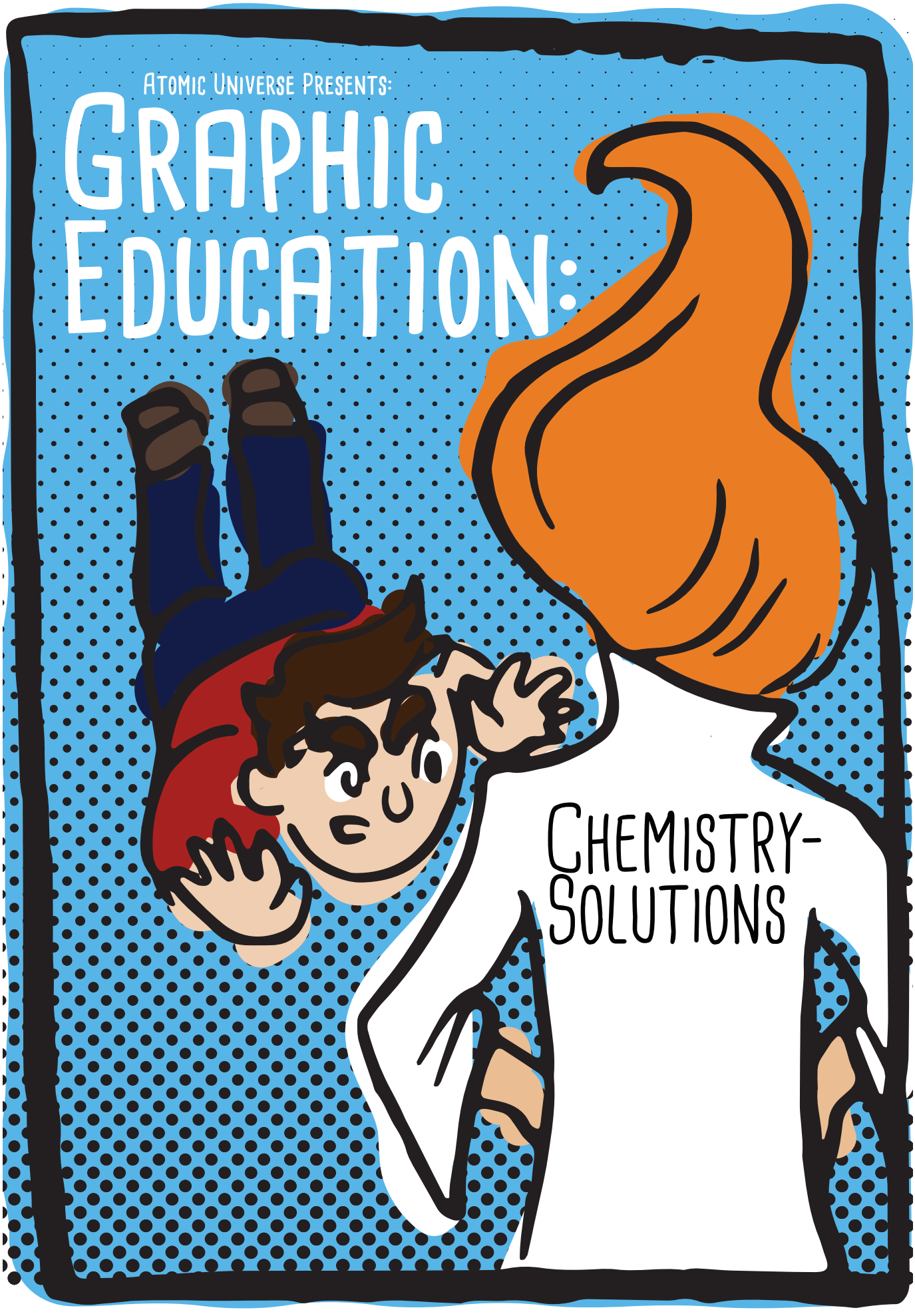
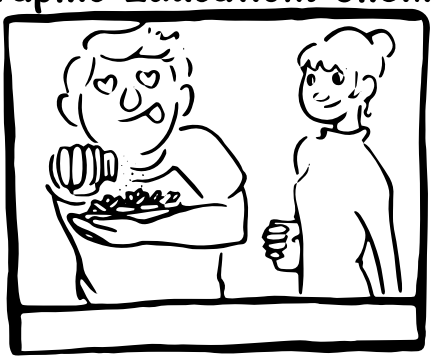
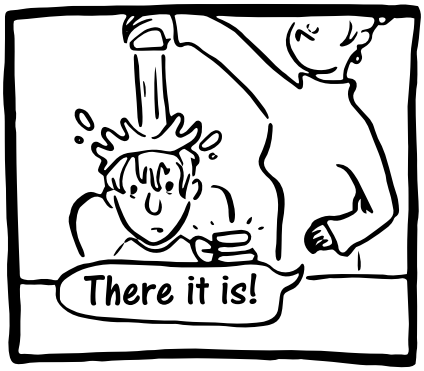
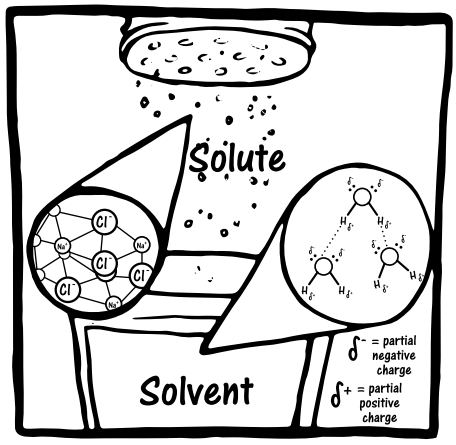

