Understanding Science

Getting personal

You may not be an expert on microbiology, geology, or climatology, but even so, scientific knowledge may factor into your everyday decision-making. Science has implications for issues we face everyday—and while science doesn't dictate which choice is the right one, it does give us important background knowledge to inform our decisions. Here are just a few examples of everyday decisions informed by science:

To wash or not to wash. One hundred and seventy years ago, hand-washing wasn't an everyday ritual—even for doctors working in both the morgue and the maternity ward! However, since then, biologists have developed the germ theory of disease, and research has shown that hand-washing prevents the spread of infection. A 2005 study found that promoting hand-washing among children in low-income areas could reduce the incidence of diseases like pneumonia by fifty percent! Though washing one's hands might seem like a simple habit today, it is so commonplace only because scientific knowledge has emphasized its benefits.

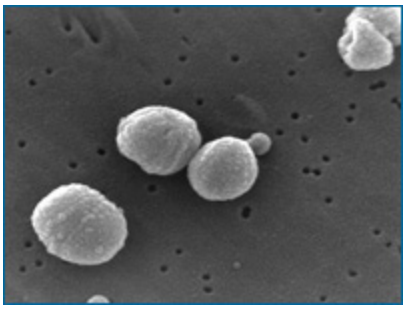
Which fish? Will you have the local tilapia or the orange roughy? Taste certainly factors into this decision, as does cost. But what about science? Conservation biology tells us that the orange roughy's population has been decimated by the seafood industry. Even more worrisome, biologists have figured out that the fish lives to be 100 years old and doesn't begin to reproduce until it's 20 years old, making it difficult for the population to recover from over-fishing. Tilapia, on the other hand, is farmed specifically for human consumption and is not threatened. Which will you choose?

The orange roughy (top) and tilapia (bottom) available on the same menu have very different conservation statuses.

Dodging disaster. Everyone needs a place to call home, but where will yours be? If you're considering a house in earthquake country, you might want to take a cue from seismologists and geologists: not all soil types are the same. Scientists have determined that some areas within earthquake zones are unusually dangerous and damage-prone because of the possibility of liquefaction—a phenomenon in which shaking causes soil particles to flow past one another easily, like a liquid. In this case, science can point you towards a more stable and safe home.

Damage due to liquefaction after an earthquake in Niigata, Japan in 1964.

Am I better yet? You're over your strep throat and feeling well again, so is it time to ditch the antibiotics? Well, you could, but evolutionary biology suggests that stopping a course of antibiotics early encourages the evolution of antibiotic resistant bacteria, by allowing those bacteria not quite killed off by the incomplete dose of antibiotics to preferentially survive and reproduce. Those mildly resistant bacteria could come back to haunt you or infect someone else, and if they do, your original antibiotic may not work against the new strain.



Streptococcus bacteria

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Petroleum preferences. You're in the market for a new car—but which one? There are many considerations, including mileage. A car that gets better mileage means that you'll pay less for gas. But geology can shed even more light on the issue. The petroleum necessary to make gas is a limited resource. The Earth only has so much oil and geologists estimate that we have already tapped much of that. The more petroleum we use, the harder it becomes to find. The harder petroleum is to find, the more expensive each barrel of oil becomes, and the more you'll be paying at the gas pump! A car that conserves gas might be more expensive now, but could end up paying off in the long run.

A plug-in hybrid electric vehicle that can run off of electricity generated by renewable sources.

Hand washing photo provided by CDC/Kelly Thomas; orange roughy photo by W. Savary from the FDA Regulatory Fish Encyclopedia; tilapia photo by B. Tenge from the FDA Regulatory Fish Encyclopedia; liquefaction photo provided by Earthquake Engineering Research Center; Streptococcus bacteria provided by CDC/Janice Carr; plug-in hybrid electric car photo by Mike Linenberger/NREL.