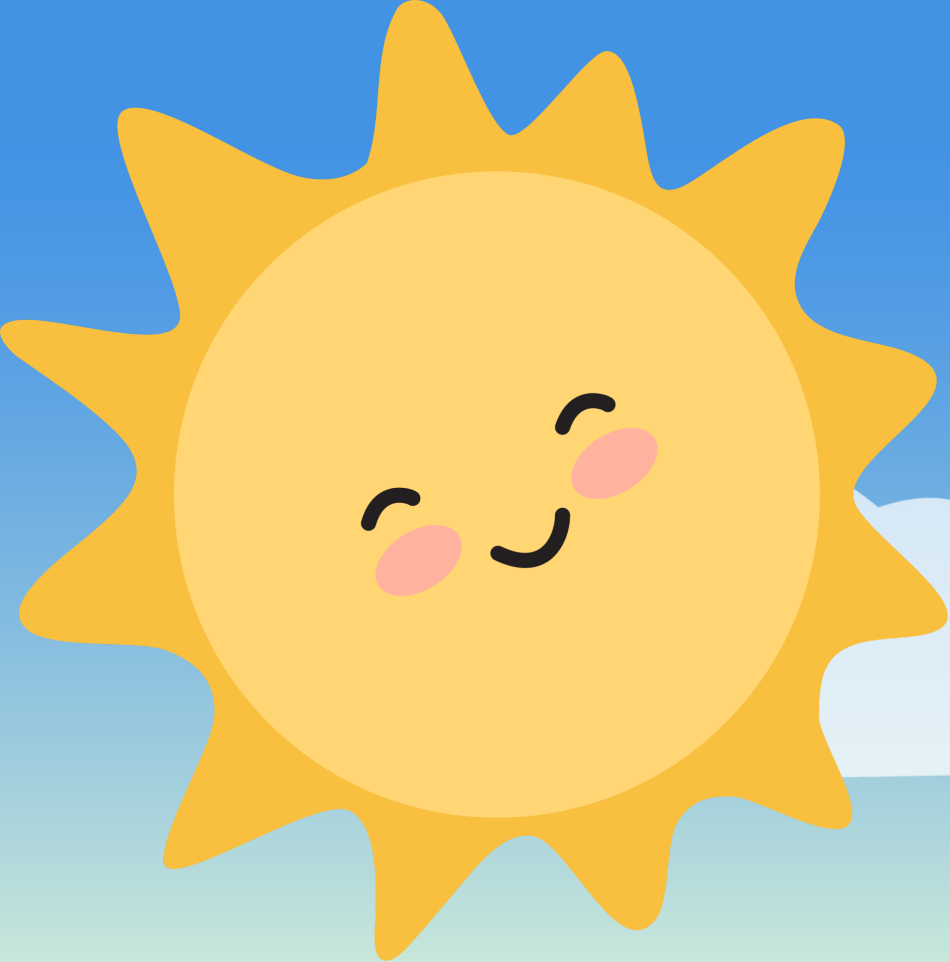
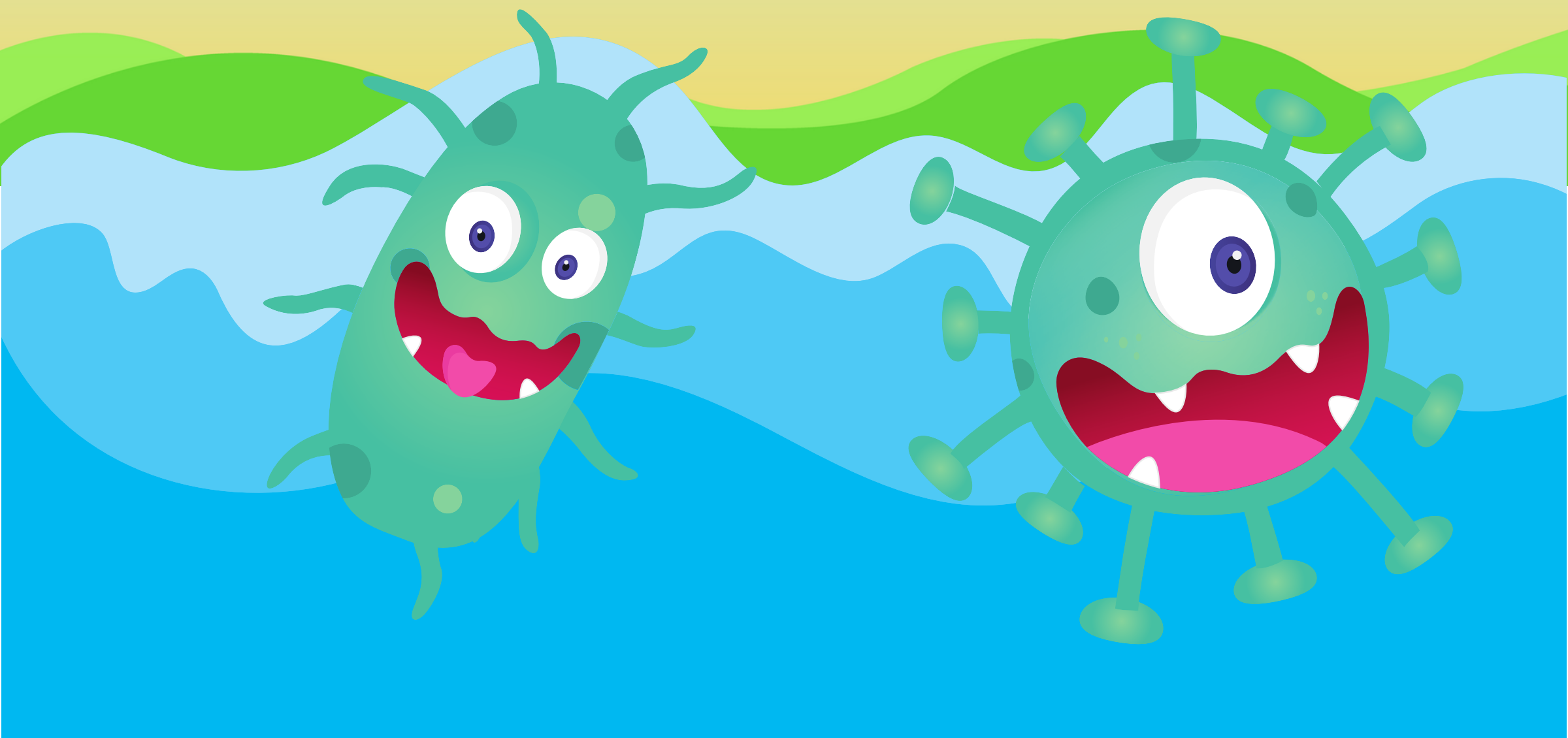