Atomic Universe Presents:
Graphic Education:
Chemistry-Solutions

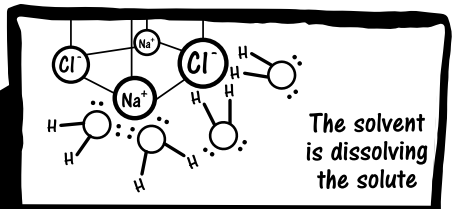
Graphic Education: Chemistry - Solutions

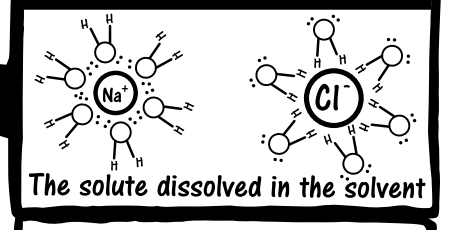






When we talk about table salt, we say NaCl for the formula. This formula refers to the unit cell, which is like the ratio of elements in its large network of atoms. All ionic compounds (which are salts) are treated this way.





The d+ H's in water are attracted to the anion (choride ion) and the d- lone pair electrons on O in water are attracted to the cation (sodium ion). Water uses this attraction to pull the ions from one another, then surround them, causing them to dissolve.

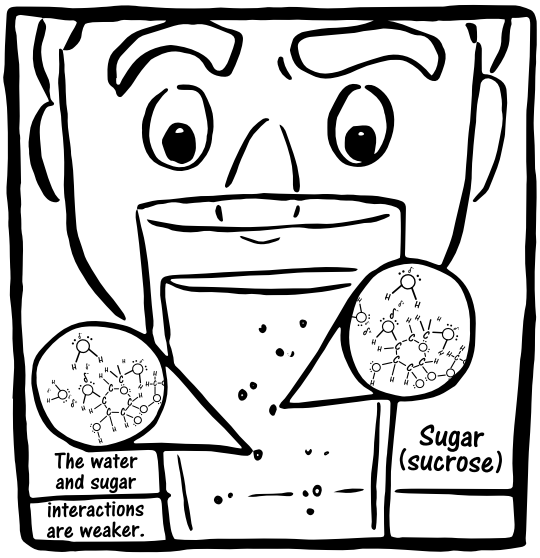
This is the process of dissolving. We symbolize this with a dissolation equation

