steel CONNECT

COMMON INFLUENCE OF SEA WATER, SWIMMING POOLS & GLOVE FACTORIES ON BUILDINGS

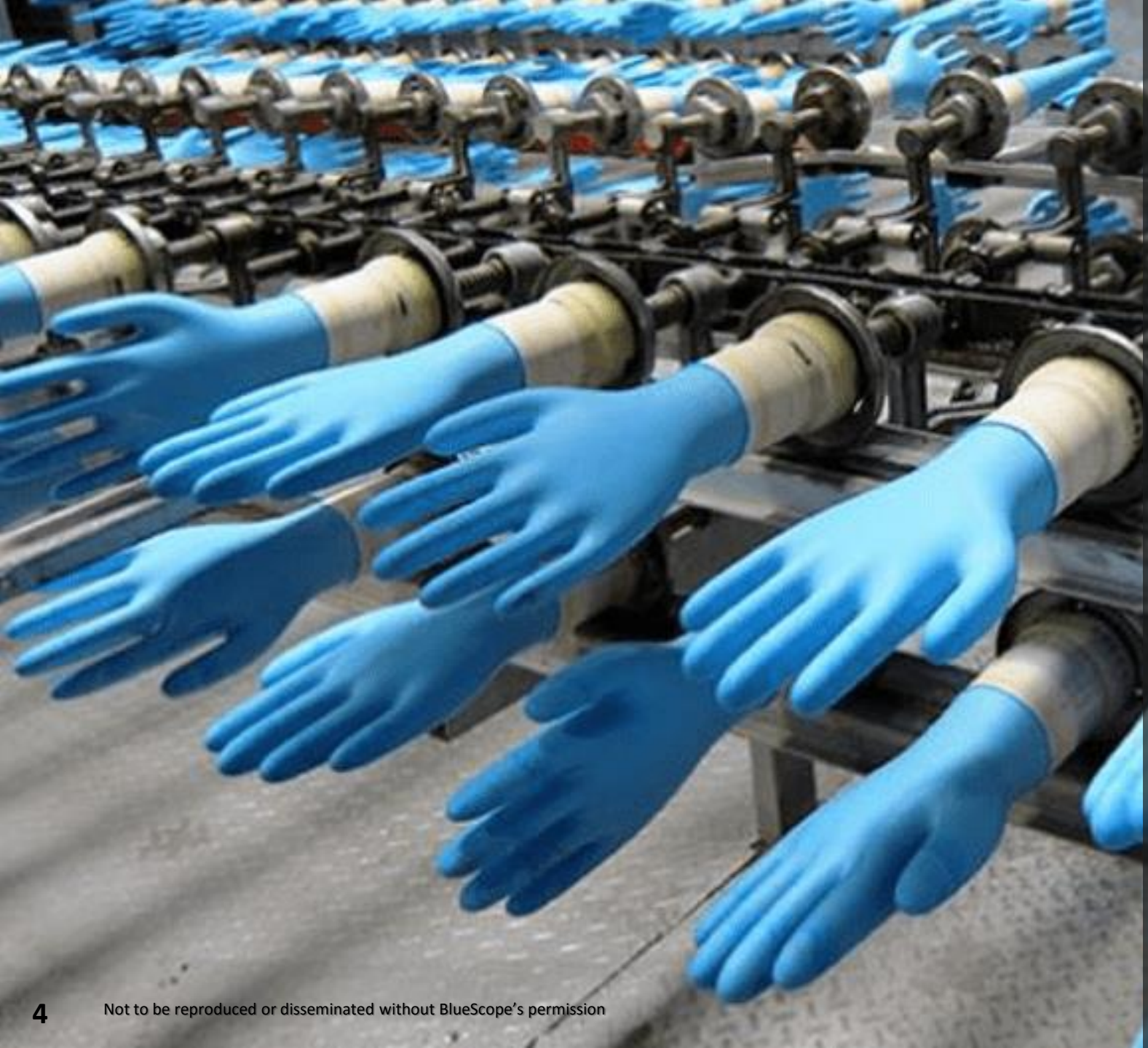
BLUESCOPE

SEA WATER

SWIMMING POOL

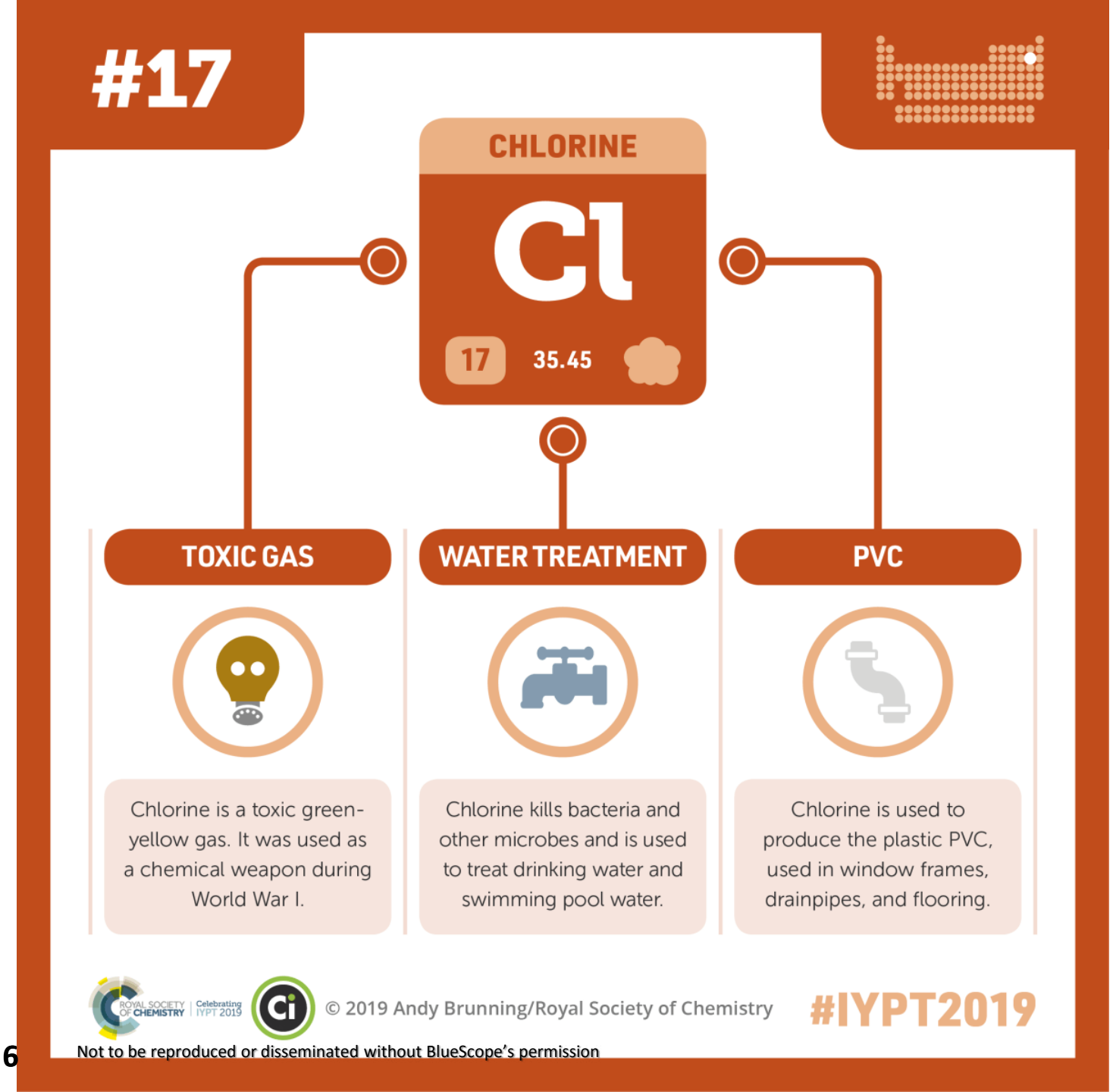
Photo by **Guduru Ajay bhargav** from **Pexels**

GLOVES FACTORIES



https://fifthperson.com/top-glove-2020/

WHAT DO THESE ENVIRONMENT HAVE IN COMMON?



