

CDE Ice Cream Science Station

(15 min)

Preparation:

The Dairy Processing class makes ice cream in their lab. One ½-gallon tub of each of their variations was saved from the regular ice cream, no stabilizer ice cream, and low fat ice cream. Samples were prepared by scooping a small scoop of ice cream into a 2 oz cup. The lids were labeled with the sample number. Samples were stored in the freezer until about 5-10 minutes before the group came. This allowed for the ice cream to soften slightly making it scoopable.

Students from Prateek's lab were recruited to help teach and run the experiment. They followed this script as a general idea of what to teach the high school students. A handout was printed for each student so they could see the structural components of the ice cream.

Student Script:

Ice cream is made up of 5 main ingredients: Milk/Cream, Nonfat Dry Milk, Sweetener, Emulsifiers, and Stabilizers. Today we are going to try three different vanilla ice creams with a slight variation in the amount of these ingredients:

Try sample 1 (Regular Ice Cream):

Ask the students What do you notice about the texture? How does the ice cream feel as it melts? Does the texture of the ice cream effect the flavor? Do you like the texture?

This is regular ice cream. This will act as a baseline for their tasting

Try Sample 2 (No Stabilizer)

Ask the students What do you notice about the texture? How does the ice cream feel as it melts? Does the texture of the ice cream effect the flavor? Do you like the texture?

This ice cream should have some graininess to it.

The main difference between ice cream 1 and 2 is the stabilizer. Ice cream 1 has stabilizer while ice cream 2 does not. **Stabilizer helps to bind water which controls the growth of ice crystals.** When ice cream is frozen the ice crystals are so small that you cannot feel them on your tongue. However, ice crystals can grow making your ice cream taste sandy or gritty. If you have ever left ice cream in your freezer for a few months you have seen that ice crystals can grow very large. **Stabilizer binds the water slowing down the growth of ice crystals and making your ice cream feel really smooth on your tongue.**

Try Sample 3 (Low Fat)

Ask the students What do you notice about the texture? How does the ice cream feel as it melts? Does the texture of the ice cream effect the flavor? Do you like the texture? Etc.

The creaminess of ice cream can also be affected by the fat in the ice cream. **A higher fat ice cream will be smoother on your tongue. Higher fat content will also melt more slowly than a low-fat ice cream.** This is because fat helps to build a structure around pockets of air in the ice cream giving it a fluffy soft texture. With a lower amount of fat the air pockets will not be supported and the ice cream can lose its shape and melt much quicker.