$$NaCl_{(s)} \xrightarrow{H_2O_{(l)}} Na^+_{(aq)} Cl^-_{(aq)}$$

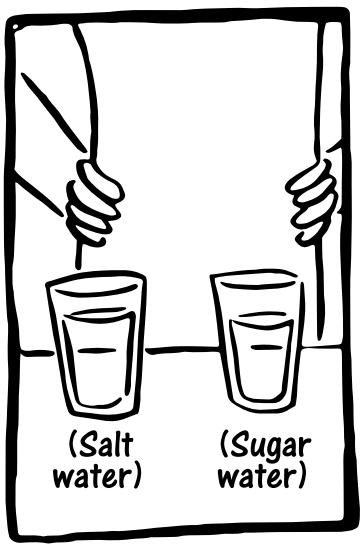
Solid sodium chloride is added to pure water to yield aqueous (which means dissolved in water) sodium ion and chloride ion.

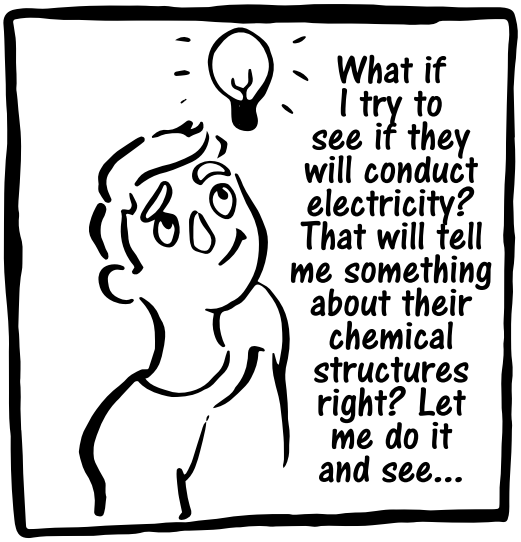
Art: Kelly Krill
Story: C.A. Preece
Science Art: Brandi Ellebruck

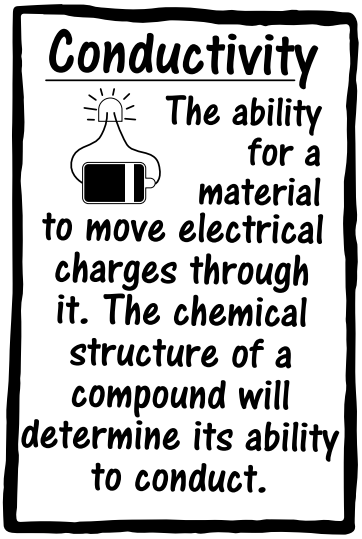

Here's more to think about.
HEY!

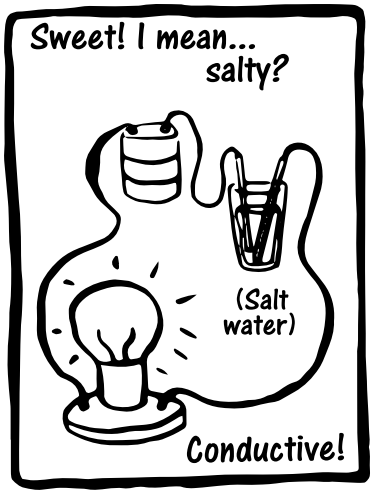

The water and sugar interactions are weaker.
Sugar (sucrose)

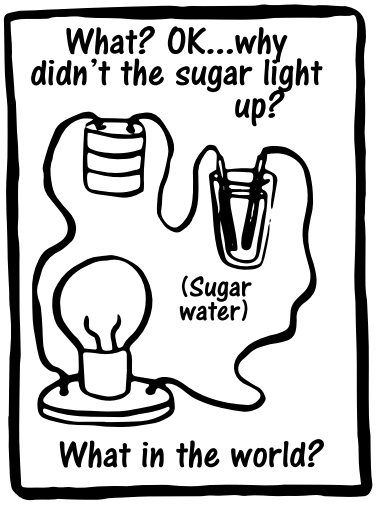

It takes so much longer for the sugar to dissolve. Weird... What is going on?