EXPLAINED FOR KIDS
BY TOBIAS STEUBE

DIAFILTRATION

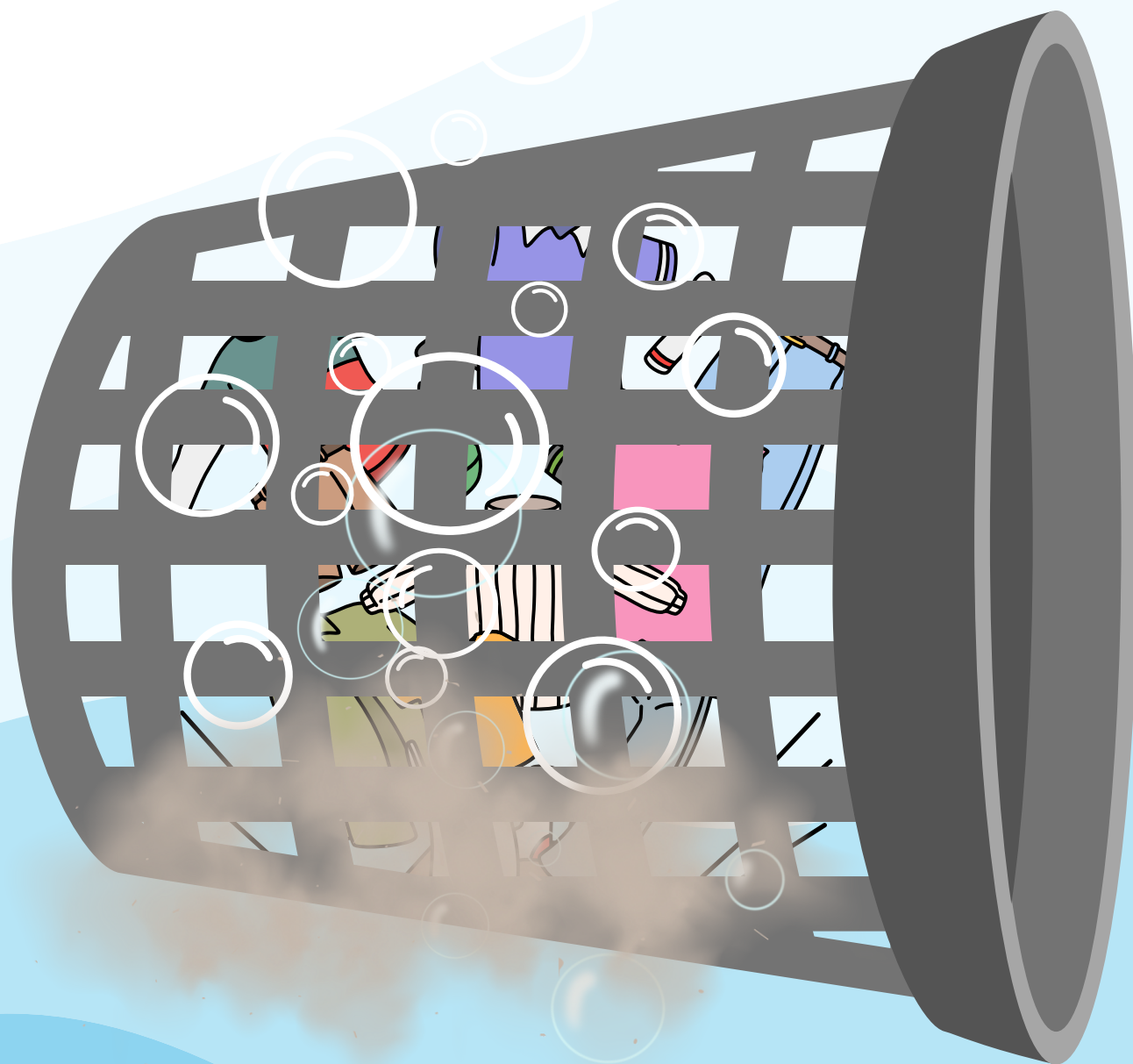




**IMAGINE, YOU PLAYED OUTSIDE WITH
YOUR FRIENDS AND YOUR CLOTH GOT
REALLY DIRTY.**



**THEN, YOU WOULD PUT ALL OF YOUR
DIRTY LAUNDRY IN A WASHING MACHINE.**



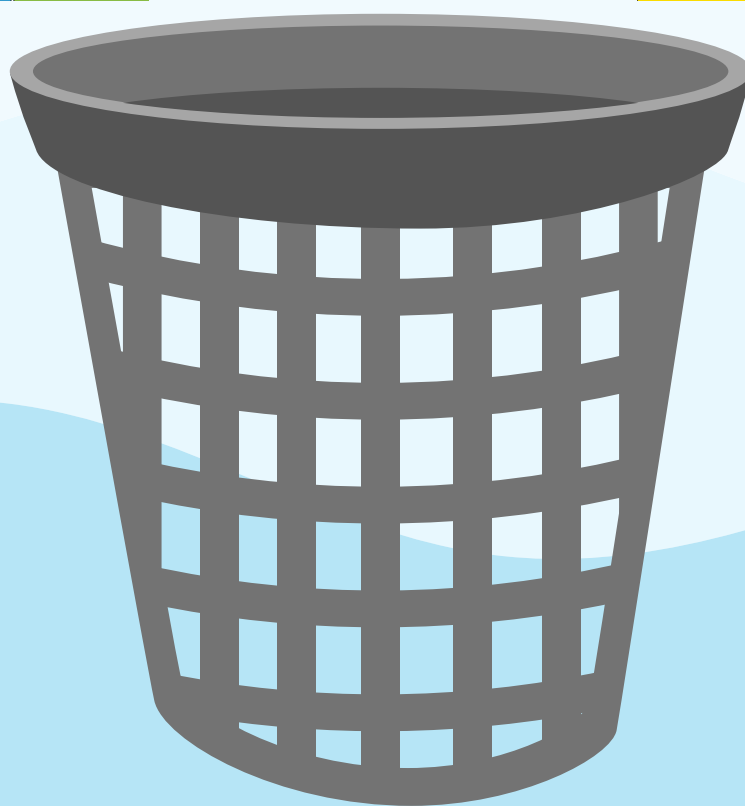