CONTAIN OR USES CHLORIDE

Chlorine Gas (Cl_2)

CONTAIN OR USES CHLORIDE

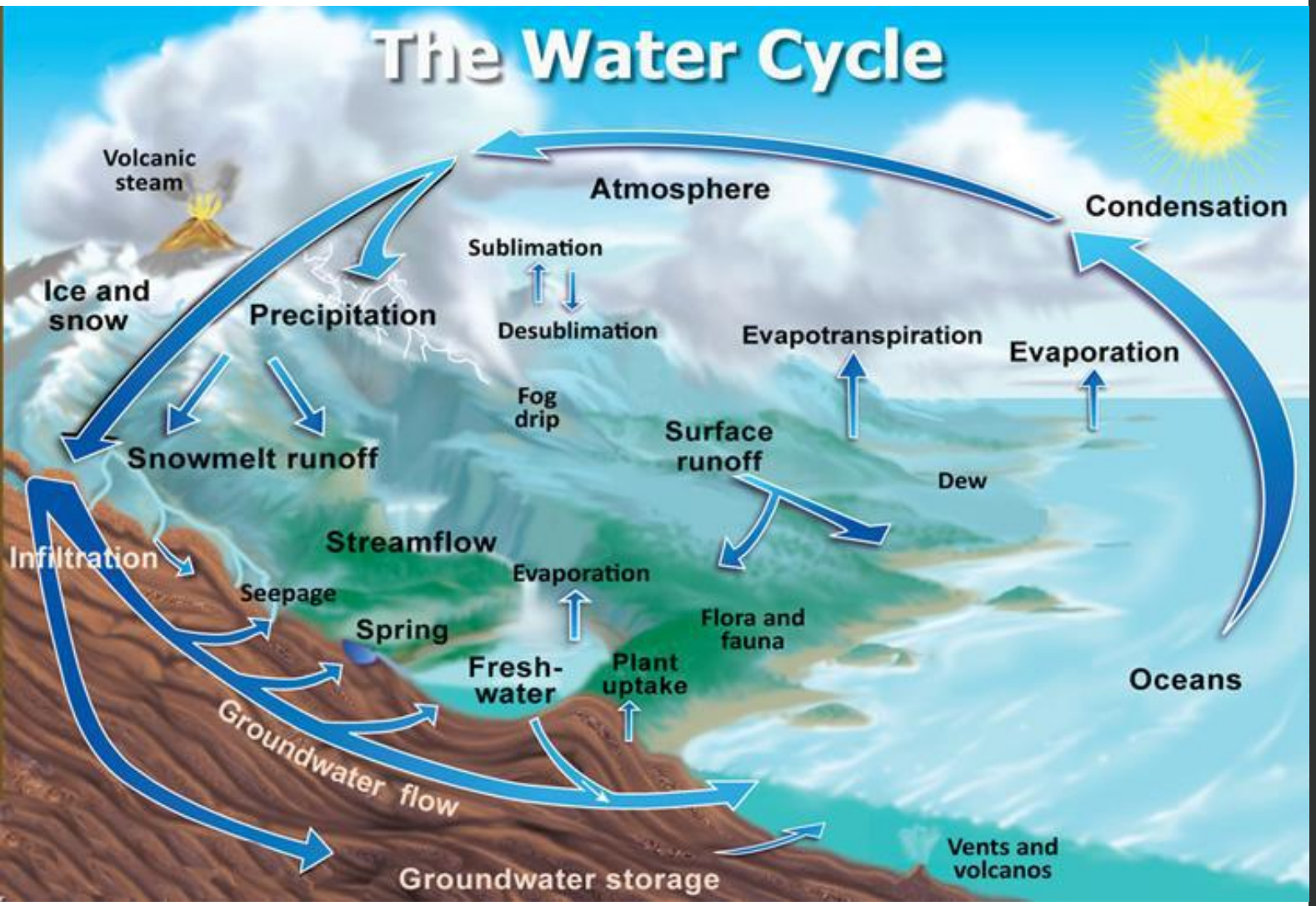
ABUNDANT IN CHLORIDE ION FORM

MOST COMMON ONE IS SODIUM CHLORIDE

https://fifthperson.com/top-glove-2020/

A.K.A. SALT

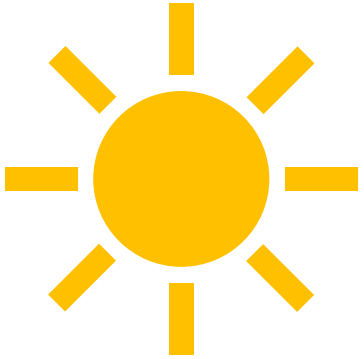
https://fifthperson.com/top-glove-2020/



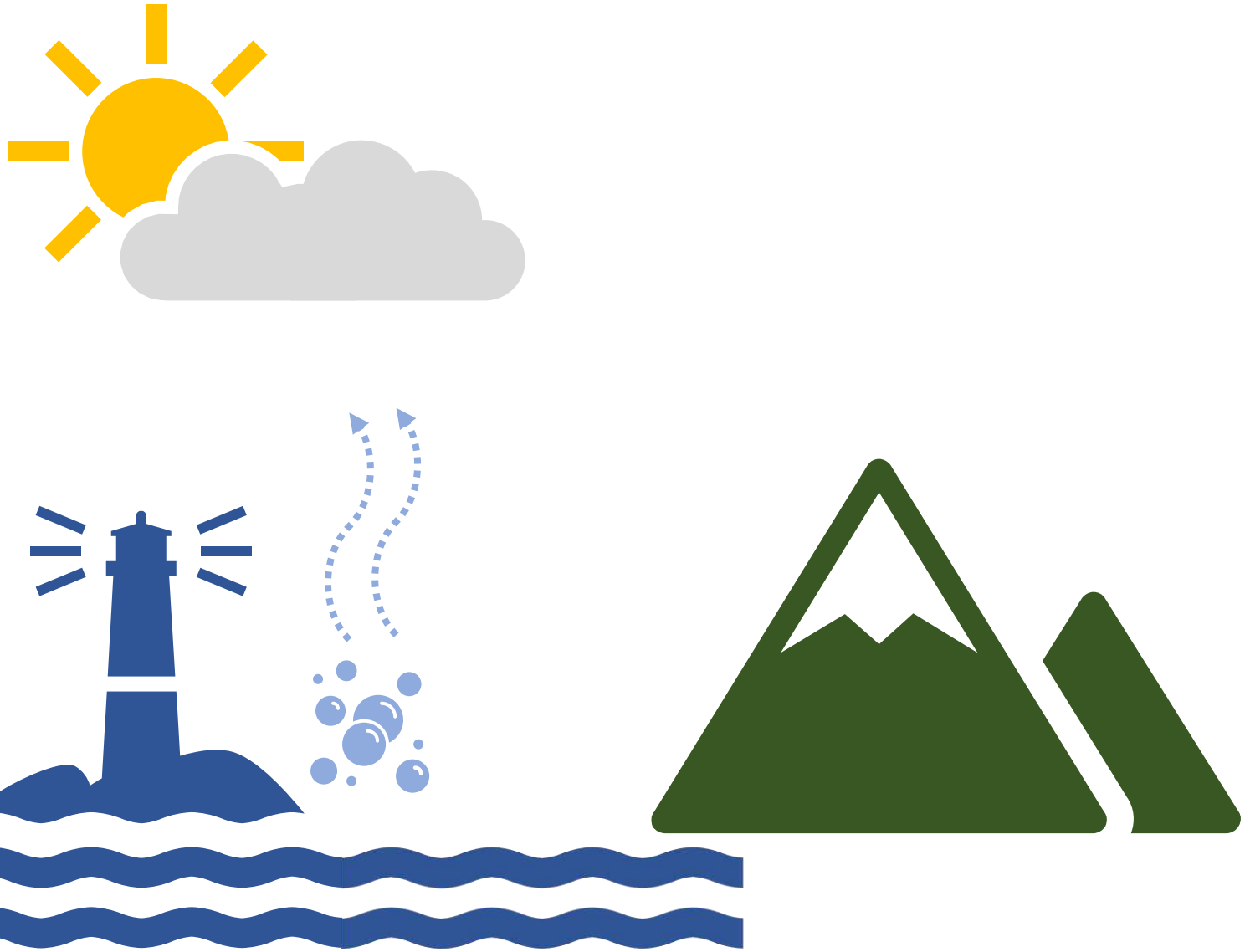
HYDROSPHERE

https://www.britannica.com/science/hydrosphere/The-water-cycle

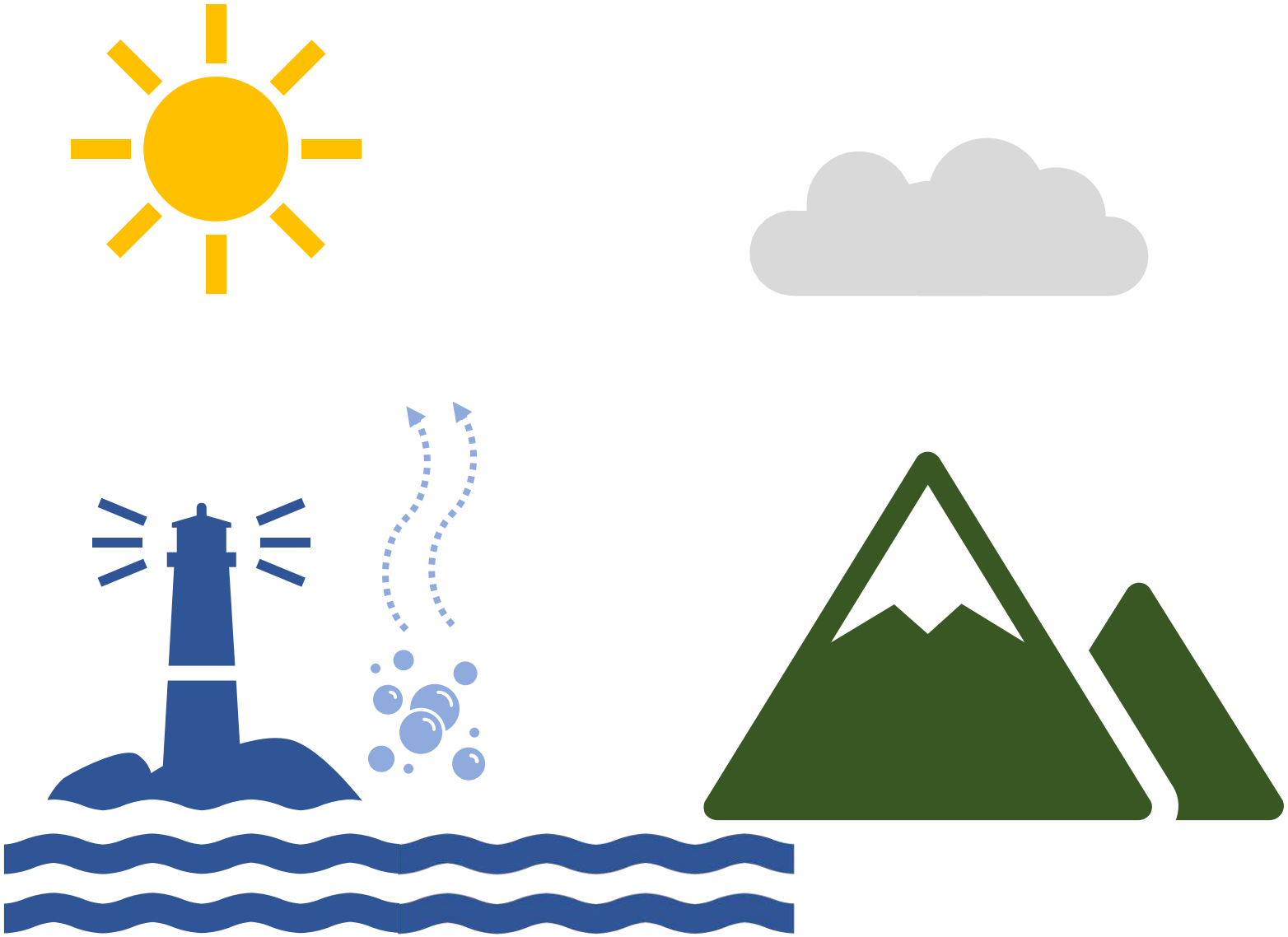
MOUNTAIN & OCEAN



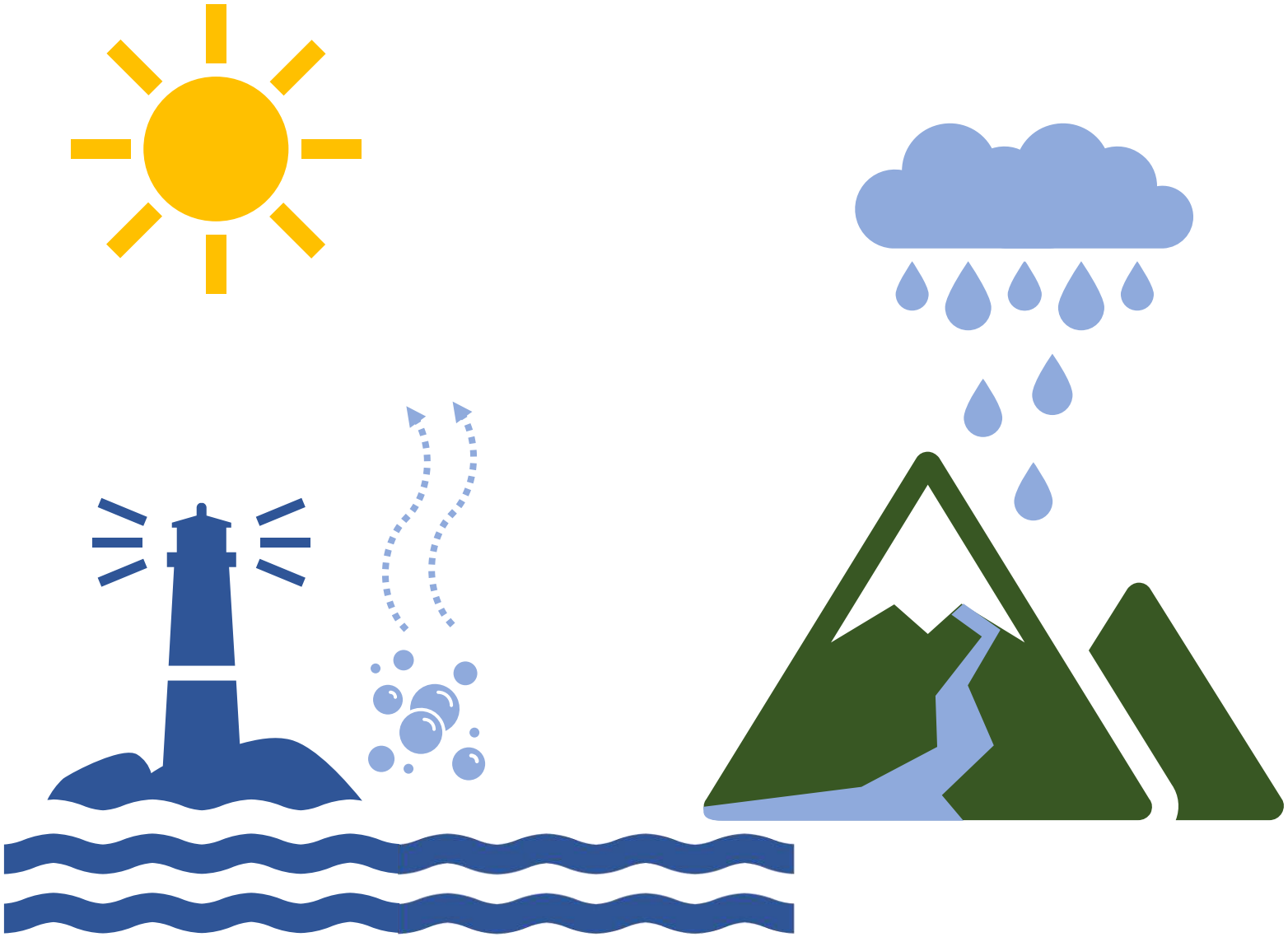
SUN



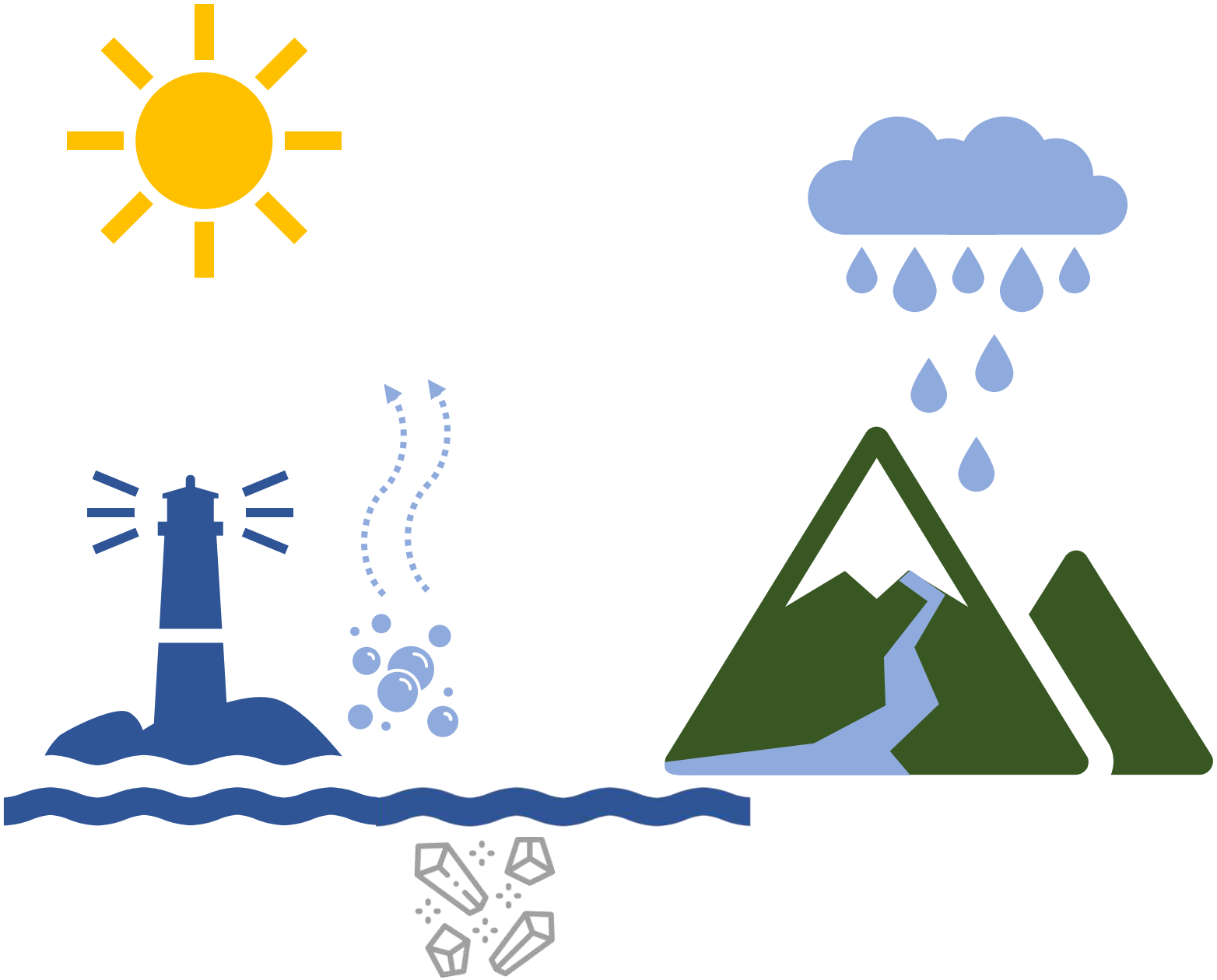
WATER EVAPORATES & FORMS CLOUD



CLOUD MOVE TO INLAND



FORMS RAIN, THEN RIVER FLOWING BACK TO THE OCEAN



WATER DISSOLVES MINERALS FROM INLAND AND FORMS SALT

SEA WATER IS SALTIER THAN FRESH WATER

https://en.wikipedia.org/wiki/Sea_salt

DRINKING WATER

–

<1GRAM OF SALT PER LITRE OF WATER

https://medium.com/@John.H.Miller/surprising-reasons-to-add-salt-to-your-drinking-water-f3f275a8331

SEA WATER

–

~35GRAMS OF SALT PER LITRE OF WATER

https://oceanservice.noaa.gov/facts/whysalty.html#:~:text=Some%20ocean%20salts%20come%20from,dissolved%20ions%20in%20the%20ocean.

