

## 5<sup>th</sup> Grade - Lesson 3.2

### Exploring Baking Powder

#### Teacher Background

In Lesson 3.2, students discover that cream of tartar and baking soda are the active ingredients in homemade baking powder.

#### What is Cream of Tartar?

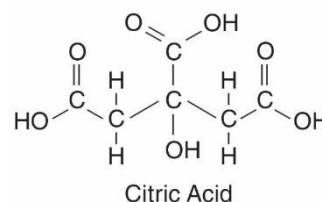
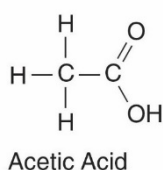
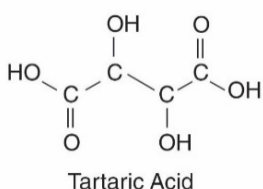
Cream of tartar is the common name for the compound potassium bitartrate, which is a white, dry, powdered acid. Potassium bitartrate comes from crystals on the inside of wine barrels produced during the process of fermenting grape juice for wine. The acid in the grape juice that crystallizes is called *tartaric acid*. The crystals are processed to become the white powder that we buy as cream of tartar.



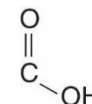
Tartaric Acid Crystals

#### Acids have something in Common

Tartaric acid, acetic acid (vinegar), and citric acid, all come from fruit and react with baking soda to produce carbon dioxide gas.



Since all of these acids behave in a similar way, it's not surprising that they have similar chemical structures. Each molecule has one or more areas called a carboxyl group:



When these acids are placed in water, the H on the OH transfers to water molecules to make them into an ion called the hydronium ion ( $\text{H}_3\text{O}^+$ ). This ion is what makes a solution acidic and gives it a sour taste. It is also the ion that reacts with the baking soda to produce carbon dioxide gas.

#### What is the Cornstarch For?

All these acids need water to react. Moisture from the air is attracted to the cornstarch and bonds to it so the water is unavailable to react with the cream of tartar. This helps prevent an unintended reaction between the cream of tartar and the baking soda while in the container.