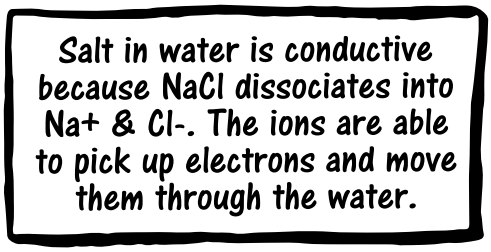

(Salt water)
(Sugar water)

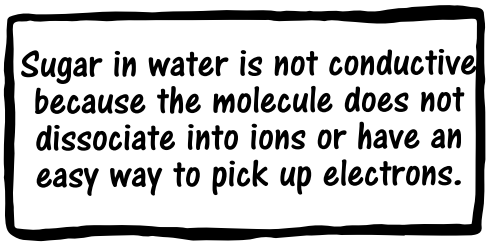

What if I try to see if they will conduct electricity? That will tell me something about their chemical structures right? Let me do it and see...


Conductivity
The ability for a material to move electrical charges through it. The chemical structure of a compound will determine its ability to conduct.


Sweet! I mean... salty?
(Salt water)
Conductive!

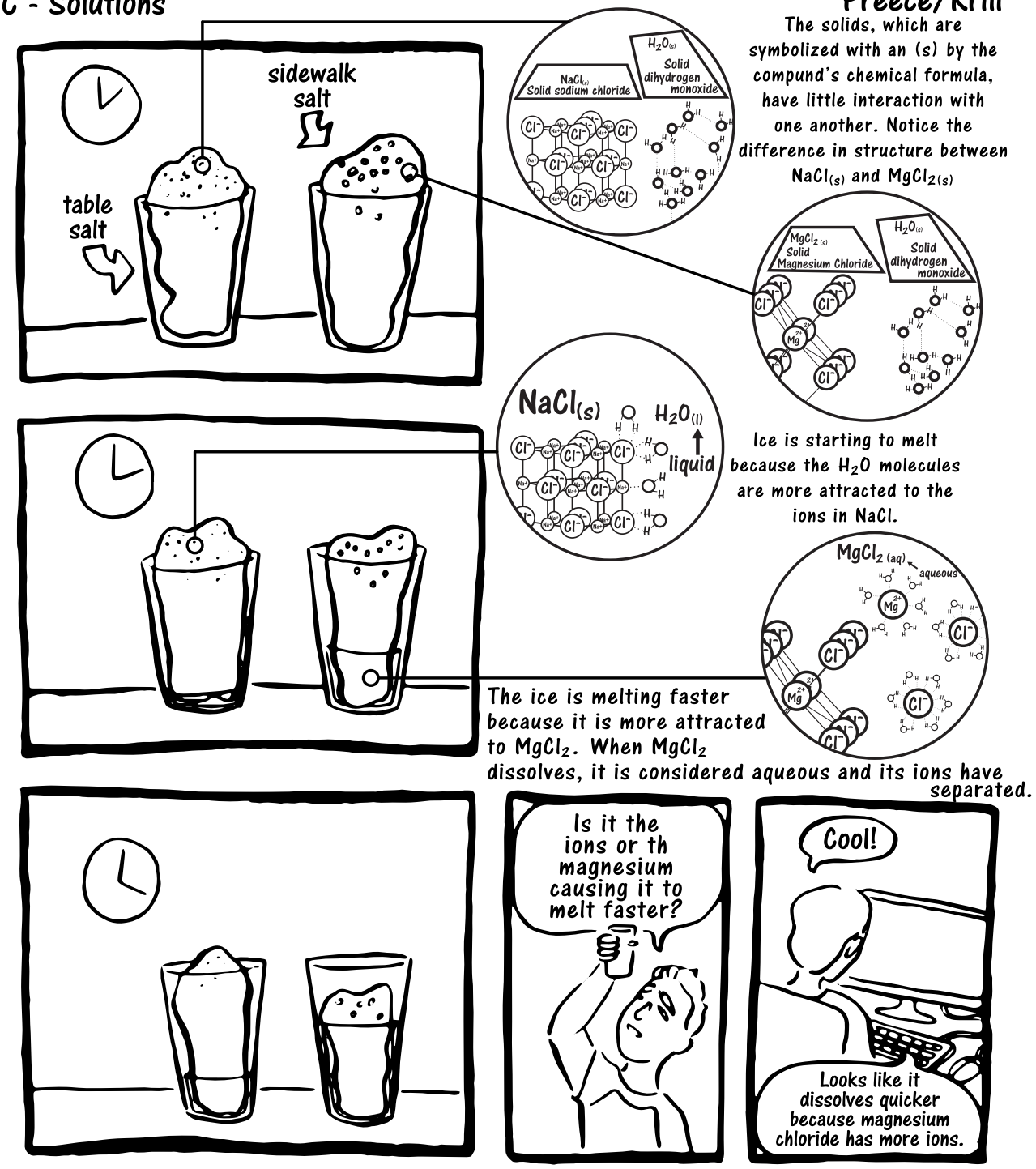

What? OK...why didn't the sugar light up?
(Sugar water)
What in the world?

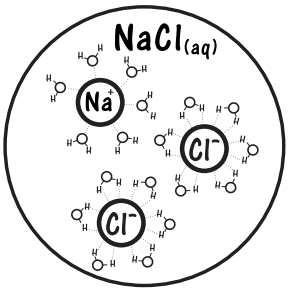

Salt in water is conductive because NaCl dissociates into Na+ & Cl-. The ions are able to pick up electrons and move them through the water.

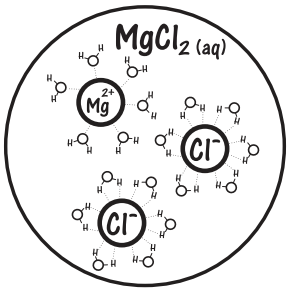

Sugar in water is not conductive because the molecule does not dissociate into ions or have an easy way to pick up electrons.


CHRIS! IT SNOWED LAST NIGHT! PUT SOME SALT ON THE SIDEWALK!
SALT
SALT
Wait. I gotta see something.
Table salt has sodium chloride (NaCl) and sidewalk salt has magnesium chloride($MgCl_2$).
SALT
Huh... Doesn't seem like that much of a difference.
Why is one used for eating and not the other?
SALT

Preece/Krill







When dissolving, notice $MgCl_{2(s)}$ is separated into its ions $Mg^{2+}_{(aq)}$ and $2Cl^-_{(aq)}$ To symbolize this, we write a dissociation equation.