1 SEA WATER

SEA SPRAY CARRIES SALT PARTICLES

1 SEA WATER

DEPOSITS ONTO ANY SURFACES

1 SEA WATER

SALT PARTICLES SETTLE ONTO ANY SURFACES

1 SEA WATER

SALT PARTICLES WILL ACCELERATE CORROSION

1 SEA WATER

SALT IS A HYGROSCOPIC MATERIAL

① SEA WATER

HYGROSCOPIC

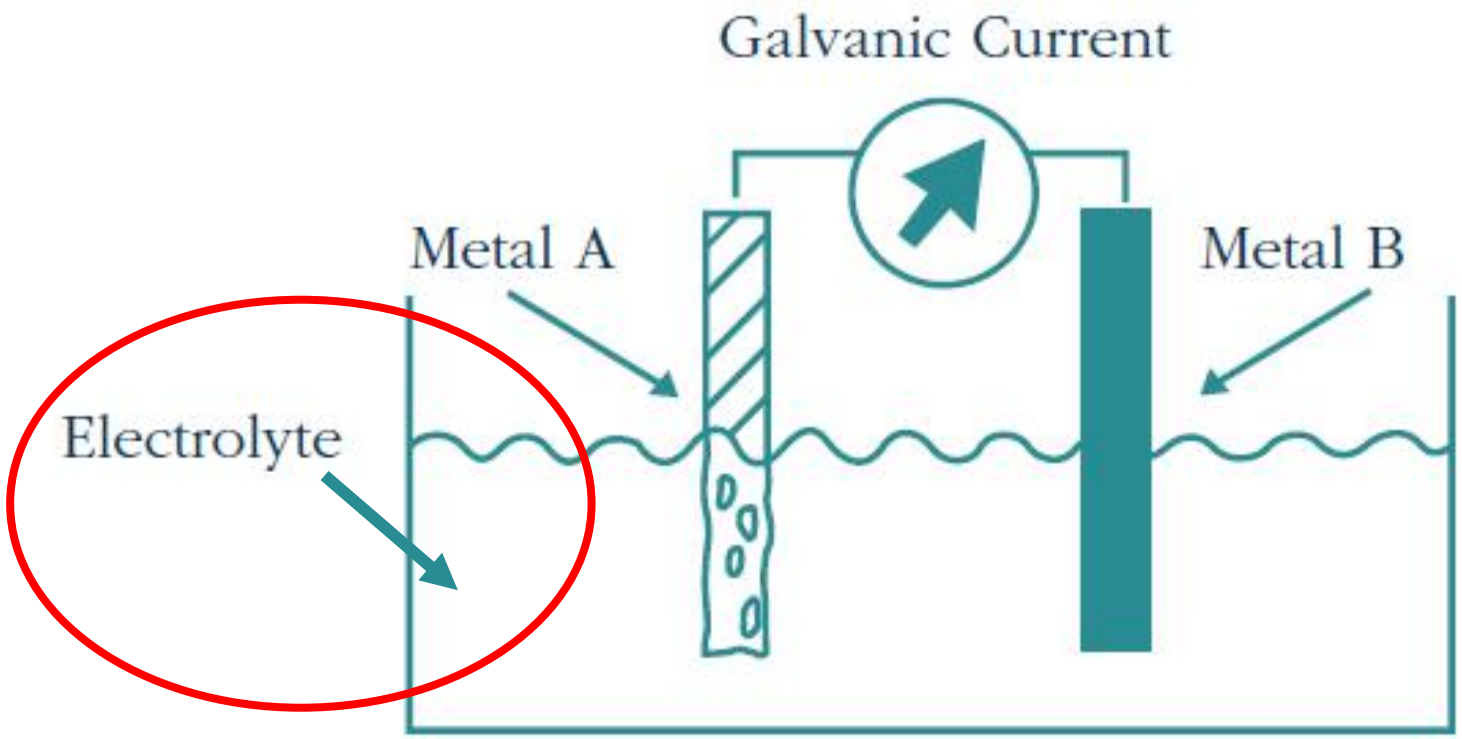
=

THE MATERIAL ABSORBS MOISTURE

1 SEA WATER

WITH THE PRESENCE OF MOISTURE AND SALT

Photo by **Aleksandr Slobodianyk** from **Pexels**



CREATING AN EFFECTIVE ELECTROLYTE

1 SEA WATER

SOME OF THE MOST VULNERABLE AREAS REQUIRES

1 SEA WATER

PROPER SELECTION OR DESIGN CAN HELP MINIMIZE THIS “SALTY” EFFECT

