

## Grade 5 - Lesson 3.3

### Forming a precipitate

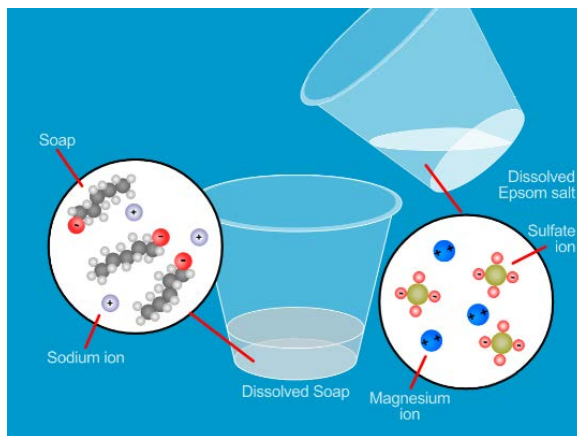
#### Student Reading

Sometimes when two substances are mixed, a chemical reaction takes place. That means that the atoms and molecules of the substances interact with each other and form new substances. One example of a reaction where this happens is when two liquids are mixed and become a solid. The solid that results is called a *precipitate*.

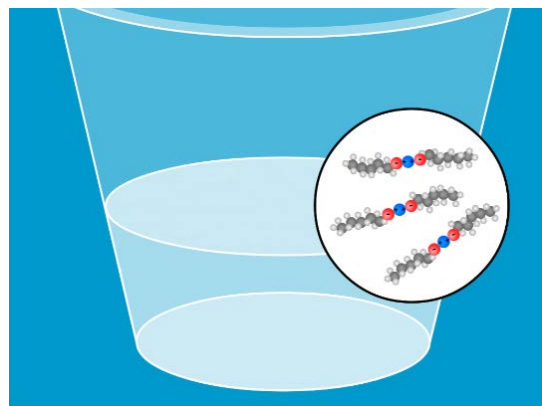
#### Hard Water + Soap = Soap Scum

A common example of a reaction that forms a precipitate is the reaction between dissolved soap and “hard” water. Hard water has certain minerals dissolved in it, such as calcium or magnesium.

One way to make hard water is by dissolving Epsom salt in water. When Epsom salt (magnesium sulfate) dissolves, it separates into its ions: a magnesium ion ( $Mg^{2+}$ ) and a sulfate ion ( $SO_4^{2-}$ ), which results in hard water.



Dissolved Soap and Epsom Salt



Soap and magnesium form soap scum

When hard water and soap are mixed, the magnesium ion reacts with soap molecules and forms a solid material called a *precipitate*, which does not dissolve. This precipitate (soap scum) reduces the ability of the soap to make bubbles.

#### Testing Soap and Soap Scum

Soap scum can look a lot like soap but you can do a test to see whether it is the same as soap or something different. If you mix the same amount of soap scum and soap in the same amount of water, you can test them for bubbling. When shaken, the soap scum bubbles less than the soap.

This shows that the soap scum must be different than the original soap. That means that a chemical reaction did take place. The soap was changed into a new substance – the soap scum precipitate.



More bubbles from soap than from soap scum