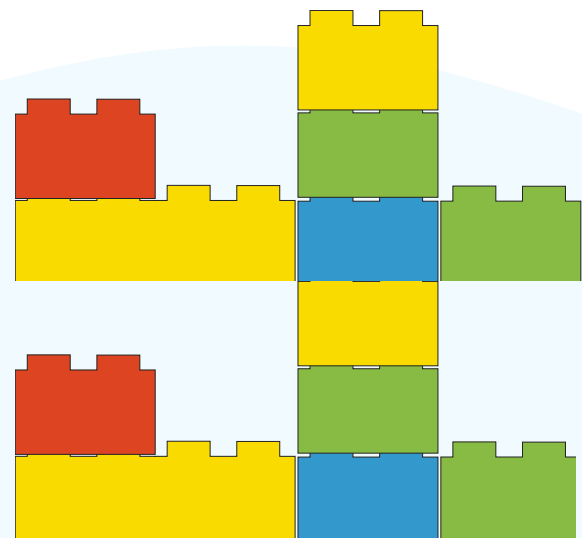
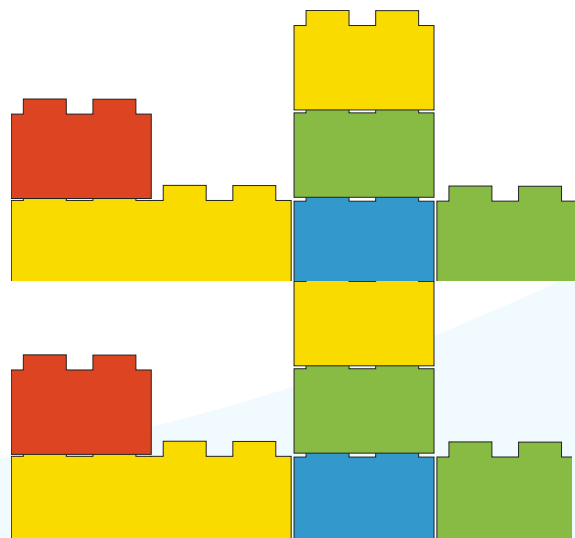
INSIDE YOUR WASHING MACHINE, THERE IS A METAL WASH BASKET. IT IS LIKE A SIEVE THAT KEEPS THE CLOTHES IN THE WASHING MACHINE AND SINCE THE DIRT IS MUCH SMALLER THAN YOUR SHIRTS AND TROUSERS, IT CAN PASS THE SIEVE AND GETS SEPARATED FROM YOUR CLOTHES.