50m from sea

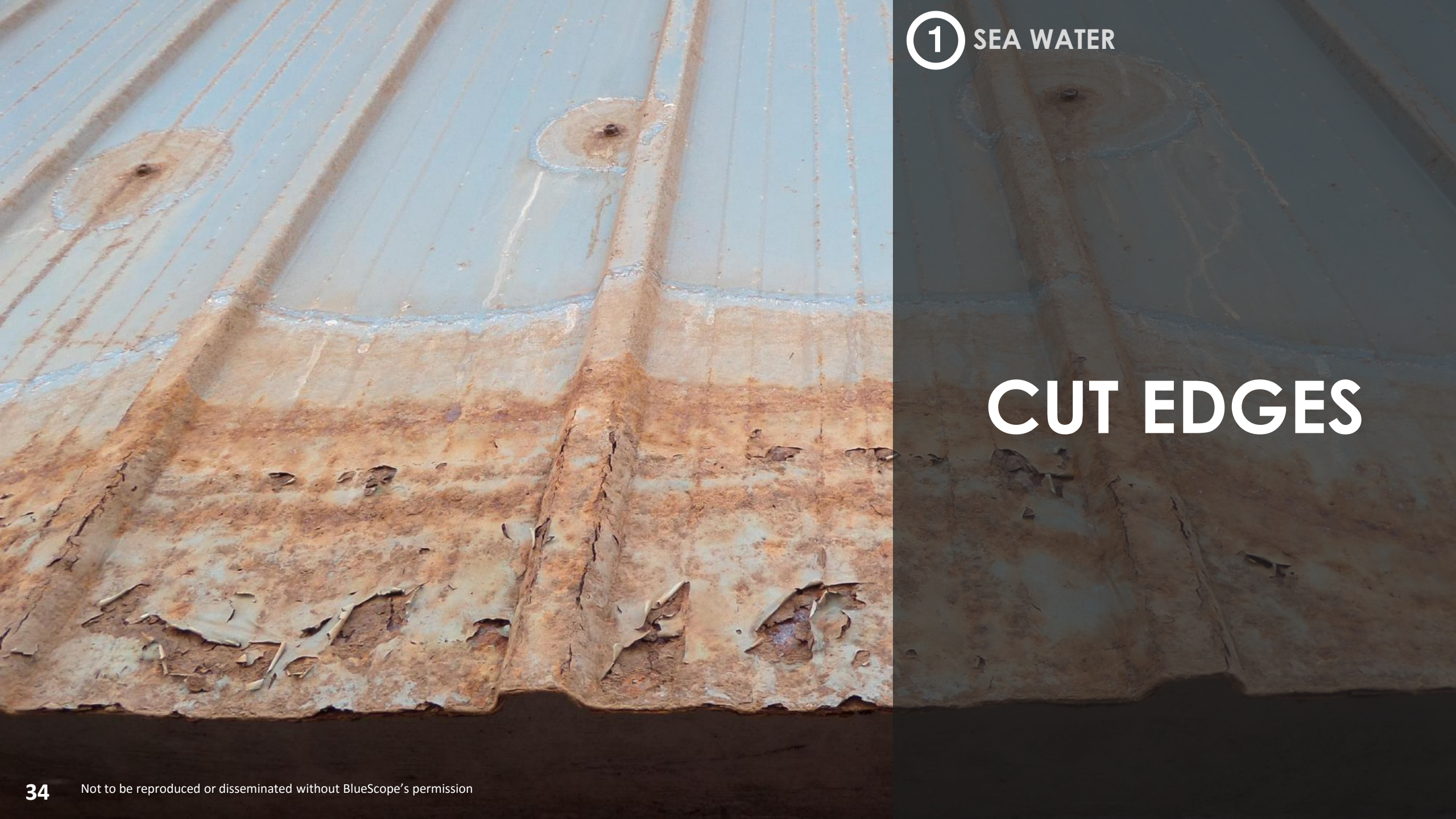
1 SEA WATER

SUCH AS THE FASTENERS

1 SEA WATER

VULNERABLE PARTS LIKE FASTENER CAN BE REMOVED BY USING CONCEALED FIXED PROFILE

600m from sea



1 SEA WATER

CUT EDGES

1 SEA WATER

CUT EDGES CAN BE MANAGED BY CHOICE OF MORE DURABLE MATERIAL

0m from sea

1 SEA WATER

WHERE MATERIAL HAS BEEN PROVEN TO LAST IN THE ENVIRONMENT FOR 5 YEARS

0m from sea

1 SEA WATER

OR >10 YEARS

10m from sea

UNWASHED AREA

1 SEA WATER

WASHED DOWN PERIODICALLY TO REMOVE SALT BUILD-UP

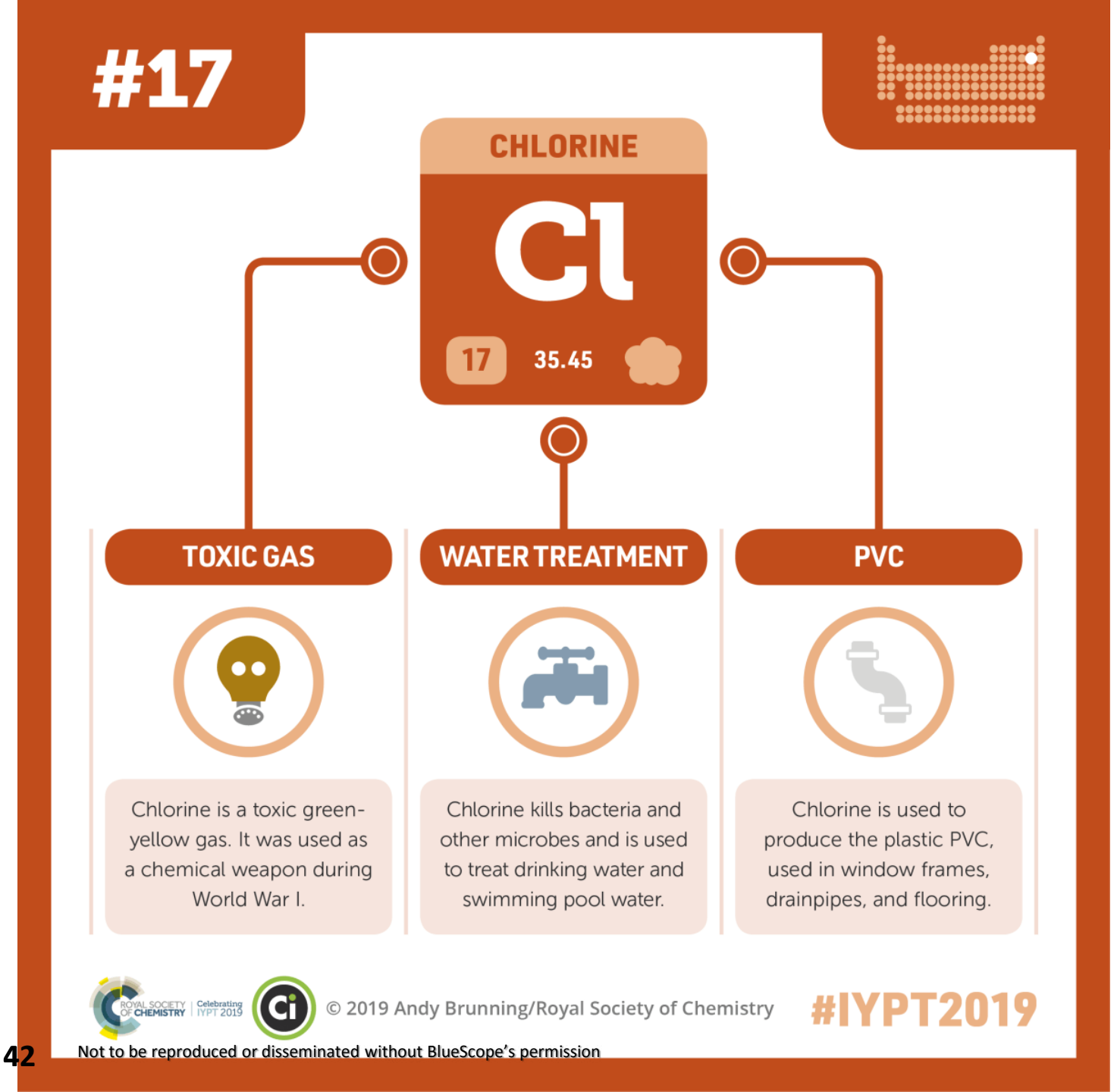
https://prestigestl.com/2019/05/17/how-to-pressure-wash-a-house/

