**Solubility sentences**

1. Look at the chemical equation below.

sodium chloride + silver nitrate → sodium nitrate + silver chloride

*Complete the sentences below to explain why this reaction produces a white precipitate.*

*You should only use the words* ***soluble*** *and i****nsoluble*** *to fill the gaps.*

Sodium chloride and water form a clear colourless solution because sodium chloride is \_\_\_\_\_\_\_\_.

Silver nitrate and water also form a clear, colourless solution because silver nitrate is \_\_\_\_\_\_\_\_\_.

When\_\_\_\_\_\_\_\_\_ sodium chloride and silver nitrate react, one product is sodium nitrate.

Sodium nitrate and water form a clear colourless solution because silver nitrate is \_\_\_\_\_\_\_\_\_.

The other product is silver chloride. Silver chloride and water do not form a solution because silver chloride is \_\_\_\_\_\_\_.

Instead a white precipitate is formed.

*Chemistry > Big idea CCR: Chemical reactions > Topic CCR2: Understanding reactions > Key concept CCR2.1: Reactions in solution*

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| --- |
| **Response activity** |
| **Solubility sentences** |

**Overview**

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| --- | --- |
| Learning focus: | When two solutions react, a product may be insoluble, resulting in the formation of a precipitate. |
| Observable learning outcome: | Explain the appearance of a precipitate in terms of the formation of an insoluble product. |
| Question type: | focused cloze activity |
| Key words: | solution, colourless, precipitate, product, suspension, substance |

This activity can help develop students’ understanding by addressing the misunderstandings revealed by the following diagnostic question:

* Precipitate

**What does the research say?**

Research (Stavridou and Solomonidou, 1998) found three stages in students’ construction of understanding about chemical change. At the first stage a chemical reaction was not understood as a change at all, rather as an event such as a colour change. In the second stage students understood that two substances can produce a new substance. Later students developed a sub-microscopic understanding of the process in terms of the rearrangement of atoms.

This activity encourages students to link observations of a reaction between solutions with an understanding of whether the reactants and products are soluble or insoluble. This is to reinforce the concept of formation of a new substance (or substances) with different properties during a chemical reaction.

**Ways to use this activity**

This activity could be completed by pairs of students. Students could be asked to share how they worked out whether to use the word ‘soluble’ or ‘insoluble’. It is important that all students are confident in linking the terms ‘soluble’ and ‘insoluble’ with macroscopic observations of a precipitation reaction.

*Differentiation*

Some students may benefit from watching a demonstration or video of the reaction. It may also help to make up the solutions in front of the students so that they see that sodium chloride solution is made from sodium chloride dissolved in water.

Practical work should be carried out in accordance with local health and safety requirements, guidance from manufacturers and suppliers, and guidance available from CLEAPSS.

**Expected answers**

Sodium chloride and water form a clear colourless solution because sodium chloride is soluble.

Silver nitrate and water also form a clear, colourless solution because silver nitrate is soluble.

When soluble sodium chloride and silver nitrate react, one product is sodium nitrate.

Sodium nitrate and water form a clear colourless solution because silver nitrate is soluble.

The other product is silver chloride. Silver chloride and water do not form a solution because silver chloride is insoluble.

Instead a white precipitate is formed.

**Acknowledgments**

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Images: None

**References**

Stavridou, H. and Solomonidou, C. (1998). Conceptual reorganization and the construction of the chemical reaction concept during secondary education. *International Journal of Science Education,* 20(2)**,** 205-221.