

Daily Dose of Science Challenge: Science of Soap. Why Does it Work?

Question:

Why is it important to use soap? Why does it work better than plain water?

Background:

Soap is both hydrophilic and hydrophobic. Test materials around the house to see which ones absorb water (hydrophilic) and which ones repel water (hydrophobic).

Activity:

Make your own 'soap molecules' with things around the house:

Suggested materials:

Spaghetti noodles or toothpicks (the hydrophobic ends)

Raisins or marshmallows (the hydrophilic ends)

Chocolate chips or grapes (the dirt or germ)

Vocabulary to incorporate into this lesson:

- Hydrophobic
- Hydrophilic
- Lipophilic
- Micelle

Procedure:

#1) Make several soap molecules by poking a toothpick into a marshmallow. Make several of these.

#2) Sprinkle "dirt/germs" on the table (or in a bowl of water)

#3) Encircle a dirt/germ molecule with toothpicks pointing in and marshmallow on the outside.

Explain: The hydrophobic ends (which also happen to be lipophilic meaning they like oil) try to gather all around the grapes (circle the toothpick ends around a grape). When you have the "dirt/germ" surrounded you have created a **micelle**. The micelle is carried away with water. The toothpick ends can actually 'poke' and destroy the outer lipid membrane of some viral or bacterial cells (including the coronavirus membrane).

Extension:

~Put oil and water in a clear glass - discuss why they separate. Add soap and observe what happens. It should turn cloudy - this is actually the micelles trapping the oil molecules and dispersing them in water.

~Make your own soap - there are multiple sites that give directions. This is a link to a very simple glycerin based soap. <https://www.youtube.com/watch?v=a6KLQdjyKss>

There are multiple other recipes. Many call for lye (probably not a good ingredient when working with children)

Connect with us:

Be creative - use whatever resources you have at home to help your kids understand hydrophobic and hydrophilic properties. Create your own version of a micelle - send a video or a picture and post it on our Facebook page.



Additional resources:

Understanding soap can be an intensive chemistry lesson for older students!

This article provides good background reading:

<https://www.nytimes.com/2020/03/13/health/soap-coronavirus-handwashing-germs.html?auth=login-google1tap&login=google1tap>

There are also multiple videos that demonstrate how micelles work.

<https://www.youtube.com/watch?v=XntinCBEC9U> (SciShow Kids has a lot of great science experiments and kid appropriate videos)

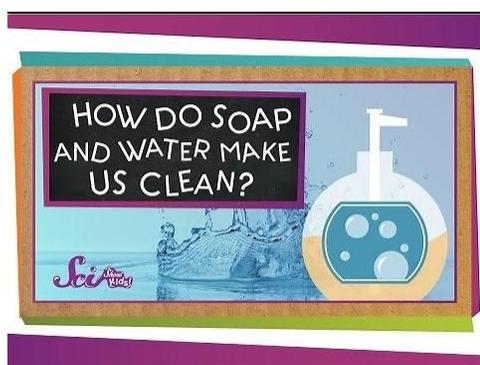
<https://www.youtube.com/watch?v=xHglmUQnrqo> (more appropriate for older students and as a parent resource - it has a lot of the chemistry background but also some good visuals)



[Soaps and Detergents](#)

Soaps and Detergents

www.youtube.com



[How Do Soap and Water Make Us Clean? | Chemistry for Kids](#)

A SciShow Kids viewer wrote us and asked: How does soap work? Find out what really happens when you take a bath! --
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