2 SWIMMING POOLS

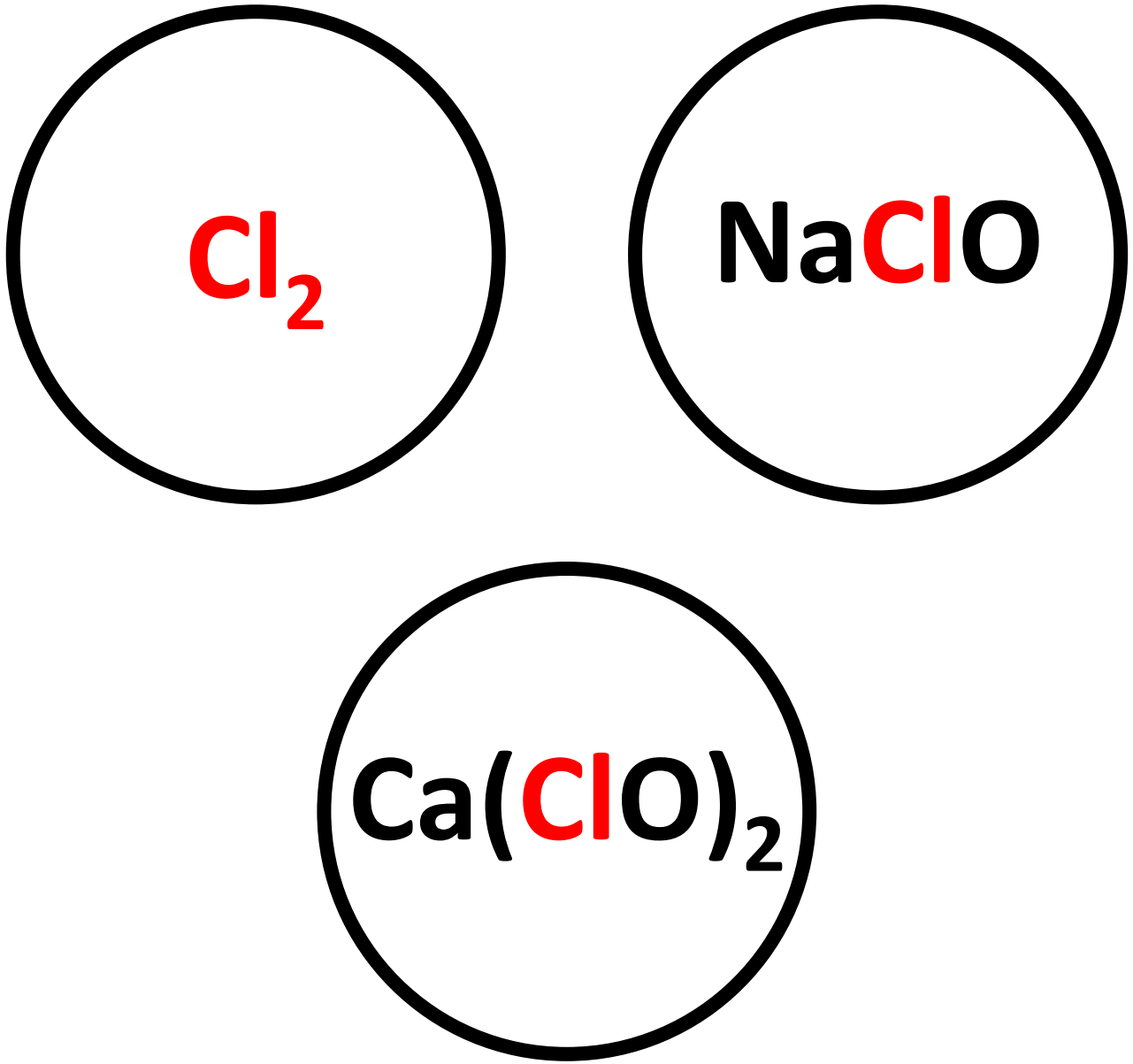
REQUIRES DISINFECTANT TO CLEAN THE POOL

https://omegamanjournal.wordpress.com/2012/03/26/pool-chemicals-drinking-water/

COMMON CHEMICAL – CHLORINE



https://www.compoundchem.com/2019/04/04/iypt017-chlorine/



CHLORINE / CHLORIDE ION

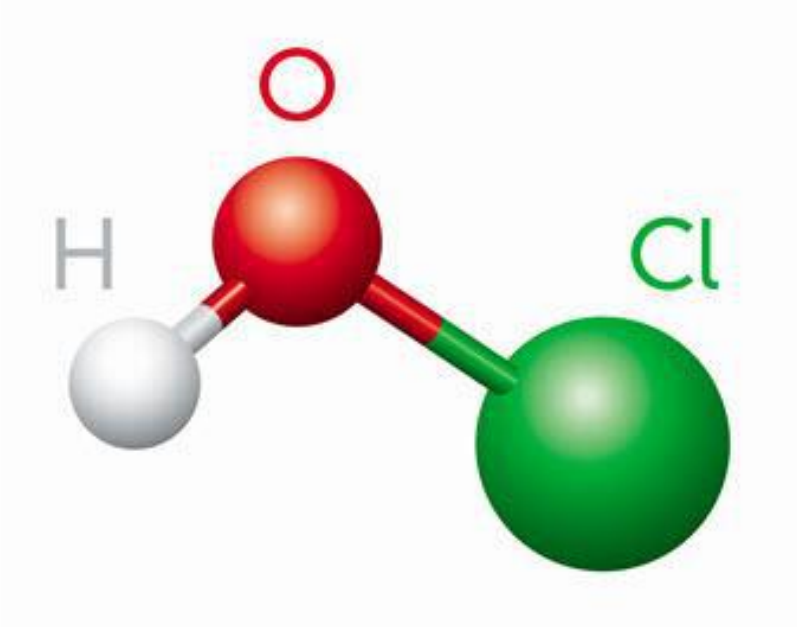
https://www.chemicalsafetyfacts.org/chlorine-keeps-pools-safe-summertime-fun/

LIQUID

TABLET

$$NaClO + H_2O \rightleftharpoons Na^+ + OH^- + HClO$$

HYPOCHLOROUS ACID
Strong oxidant, chief bactericidal agent



HYPOCHLOROUS ACID (HOCl) OR "FREE CHLORINE"

https://www.compoundchem.com/2015/08/12/swimming-pools/;
https://www.spray.com/klarion/hypochlorous-acid

EVER WONDER THE POOL'S DISTINCT SMELL?

https://ministry-to-children.com/smelly-stuff-object-lesson-genesis-821/

2 SWIMMING POOLS

EVER WONDER WHY YOU SHOULD SHOWER BEFORE ENTERING THE POOL?

