A Matter of Mixing

Water is great for cleaning. It can wash away almost anything, but when it comes to oil or grease, it doesn't have a chance. That is because oil and grease are very different from water in the way they behave.

Water is able to wash things away because it dissolves them. An example of this is when salt is added to water. The salt seems to disappear, because it separates into smaller and smaller pieces until we can't see it any more. These small pieces of salt dissolve in the water. They are still there, but we just can't see them. Sugar does the same thing. It dissolves into water. There are a couple of ways that we can prove to ourselves that the sugar or the salt is still there. For one, we can taste them. Salt water tastes salty, and sugar water tastes sweet. Also, if we take salt water, or sugar water, and let it sit on a counter or a windowsill for a while, the water will evaporate and leave a white powder behind. In the case of salt water, the powder is salt, and for sugar water, the powder is sugar.

Chemists use the term hydrophobic (hi-dro-FO-bic) meaning "water-fearing" to describe things like oil and grease, because they never mix with water. Other materials like sugar that quickly dissolve in water are called hydrophilic (hi-dro-FIL-ic) meaning "water-loving".

As a rule, we can say that things with similar properties can dissolve in each other. That is, hydrophilic materials will dissolve in other hydrophilic materials, and hydrophobic materials will dissolve in other hydrophobic materials. For example, salt and water are both hydrophilic, so salt will easily dissolve in water. However, things with very different properties will not dissolve in each other. For example, salt will not dissolve in oil, because salt is hydrophilic, and oil is hydrophobic.

Soaps and detergents are exceptions to this rule, because they can dissolve in hydrophobic or hydrophilic materials. In some cases they will act more like water, and in others they will act more like oil.

Soaps and detergents show both hydrophilic and hydrophobic properties. If a detergent is added to a container with oil and water, the detergent will stick to both the water and the oil, causing them to mix. This is how detergents help to clean your clothes. The detergent mixes with oily stains, and lifts them into the water so that they can be washed away. So, the next time that you need to wash your jeans, think about whether water will work by itself, or whether you need to add some detergent to help mix things up!

Hydrophilic Materials	Hydrophobic Materials
Water	Olive oil
Salt	Butter
Sugar	Axle grease
Rubbing alcohol	Beeswax
Vinegar	Lipstick

American Chemical Society
Membership Division—Office of Community Activities
1155 16th Street, NW, Washington, DC 20036
email kids@acs.org or call 800-227-5558, ext. 6187
chemistry.org/kids
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