

5th Grade - Lesson 3.3

Forming a Precipitate

NGSS Alignment

Performance Expectations

5-PS1-3: Make observations and measurements to identify materials based on their properties.

5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Measurements of a variety of properties can be used to identify materials. (5-PS1-3)

Students see that an Ivory Soap solution mixed with an Epsom Salt (magnesium sulfate) produces a soap scum precipitate. Students develop an understanding that the production of a precipitate with an Epsom Salt solution is a characteristic property of Ivory Soap.

- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)

Students combine a soap solution with an Epsom Salt solution and particles of a solid are formed. Since two solutions were mixed and a solid was produced, students conclude that the solid is a new substance and a chemical reaction took place. Students compare Ivory Soap with the soap scum in a bubbling test and see that the two substances are different.

Science and Engineering Practices

Developing and Using Models

- Develop a model to describe phenomena.

Students use molecular model animations to help explain the interaction between soap molecules and Epsom Salt that produces the soap scum precipitate.

Planning and Carrying Out Investigations

- Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials is considered.

Students add the same amount of soap flakes and filtered soap scum to the same amount of water in two identical bottles. They then cap the bottles and shake them in the same way for the same length of time. In this way, students identify and control variables as they conduct a fair test. Multiple groups conduct the same experiment so several trials take place at the same time.

Crosscutting Concepts

Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large. (5-PS1-1)

Students develop an understanding that the molecules in soap interact with the ions in Epsom Salt to produce a soap scum precipitate. Students see that their macroscopic observations of the production of a precipitate can be explained on the sub-microscopic molecular level.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Students develop an understanding that the interactions of molecules in soap with the ions in Epsom salt causes the production of the soap scum precipitate.