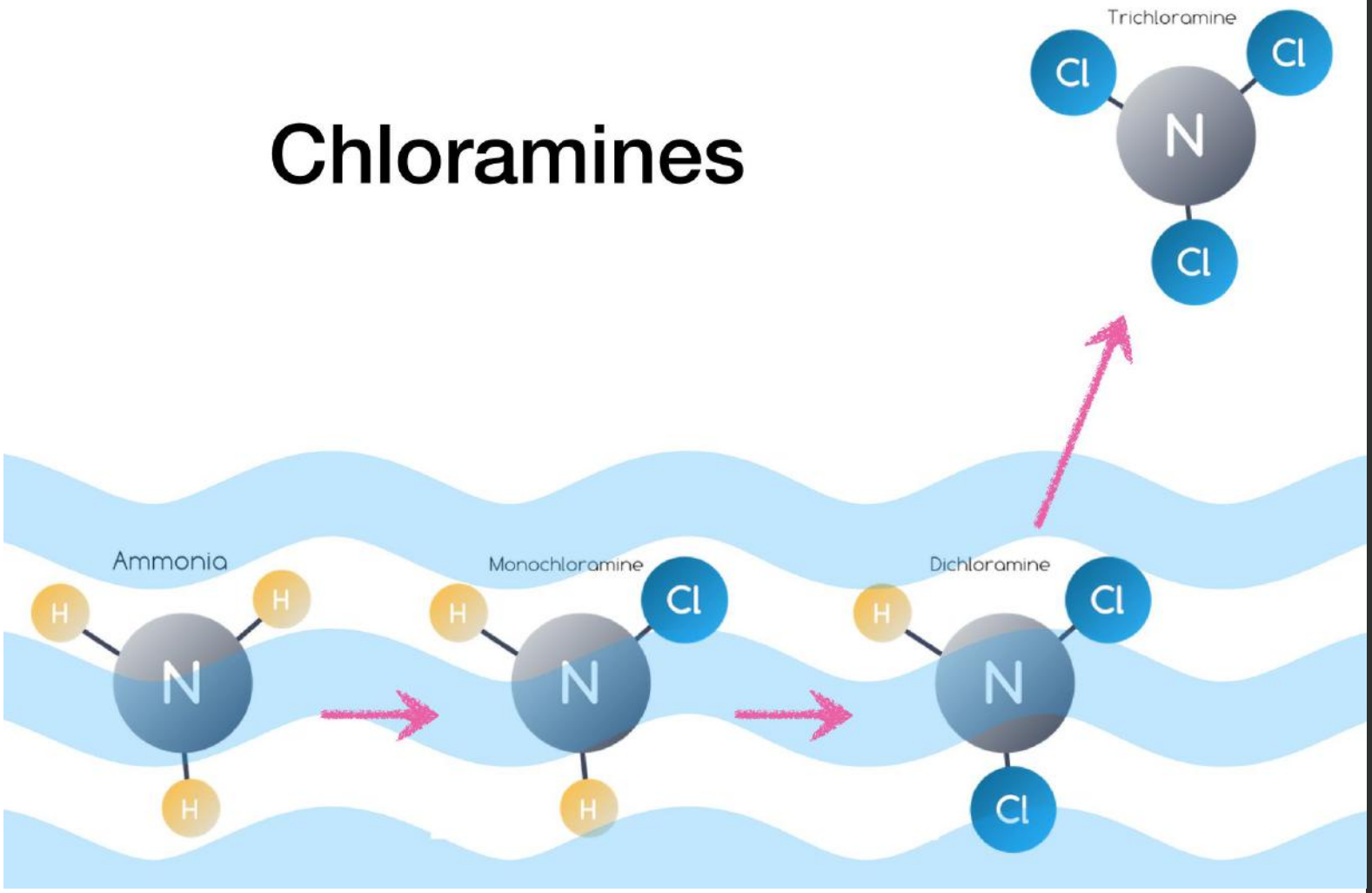
https://www.buzzfeed.com/carolinekee/swimming-pools-are-full-of-diarrhea

2 SWIMMING POOLS

HUMAN PERSPIRATION LIKE SWEAT & URINE REACTS WITH FREE CHLORINE

https://www.sciencealert.com/why-do-you-sweat-more-than-everyone-else

Chloramines



FORMS CHLORAMINE

…

THIS IS THE SMELL!!

https://blog.chloramineconsulting.com/chloramine-vapor

2 SWIMMING POOLS

MORE PEOPLE IN THE POOL MEANS MORE CHLORAMINES GENERATED

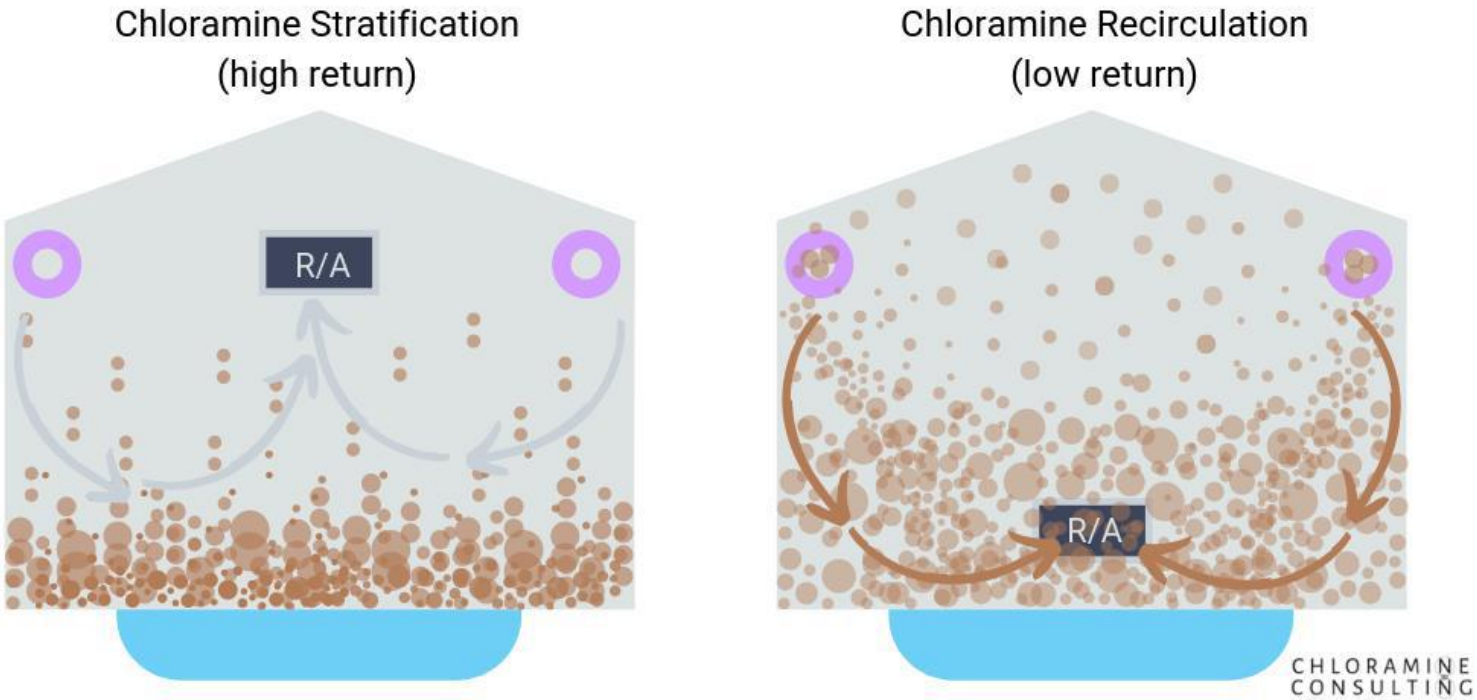
https://www.youtube.com/watch?v=M0NcWj-eQes

CHLORAMINES ACCELERATES METAL CORROSION, EVEN TO STAINLESS STEEL

https://blog.chloramineconsulting.com/rust-on-stainless-steel-pool-equipment

WORSE FOR INDOOR POOLS

https://www.constructionspecifier.com/avoiding-problems-in-aquatics-facilities-atypical-design-for-atypical-buildings/



