



**Polar Substance in Water**  
Sodium and chloride ions are attracted to charged regions on molecules of polar solvents such as water.

**Nonpolar Substance in Water**  
Fats and oils are nonpolar, so they will remain separate from molecules of a polar solvent such as water.

Because water is polar and oil is nonpolar, their molecules are not attracted to each other. The molecules of a polar solvent like water are attracted to other polar molecules, such as those of sugar. This explains why sugar has such a high solubility in water. Ionic compounds, such as sodium chloride, are also highly soluble in water. Because water molecules are polar, they interact with the sodium and chloride ions. In general, polar solvents dissolve polar solutes, and nonpolar solvents dissolve nonpolar solutes. This concept is often expressed as “Like dissolves like.”

So many substances dissolve in water that it is sometimes called the universal solvent. Water is considered to be essential for life because it can carry just about anything the body needs to take in or needs to get rid of.



**CHECK YOUR READING**

Why will a nonpolar substance not dissolve in a polar substance?

## 10.2 Review

### KEY CONCEPTS

1. How can a solution be made more concentrated? less concentrated?
2. What two factors can change the solubility of a gas?
3. Are nonpolar compounds highly soluble in water? Why or why not? (8.5.d)

### CRITICAL THINKING

4. **Predict** Suppose you stir sugar into ice water. Some sugar remains on the bottom of the glass. After the glass sits out for an hour, you stir it again. What will happen? Why?
5. **Infer** A powder dissolves easily in water but not in oil. Are the molecules in the powder probably polar or nonpolar? Explain.

### CHALLENGE

6. **Synthesize** If mixing a substance with water forms a suspension, does the substance have a high or a low solubility in water? Explain.