MANY FILTERS WORK THE SAME WAY. THEY ARE LIKE THE WASH BASKET. THINGS WHICH ARE SMALLER THAN THE GRID CAN PASS THE FILTER AND BIGGER THINGS REMAIN ON THE OTHER SIDE OF IT.



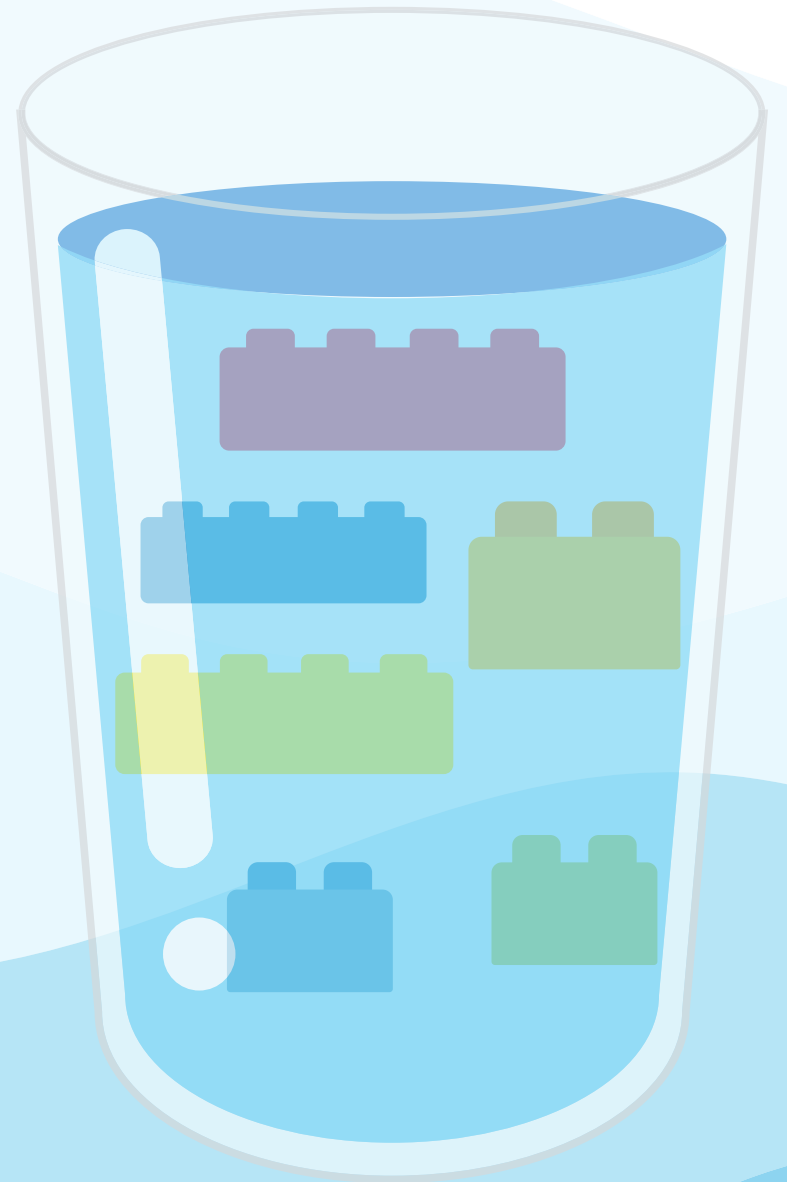
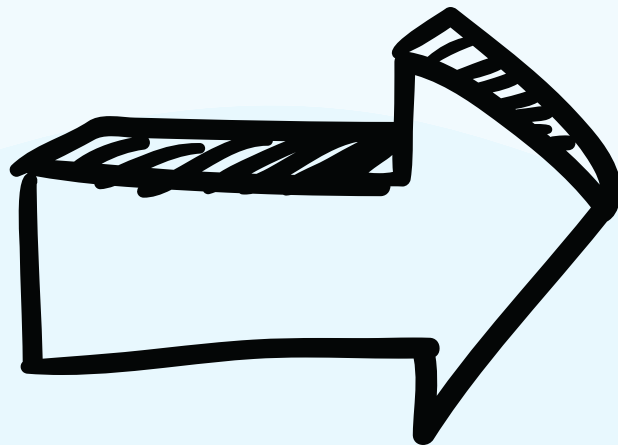
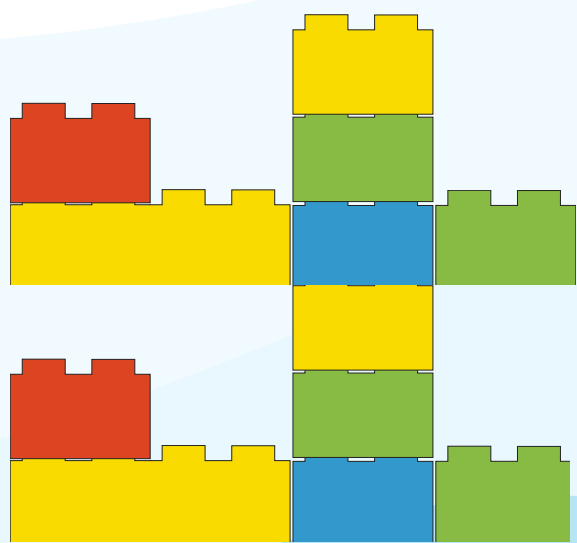
**SO, IT IS PRETTY EASY TO SEPARATE THINGS OF
A DIFFERENT SIZE. WHAT ARE WE DOING,
THOUGH, IF WE WANT TO SEPARATE THINGS
OF THE SAME SIZE?**