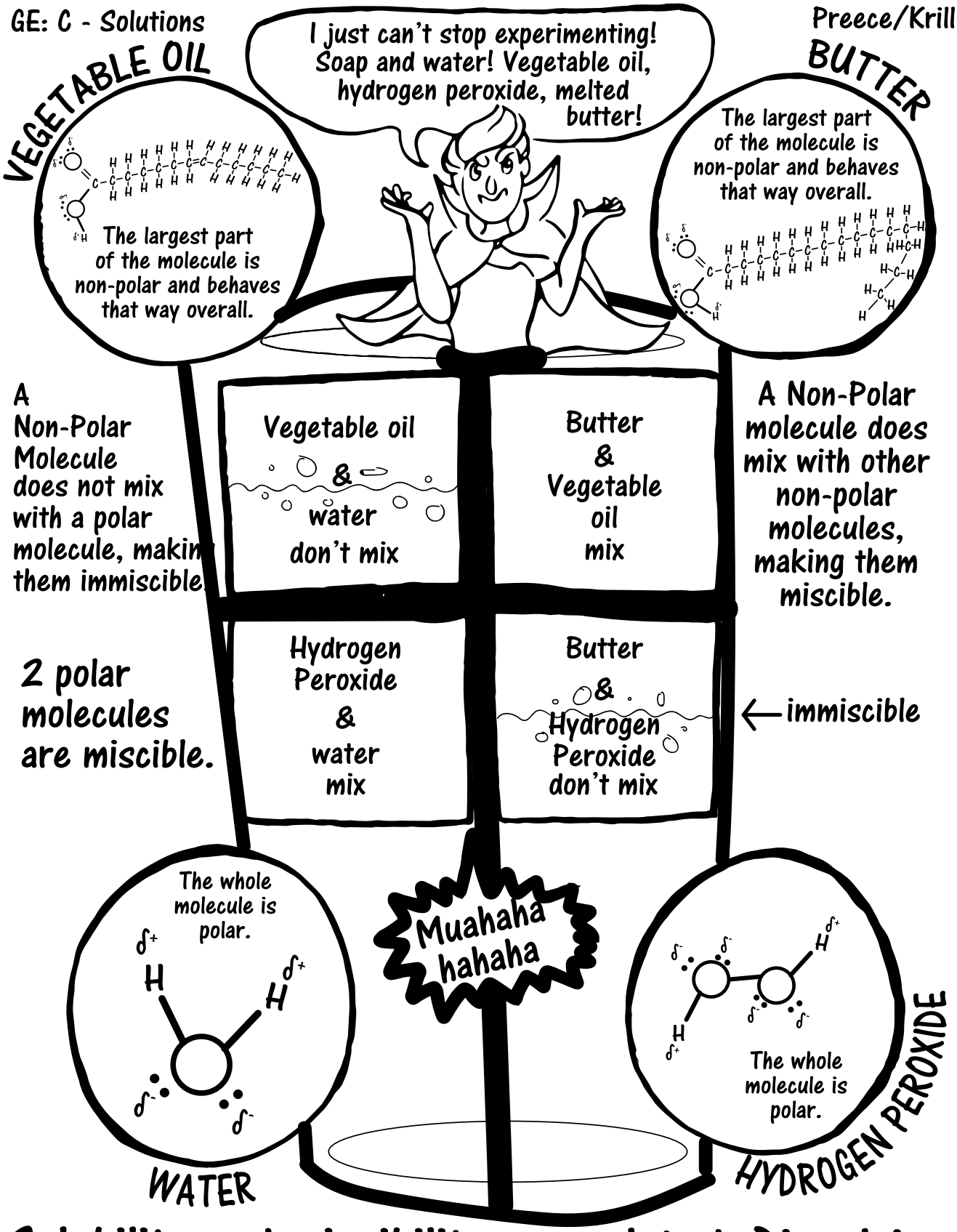
$$MgCl_{2(s)} \xrightarrow{H_2O_{(l)}} Mg^{2+}_{(aq)} + 2Cl^-_{(aq)}$$


I wonder if sugar will have much of an effect on melting the ice.
SUG
It didn't conduct and doesn't break down ions, so I'm guessing no.
Let's see!
(Sugar)
(No sugar)
Well that answers that.
Pay attention to me...
Kitty! What are you doing? Stop it!
Why are you not petting me yet?
KITTY! KELLY COME GET YOUR EVIL CAT!!!
Ahh yes... that's it...
Ouch! You're the worst!
I'm done now.
Huh... Some of the sugar touching the water hasn't dissolved.


Is there only a certain amount that will dissolve? Man, I'm on a roll today. Let's test it!
Poof! It vanished
Okay, dissolves more...
Wow! Well, I guess it can't dissolve anything.
This is enough experimenting for one day.


That's wild that ionic compounds breakup into ions when put it water AND that they can lower the melting point of the water...
ZZZZZZZZZZZZZZ
My ionic power will ionize you into oblivion!
You don't have what it takes!
BOOMH
Tch. Good one.
OOOFF!
Mom said get up and clean up the mess on the table so we can have dinner.
Couldn't you have called my name?
Not as much fun.

