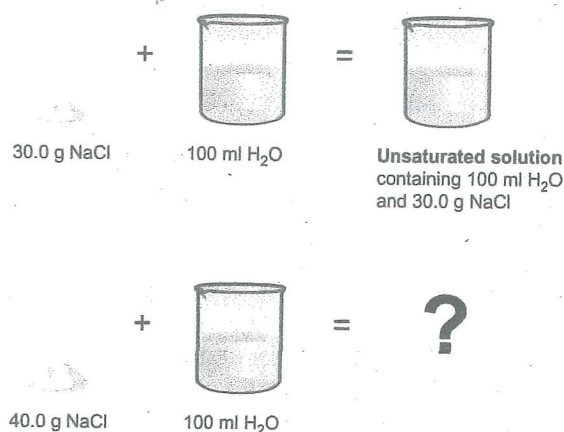


★ Spotlighted Item: **SHORT ANSWER**

DIRECTIONS: Read the passage, and study the diagram. Then read the question, and write your response on the lines. This task may take approximately 10 minutes to complete.

UNSATURATED AND SATURATED SOLUTIONS

Solubility is the amount of solute that can be dissolved in a given amount of solvent at a specific temperature. A solution is unsaturated as long as more solute can be dissolved. It reaches saturation when no more solute can be dissolved. The investigation represented by the diagram illustrates this concept. In the first step, 30 grams (g) NaCl are added to 100 milliliter (ml) water. In the next step, another 10 g NaCl are added slowly to the mixture. Under the conditions of the investigation, the solution becomes saturated when 36 g NaCl have dissolved.



3. Based on the information, describe what occurs during the investigation and predict the outcome.

DIRECTIONS: Read the passage and question, and choose the **best** answer.

STRONG AND WEAK ACIDS

Acids can be strong or weak. Strong acids ionize completely in solution so that all hydrogen is in the H⁺ (hydrogen ion) form. An example is HCl ($\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$). Weak acids do not ionize completely in solution. When weak acids dissociate, some of the hydrogen remains bonded to the parent molecule. An example is HNO₂ ($\text{HNO}_2 \rightleftharpoons \text{H}^+ + \text{NO}_2^-$). In the equation, the double arrow indicates that not all the HNO₂ ionizes.

4. Acetic acid is a weak acid. It would be expected

A. to have more H⁺ ions in solution than HCl.
 B. to ionize completely in solution.
 C. to have fewer H⁺ ions in solution than HCl.
 D. not to undergo ionization in solution.



DIRECTIONS: Read the passage and question. Then write your response on the lines. This task may take approximately 10 minutes to complete.

SOLUBILITY OF SALT IN WATER

A researcher reads a report about the results of investigations demonstrating that CO_2 is less soluble in warm water than in cold water. She wonders whether salt might be less soluble in warm water, as well. If so, then increasingly warm oceans resulting from climate change would mean that over time the oceans would become less salty as salts precipitated out of solution and fell to the bottom of the ocean. She forms a hypothesis: The solubility of salt in water decreases as water temperature increases.

11. Design a controlled experiment that the researcher could use to test her hypothesis. Identify the dependent and independent variables. Include a description of how the data should be collected and analyzed and how the researcher will determine whether her hypothesis is correct.

DIRECTIONS: Read the passage and question, and choose the **best** answer.

ATOMIC THEORY

Before the modern atomic theory was accepted, many scientists thought that John Dalton's atomic theory was accurate. According to Dalton's theory, atoms were solid spheres that could not be broken down into smaller particles.

12. Which factor **most likely** caused scientists to reject Dalton's theory?
- A. Scientists developed a hypothesis that contradicted Dalton's theory.
 - B. Dalton was unable to publish his ideas in peer-reviewed journals.
 - C. Most of the scientists were of the general opinion that Dalton's theory was incorrect.
 - D. Dalton's theory could not explain some of the new observations that scientists were making.