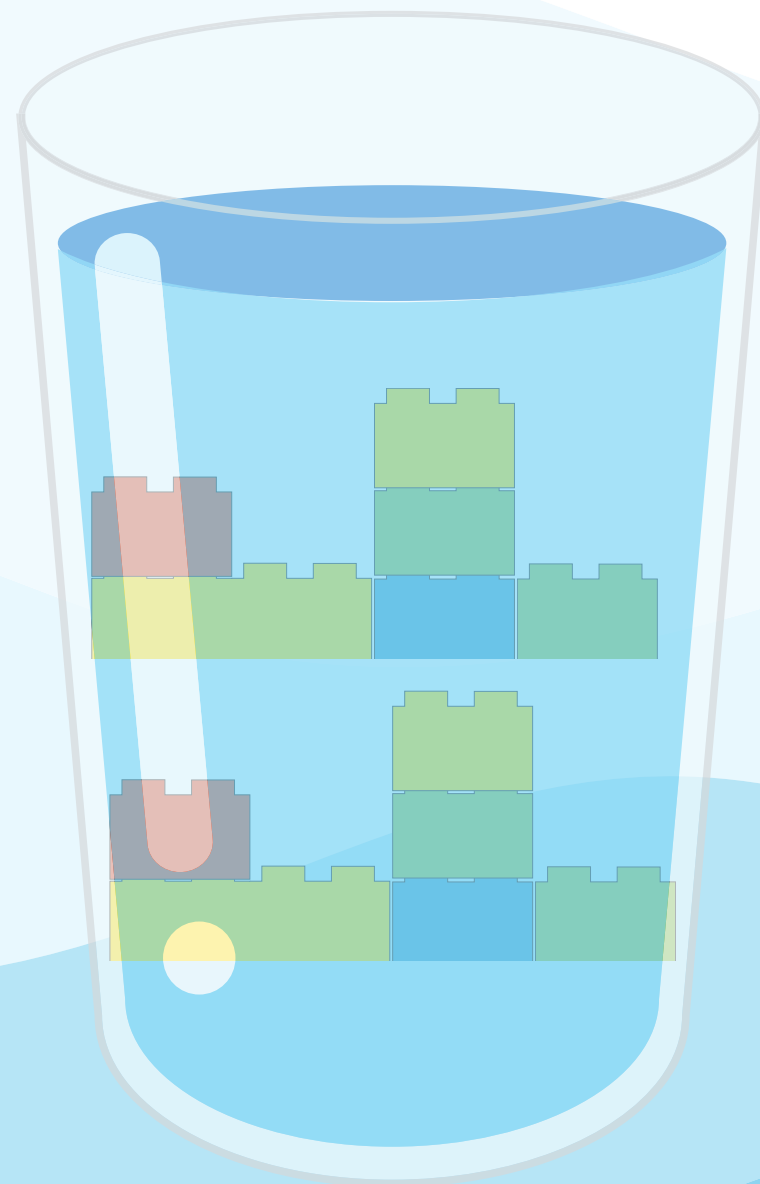
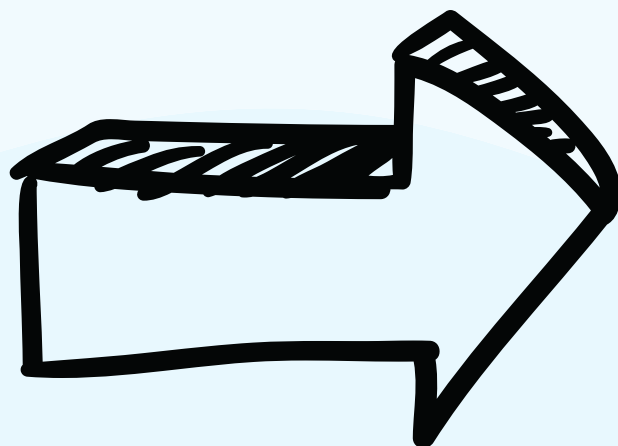
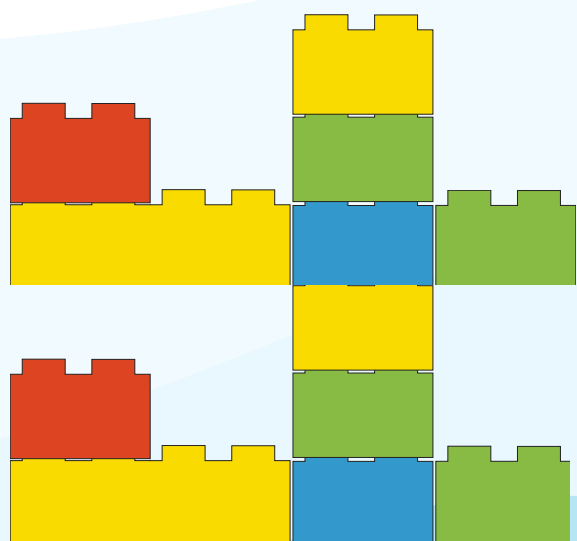
SO IMAGINE, YOU HAVE TWO DIFFERENT BLOCKS OF LEGOS. THESE LEGO BLOCKS REPRESENT MOLECULES. BOTH ARE THE SAME SIZE. EVERY SINGLE BRICK WOULD PASS THE FILTER BUT SINCE THEY ARE PUT TOGETHER AS A BLOCK, THEY WON'T GET THROUGH THE GRID.