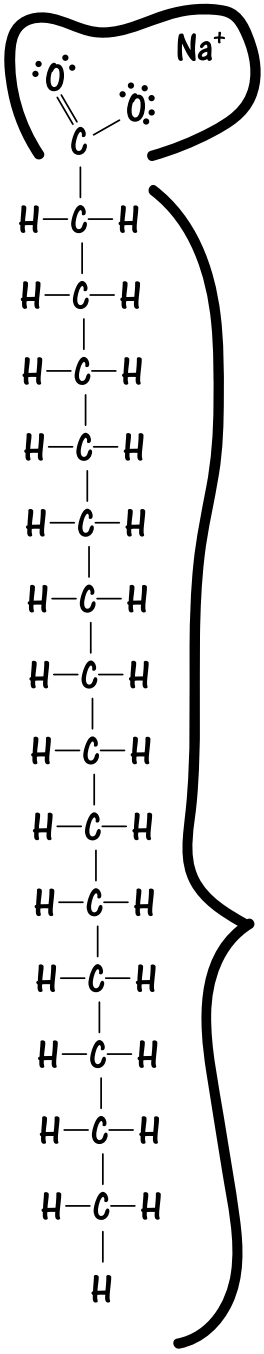
Preece/Krill

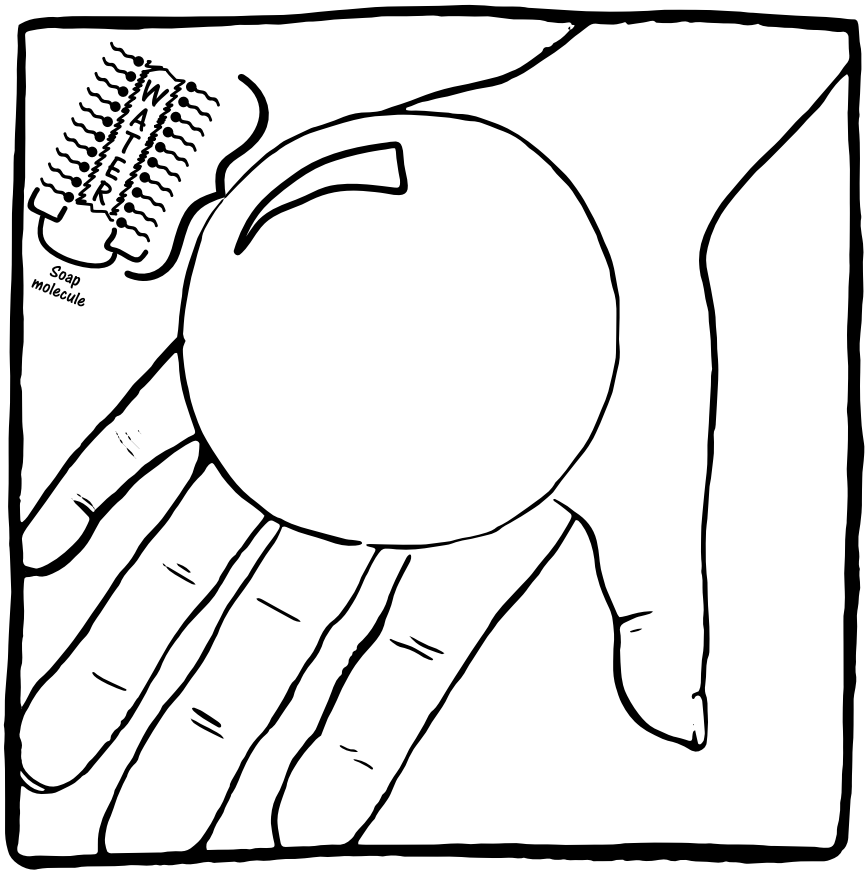


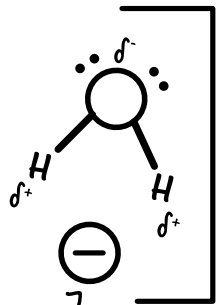
Solubility and miscibility are related. Dissolving usually refers to a solid in a liquid (like salt in water), whereas miscibility usually refers to mixing two liquids (as seen above).

Clean up for dinner, eh?
Oh I'm clean alright...

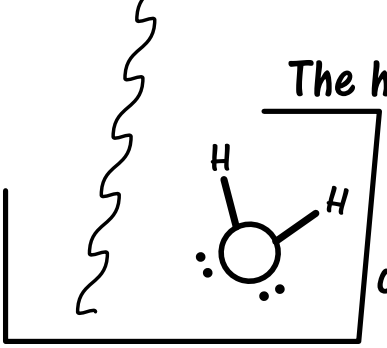
Soap molecule







The hydrophilic (or polar) end has strong interactions with water.



The hydrophobic tail has no partial or full charges, so it tries to stay away from water.