

Chapter 3: conductivity and conductometry

ACTIVITY 2 : Taking a bath during a storm

DOCUMENT 1: Electrical conductivity of water



You're never too old to learn something new. All my life I've heard that water and electricity make a dangerous pair together. And pretty much all of the time that is true—mixing water and electricity, be it from a lightning bolt or electrical socket in the house, is a very dangerous thing to do. But [...] pure water is actually an excellent insulator and does not conduct electricity.

Water that would be considered "pure" would be distilled water (water condensed from steam) and deionized water (used in laboratories), although even water of this purity can contain ions.

But in our real lives, we normally do not come across any pure water. Water contains significant amounts of dissolved substances, minerals, and chemicals. These things are the solutes dissolved in water. Water quits being an excellent insulator once it starts dissolving substances around it. Salts, such as common table salt (NaCl) is the one we know best. In chemical terms, salts are ionic compounds composed of cations (positively charged ions) and anions (negatively charged ions). Even a small amount of ions in a water solution makes it able to conduct electricity (so definitely don't add salt to your "lightning-storm" bath water). Once water contains these ions it will conduct electricity, such as from a lightning bolt or a wire from the wall socket, as the electricity from the source will seek out oppositely-charged ions in the water. Too bad if there is a human body in the way.

Interestingly, if the water contains very large amounts of solutes and ions, then the water becomes such an efficient conductor of electricity that an electrical current may essentially ignore a human body in the water and stick to the better pathway to conduct itself—the masses of ions in the water. That is why the danger of electrocution in sea water is less than it would be in bath water.

Source : <https://water.usgs.gov/edu/electrical-conductivity.html>

Problem solving:

During a storm is it safer to take a bath in distilled water or in salt water?

Activity summary

What you must remember:

- Conductivité
- Conductivité ionique molaire

Skills linked to the curriculum:

Compétences	Capacités à maîtriser
- ANA	Comparer qualitativement des conductivités ioniques molaires d'anions et de cations.
- COM	Formuler et argumenter des réponses structurées Formuler et présenter une conclusion