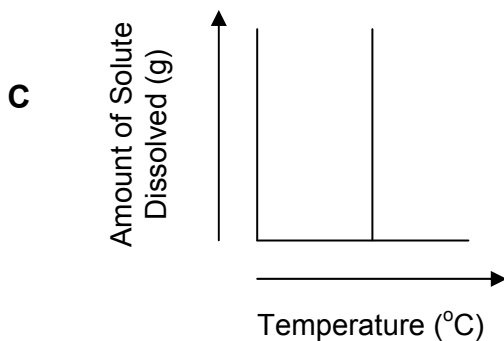
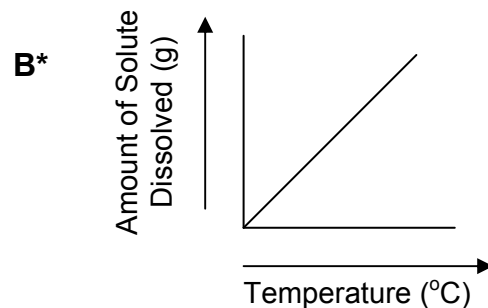
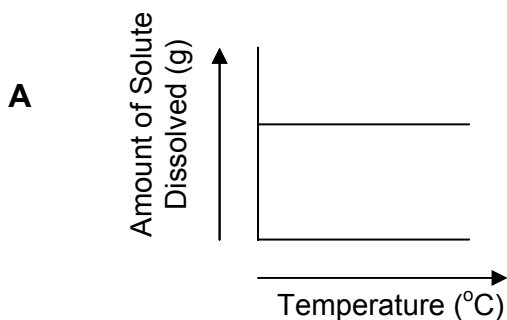


## SOLUTION CHEMISTRY (Items 42 – 45)

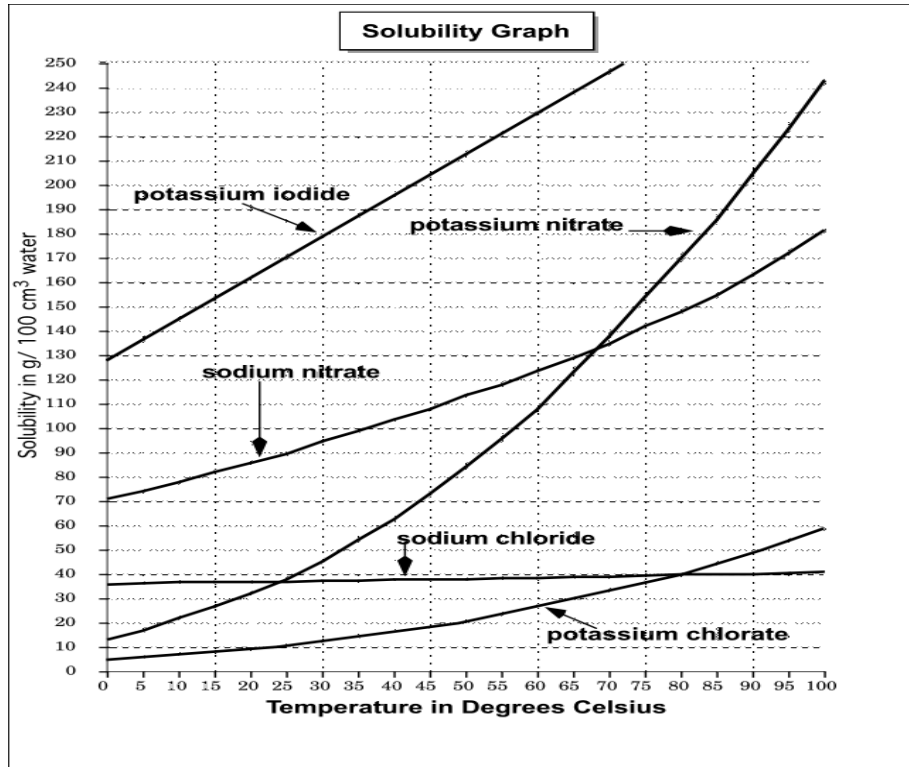
42. Two IPC students conducted an experiment to test the solubility of three different substances. They put 20 mL of three different types of liquids in the same type of containers and three different substances. They measured the amount of time it took for the solute to dissolve. Which of the following procedures will improve their investigation? (TEKS 9E)

- A stir all three solutions
- B use the same type of liquid\*
- C change the temperatures
- D use the same solute

43. As the temperature of a sample of water increases, the amount of sugar that can be dissolved in the water also increases. Which graph illustrates this relationship? (TEKS 2C, 2D)



44. A crystal of solute is dropped into a solution but it does not dissolve. Instead it falls to the bottom of the flask. Identify the type of solution. (TEKS 9D)
- A Dilute
  - B Saturated\*
  - C Unsaturated
  - D Supersaturated



45. From the information provided on the above solubility graph, how many grams of potassium nitrate ( $\text{KNO}_3$ ) are dissolved in 100g of  $\text{H}_2\text{O}$  at 65 degrees Celsius? (TEKS 2C, 2D, 9E)
- A 45 grams
  - B 50 grams
  - C 130 grams\*
  - D 240grams



