

# How Soap Kills COVID-19 on Hands

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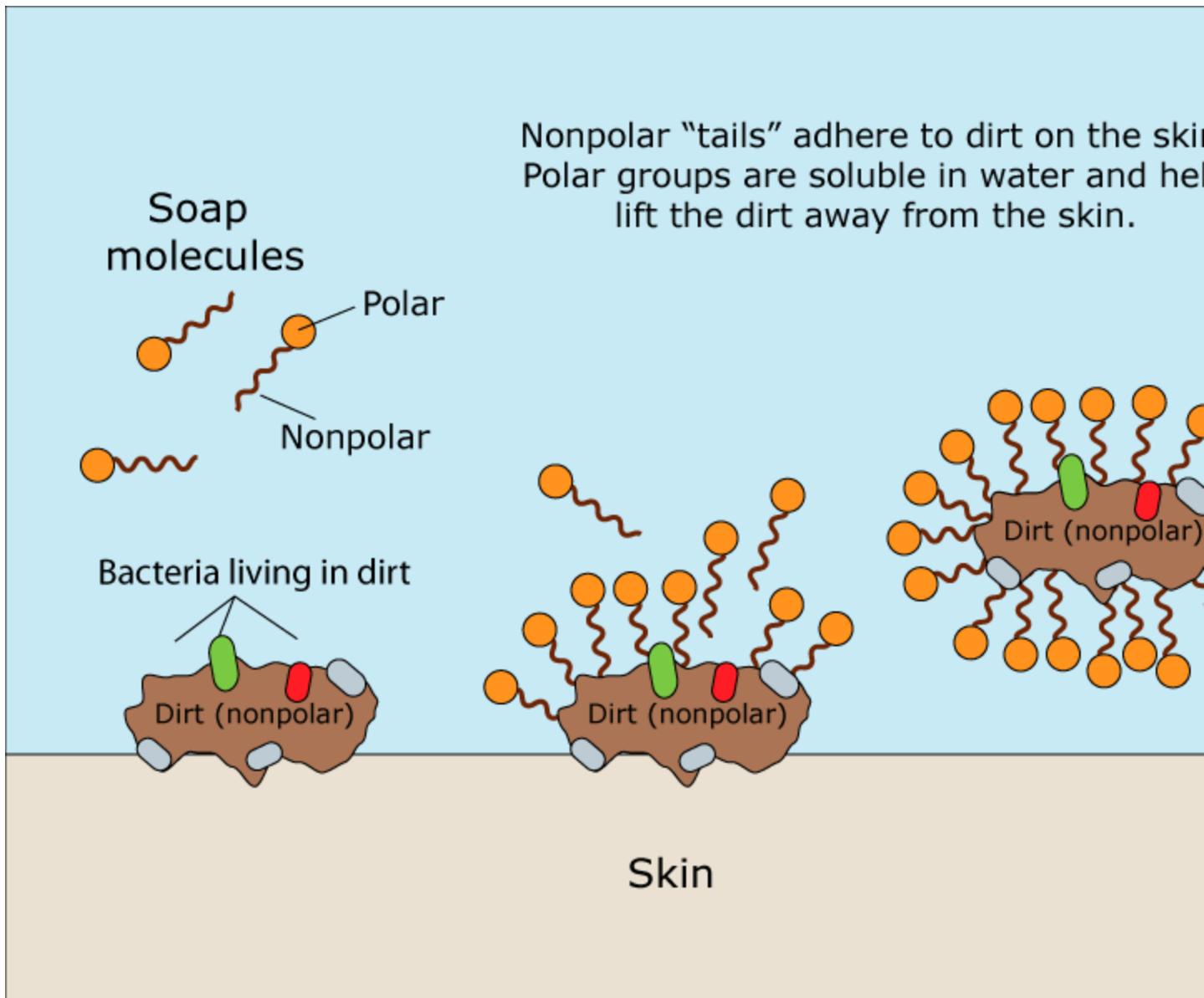
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How 20 seconds of washing your hands with soap will save lives, the chemistry explained:

Water alone may rinse off dirt, but viruses and bacteria are so small they often need chemical and mechanical intervention to get their sticky nanoparticles out of the crevices that make up our unique fingerprints. That's why soap is so important. It's made for this job. Give soap 20 seconds, at least, of thorough scrubbing and the pin-shaped molecules will penetrate the types of bacteria and viruses, including COVID-19, that protect themselves with an oily lipid membrane. Like a nail popping a tire, the water-repelling end of the soap molecule, a hydrophobic tail that can bond with oil and fats, stabs COVID-19 and leaves the virus a deflated and broken sack of RNA cells.

And while alcohol can also break an oily membrane, washing with soap has the added benefit of physically removing even tougher to break viruses and bacteria from the skin. This is thanks to the dual nature of soap molecules. As the hydrophilic, or water-loving, heads reach out to bond with the water, the tails turn inwards to protect themselves from the water and by doing so, scoop up anything they catch in tiny soap bubble cages called micelles. Scrubbing all parts of your hands and wrists vigorously, with a sudsy lather, is key to locking these invading particles away for good - and washing them down the drain. And whether the water is cold or warm doesn't matter, so long as it's soapy.



Graphic: How soap works and interacts with dirt

The World Health Organization recommends scrubbing the wrists, palms and backs of your hands, the spaces in-between your fingers in an interlacing motion, making fists around each thumb and rubbing your fingertips into your palms.

The problem with antibacterial soaps and gels is that in terms of COVID-19 they are not more helpful than regular soap and are useless as gels unless they include at least 60% alcohol, because the antibacterial products do not affect viruses at all. Further-more, whatever bacteria do survive such treatment, they can evolve to become resistant to the antibacterial products in the future. Why take the chance of making bacteria stronger when all you need is a little soap and water?

UNESCO is the only UN organisation working on science and engineering education and research. Chemistry, as part of the basic sciences, teaches us the importance of sanitation and washing our hands in order to combat COVID-19. The importance of Science and Engineering education for the world cannot be underplayed - our future solutions depend on it!

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**Images:**

- Soap molecule graphic by Michael Gerhardt
- COVID-19 illustration by the U.S. Centers for Disease Control and Prevention (CDC)