IF WE WOULD CHOOSE A FILTER THAT LETS A BLOCK OF PASS, WE WOULD NOT BE ABLE TO SEPARATE THEM. THEY WOULD BOTH PASS THE FILTER. IF WE WOULD MAKE THE FILTER TIGHTER, IT WOULD RETAIN BOTH BLOCKS. HOWEVER, THERE IS A TRICK!



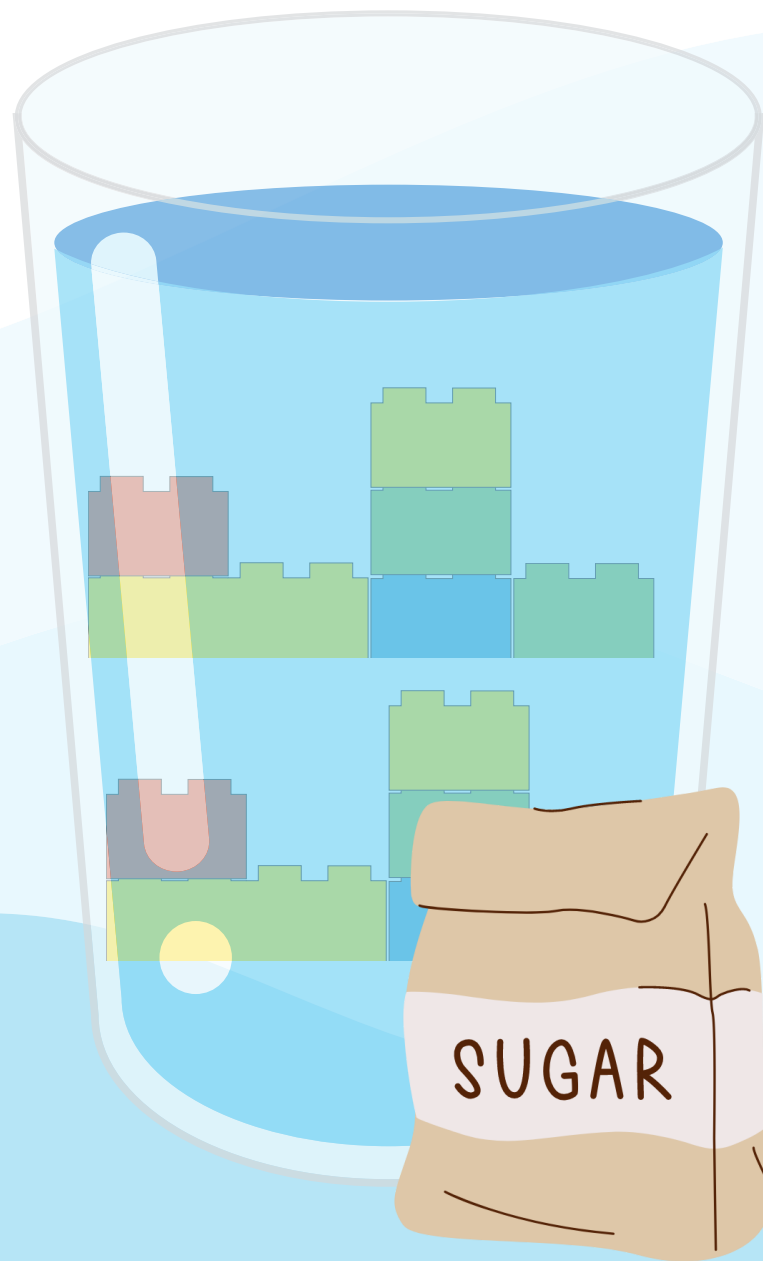
AT FIRST, WE NEED TO UNDERSTAND, THAT THERE ARE DIFFERENT MATERIALS. IF OUR FIRST BLOCK OF BRICKS WOULD BE WASHED OUT WITH WHAT WE CALL A "SOLVENT", IT WOULD DISINTEGRATE INTO ALL OF ITS SINGLE BRICKS. IN THIS CASE, WE WOULD CALL IT AN "IONIC COMPOUND".



