

**SECTION 19-1**

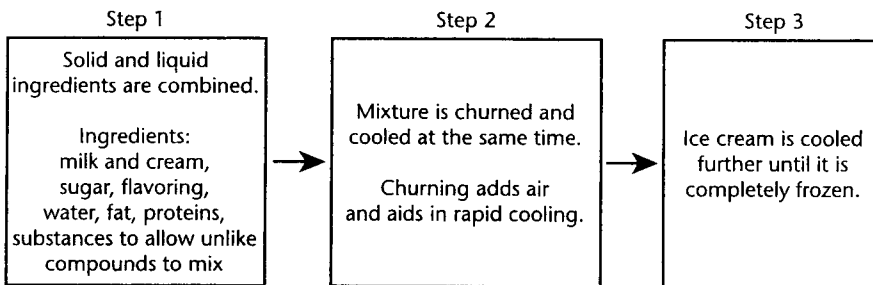
**ENRICH**

# The Chemistry of Ice Cream

In Section 1, you learned the difference between a solution and a suspension. A *colloid* is a mixture that is intermediate between a suspension and a solution. A colloid is similar to a suspension in that its particles are larger than those of a solution. However, the particles of a colloid, like those of a solution, are small enough that they cannot be separated by settling or filtration. The particles in a colloid are said to be *dispersed*, rather than dissolved or suspended. Familiar colloids include shaving cream, whipped cream, fog, and smoke.

Ice cream is another familiar colloid. It is made from particles of fat, tiny ice crystals, and a water solution of sugars, salts, and proteins. The particles of the liquid are dispersed in many tiny bubbles of air to make the colloid. Because water is polar and fat is nonpolar, other substances are added to keep these “unlike” particles mixed together under the proper conditions.

The colloid formed by ice cream remains stable only at cold temperatures. When ice cream is warmed above freezing, its dispersed particles absorb energy and begin to move faster. When the fast-moving particles collide, they sometimes stick together. Eventually, the particles grow so large that they can no longer remain dispersed, and they settle out of the colloid.



Answer the following questions on a separate sheet of paper.

1. Suppose the liquid water in ice cream did not have solutes dissolved in it. What effect do you think this would have on the ice cream and why? *The water would freeze at higher temps than it would with the other ingredients dissolved in it.*
2. What do you think happens to the air in the colloid when ice cream melts? *The air would escape from the mixture*
3. Look at the diagram above. Why do you think air isn't added until Step 2 when the mixture is cooled? *Because the particles need to become mixed and their temp. is cool enough to trap the air.*
4. Milk is also a colloid. It consists mainly of water, proteins, and fat. Which colloid is more stable, milk or ice cream? How do you know?

*Milk is more stable because it remains a colloid at a much wider range of temperatures than does ice cream.*