Mar 10th, 2:00 PM - 3:00 PM

Utilizing Feedback in On-Line Quizzes to Improve Student Learning and Retention

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Recommended Citation
Jewell, Melody, "Utilizing Feedback in On-Line Quizzes to Improve Student Learning and Retention" (2011). SoTL Commons Conference. 60.
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Utilizing Feedback in On-Line Quizzes to Improve Student Learning and Retention  

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SAMPLE QUESTION 1  
You have a clear solution of sugar water at 95°C. You cool it to 10°C and the solution stays clear after shaking. Which of the following is true?  
A) The solution at 95°C was saturated  
B) The solution at 95°C was unsaturated  
C) The solution at 10°C is super-saturated  
D) The solution at 10°C must be saturated  

Feedback: When cooled, the solubility of a solid generally decreases, so if the solution at 95°C was saturated, as it cooled then less of the solid would be able to dissolve and crystals would form as it cooled (this did not happen because the solution remained clear). Therefore, the solution at 95°C must have been unsaturated. The solution at 10°C could not be super-saturated because when you shook it, no crystals formed. There is no way to tell without further experimentation whether the solution at 10°C is saturated (contains the maximum possible amount of dissolved solute) or unsaturated (contains less than the maximum).

SAMPLE QUESTION 2  
The pressure on a 500.0 mL gas sample changes from 760. mm Hg to 800. mm Hg. What is the new volume assuming all other factors remain constant?  
A) 425 mL  
B) 475 mL  
C) 525 mL  
D) 595 mL  

Feedback: Boyle’s Law relates the pressure and volume of a gas keeping temperature and amount of gas constant. Pressure and volume are inversely related; if one goes up, the other goes down. \( P_1V_1 = P_2V_2 \) where \( P_1 = 760 \text{ mm Hg}, V_1 = 500.0 \text{ mL}, P_2 = 800 \text{ mm Hg} \) \( (760 \text{ mm Hg} \times 500.0 \text{ mL}) = (V_2 \times 800 \text{ mm Hg}) \); \( V_2 = 475 \text{ mL} \).