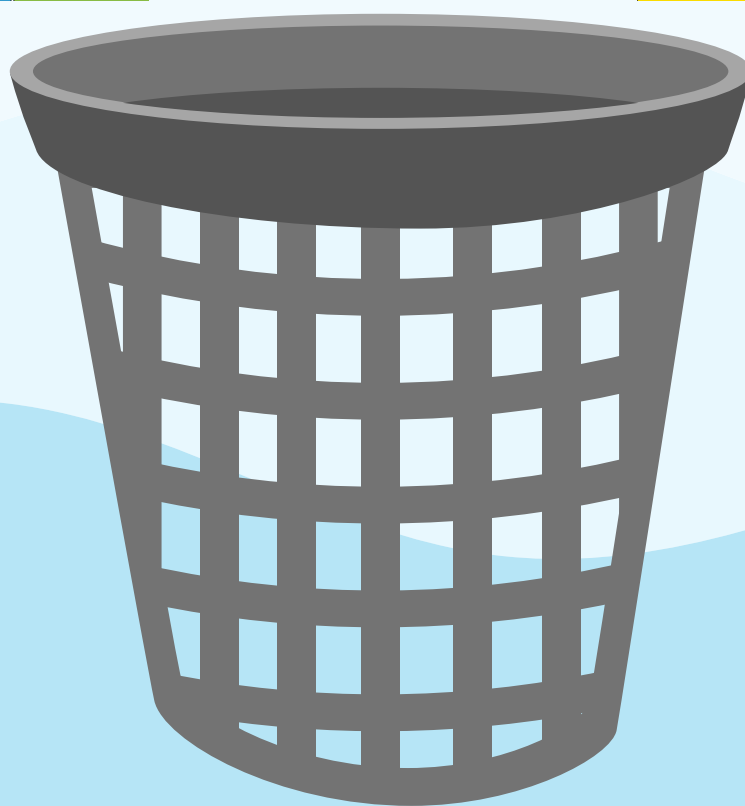
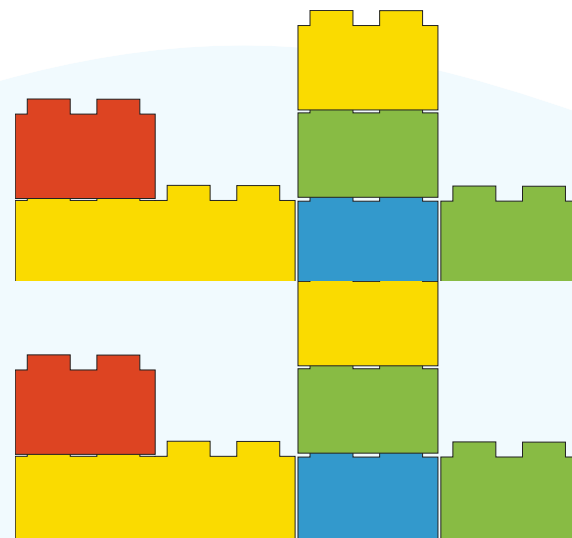
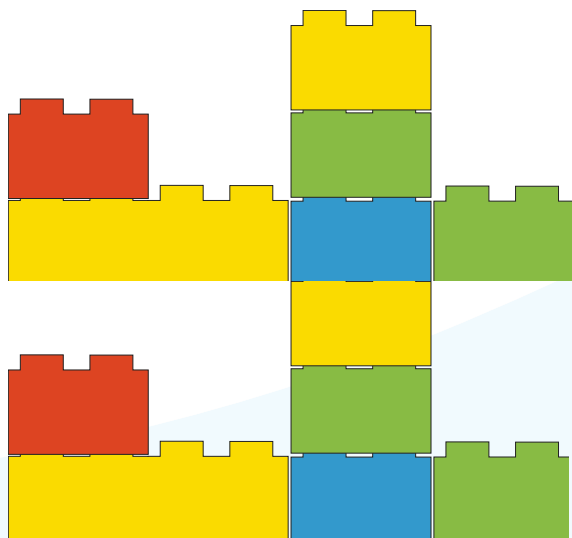
OUR SECOND BLOCK IS DIFFERENT. IF WE WOULD DISSOLVE IT WITH A SOLVENT, IT WOULD NOT SEPARATE INTO SINGLE BRICKS BUT INTO SMALLER BLOCKS. THIS IS WHAT WE CALL A "COVALENT COMPOUND".



