

# The Secret Science of...



## Ice Cream Science – What’s the Scoop?

Most ice cream is made of:

- cream
- sugar
- flavoring
- air

You can’t really taste the air but it’s important.

## The “Cream” in Ice Cream

When milk comes out of the cow, it is a combination of mostly water, fat, proteins and a type of sugar. If you let this milk stand still for a while, the fat (mixed with some of the other ingredients) rises to the top and floats on the rest of the milk. This fatty mixture is the cream.



## How Sweet it is!

Ice cream usually starts with a mixture of milk and cream. Sugar is added first. Then some type of flavoring like chocolate, vanilla, or strawberry is added. These ingredients are mixed together really well to make a sweet thick syrup that’s ready to be cooled.



## Colder than Ice!

The sugary syrup needs to get colder than ice in order to freeze. In a home ice cream maker, ice is mixed with salt in an outer container which gets really cold. The syrup is safe inside an inner container, and the mixing begins.



### The Smaller the Better

As the sugary syrup gets colder and colder, ice crystals form. If the ice crystals are tiny, the ice cream will feel smooth in your mouth. But if the ice crystals are too big, the ice cream will be crunchy—not good! Not all the syrup freezes, some remains a liquid which also helps keep the ice cream smooth.

### Solid, Liquid, and Gas!

As the ice cream is stirred and mixed, tiny air bubbles get mixed in with everything else. These air pockets make the ice cream fluffy. It's easier to scoop, too! Solid ice crystals, liquid syrup, and air make ice cream a combination of all three states of matter!

### Find Out More.

#### Why does ice cream float in an ice cream soda?

Ice cream has a lot of fat which floats, and ice crystals which float, and a lot of air which definitely floats. Those ingredients help make ice cream a great floater!



#### If you refreeze melted ice cream, why is it never as good as it was before?

When the ice cream melts, the liquid ice cream fills up the air pockets. When it refreezes, there are fewer air pockets, so the ice cream is less airy and fluffy. The other reason is that when the ice cream melts, the original tiny ice crystals melt. Refreezing the ice cream makes larger ice crystals which makes the ice cream too crunchy.

#### Why does some ice cream seem creamier than others?

It's the fat. The milk fat in ice cream is mostly what gives ice cream that creamy rich taste and feeling in your mouth. The creamiest ice creams have about 16% fat and the least creamy have about 10% fat.