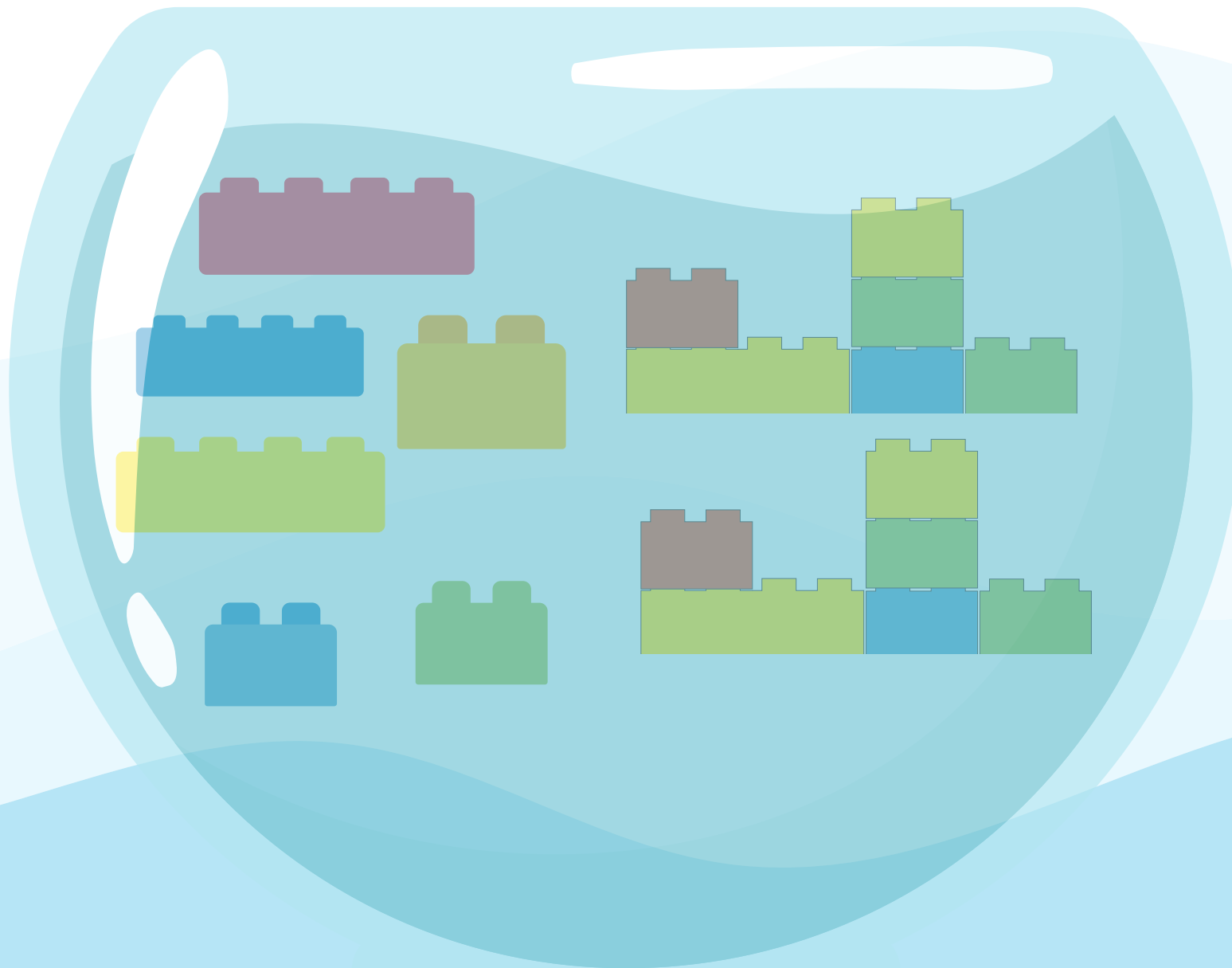
DO YOU KNOW WHAT SALT IS? SALT IS AN IONIC COMPOUND. IT IS MADE OF A METAL PART AND A NON-METAL PART. WHEN WE DISSOLVE IT, IT WILL DISINTEGRATE IN ITS BRICKS. WE CALL THESE BRICKS "IONS".



SUGAR IS A GOOD EXAMPLE FOR A COVALENT COMPOUND. WHEN WE DISSOLVE IT, IT WILL NOT DISINTEGRATE INTO IONS BUT INTO SMALLER MOLECULES.



**NOW, LET US COME BACK TO OUR FILTER. OUR BIG
LEGO MOLECULE BLOCKS COULD NOT BE
SEPARATED WITH A FILTER BECAUSE THEY ARE
OF THE EXACT SAME SIZE.**



**HOWEVER, IF WE WASH OUR OUR LEGO MOLECULES
IN A SOLVENT, THEY SEPARATE INTO BRICKS AND
BLOCKS OR - TO PRECISE - THEY SEPARATE IN EITHER
IONS AND SMALLER MOLECULES, DEPENDING WHETHER
THEY ARE IONIC OR COVALENT COMPOUNDS.**



NOW WE'VE GOT IT! YAY!

**BY WASHING THE MOLECULES WITH THE RIGHT SOLVENT,
WE MADE SAME SIZED MOLECULES TO BECOME DIFFERENT
SIZED MOLECULES AND IONS. NOW, WE CAN SEPARATE
THEM EASILY WITH A FILTER. SINCE THIS PROCESS IS A
COMBINATION OF DILUTION AND FILTRATION, WE CALL IT
"DIAFILTRATION".**



**DIAFILTRATION IS A VERY IMPORTANT
FILTRATION METHOD IN PHARMACEUTICAL
APPLICATIONS WHERE WE WANT TO SEPARATE
VERY SPECIFIC SUBSTANCES FROM EACH OTHER
AND EVEN THE SMALLEST IMPURITIES COULD BE
HARMFUL.**



**THANKS TO DIAFILTRATION, WE CAN
MAKE SUPER DUPER HIGH QUALITY
MEDICINE WHICH HELPS US WHEN
WE GOT SICK .
THAT'S WHY IT IS SO IMPORTANT!**