CHLORAMINES WILL BE RECIRCULATED WITHIN THE BUILDING

https://blog.chloramineconsulting.com/chloramine-vapor

② SWIMMING POOLS

1985, ONE SWIMMING POOL ROOF COLLAPSED DUE TO STAINLESS STEEL RODS FAILURE

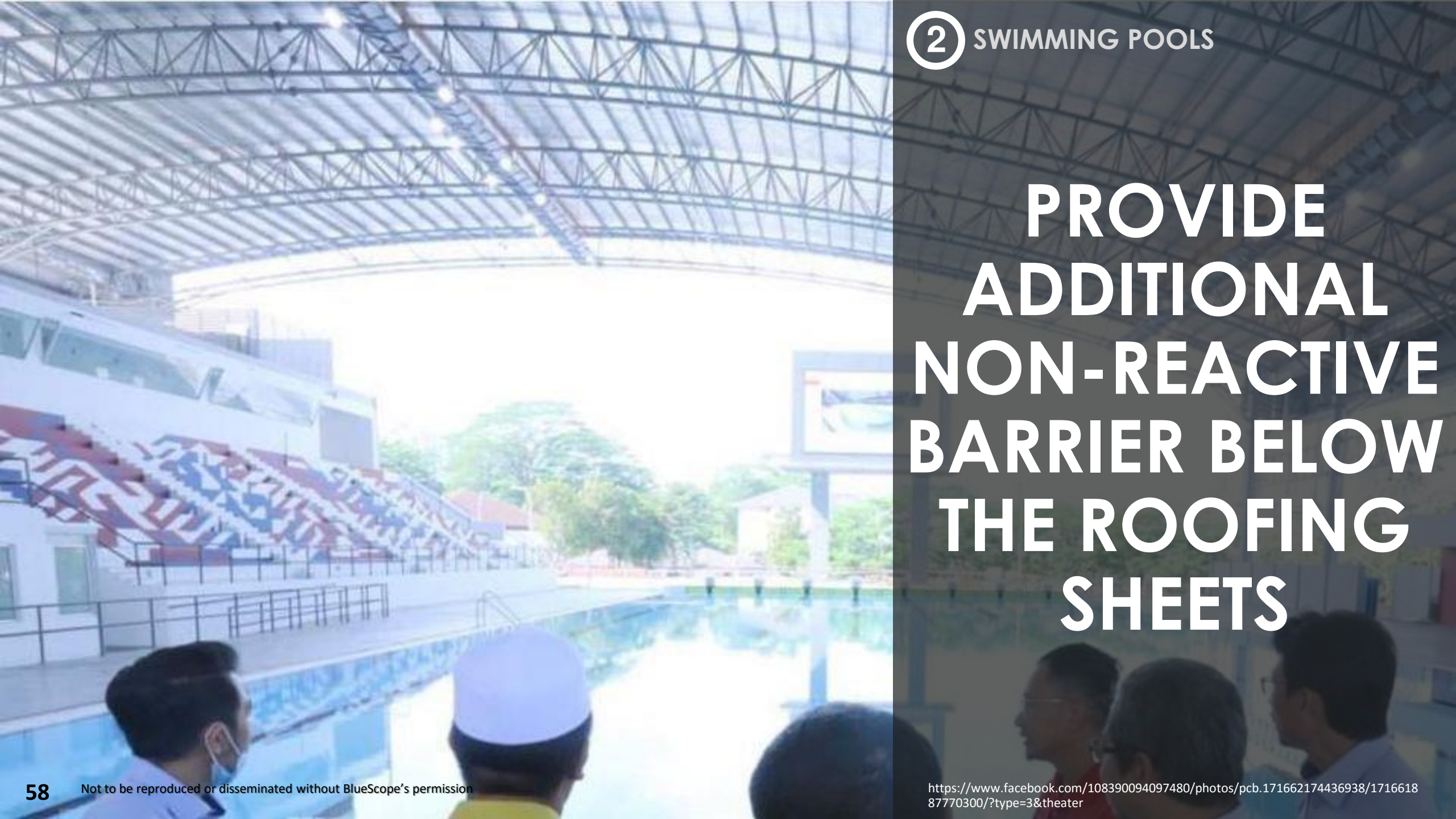
http://www.studiekern-corrosie.nl/wp-content/uploads/2013/06/2331.pdf

DUE TO STRESS CORROSION CRACKING (SCC)

https://www.researchgate.net/figure/3-Example-of-stress-corrosion-cracking-of-a-Type-316-stainless-steel-under-thermal_fig9_294693732

TO PREVENT / MINIMIZE THE CHLORAMINES EFFECT

https://blog.chloramineconsulting.com/rust-on-stainless-steel-pool-equipment



2 SWIMMING POOLS

PROVIDE ADDITIONAL NON-REACTIVE BARRIER BELOW THE ROOFING SHEETS

https://www.facebook.com/108390094097480/photos/pcb.171662174436938/171661887770300/?type=3&theater

BUILDING DESIGN NEEDS TO PROVIDE SUFFICIENT VENTILATION

Sarawak Aquatic Centre

BUILDING DESIGN NEEDS TO PROVIDE SUFFICIENT VENTILATION

Larkin Aquatic Centre

CONDUCT SCHEDULED INSPECTION AND MAINTENANCE

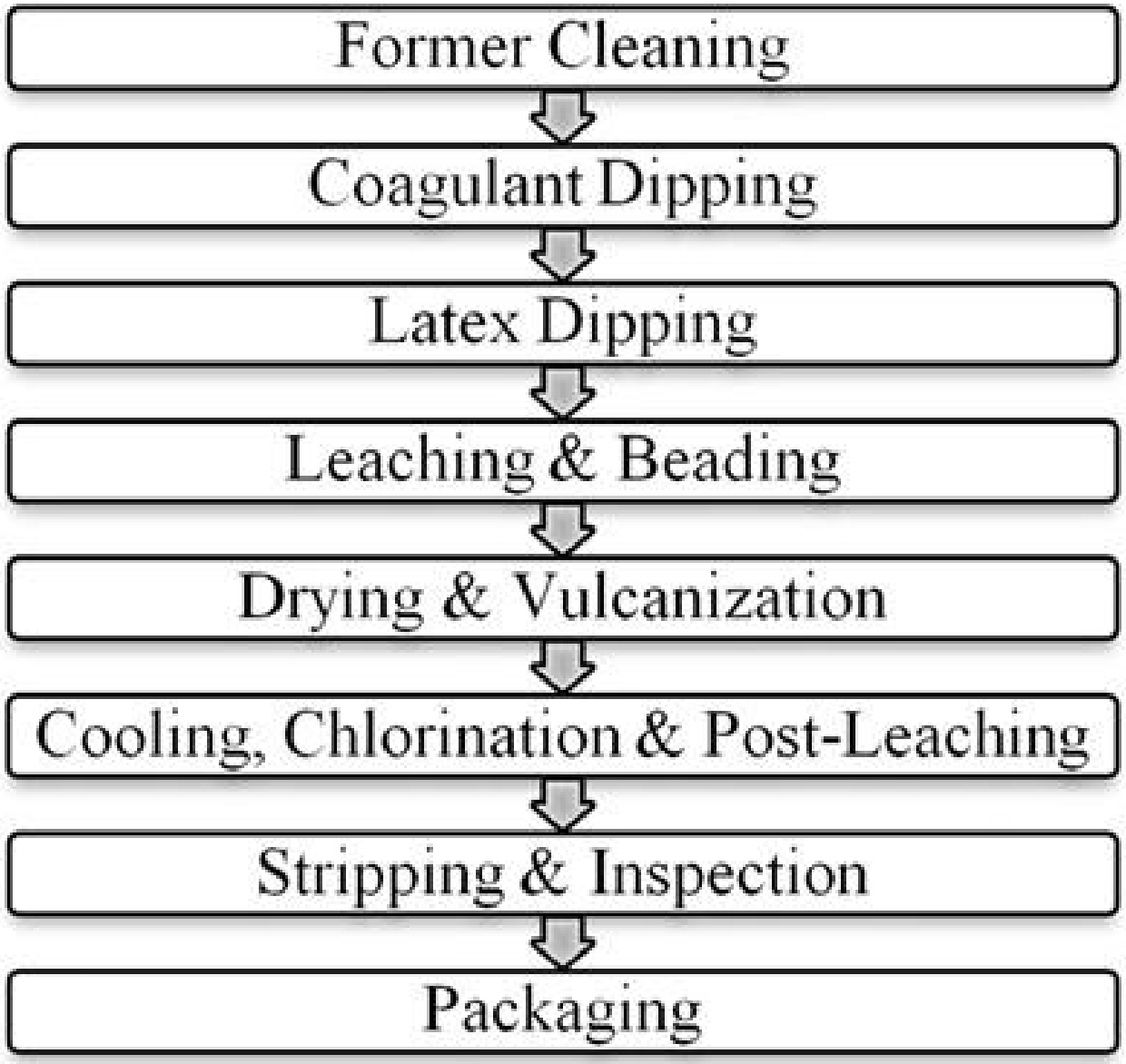
https://skysetbuilders.com/common-misconceptions-about-building-inspection

3 GLOVE FACTORIES

https://blog.ammex.com/finishing-the-glove-how-does-it-work/#.X8cypWgzY2w

DIFFERENT TYPE OF GLOVES

https://www.finehomebuilding.com/2019/11/05/choosing-disposable-gloves

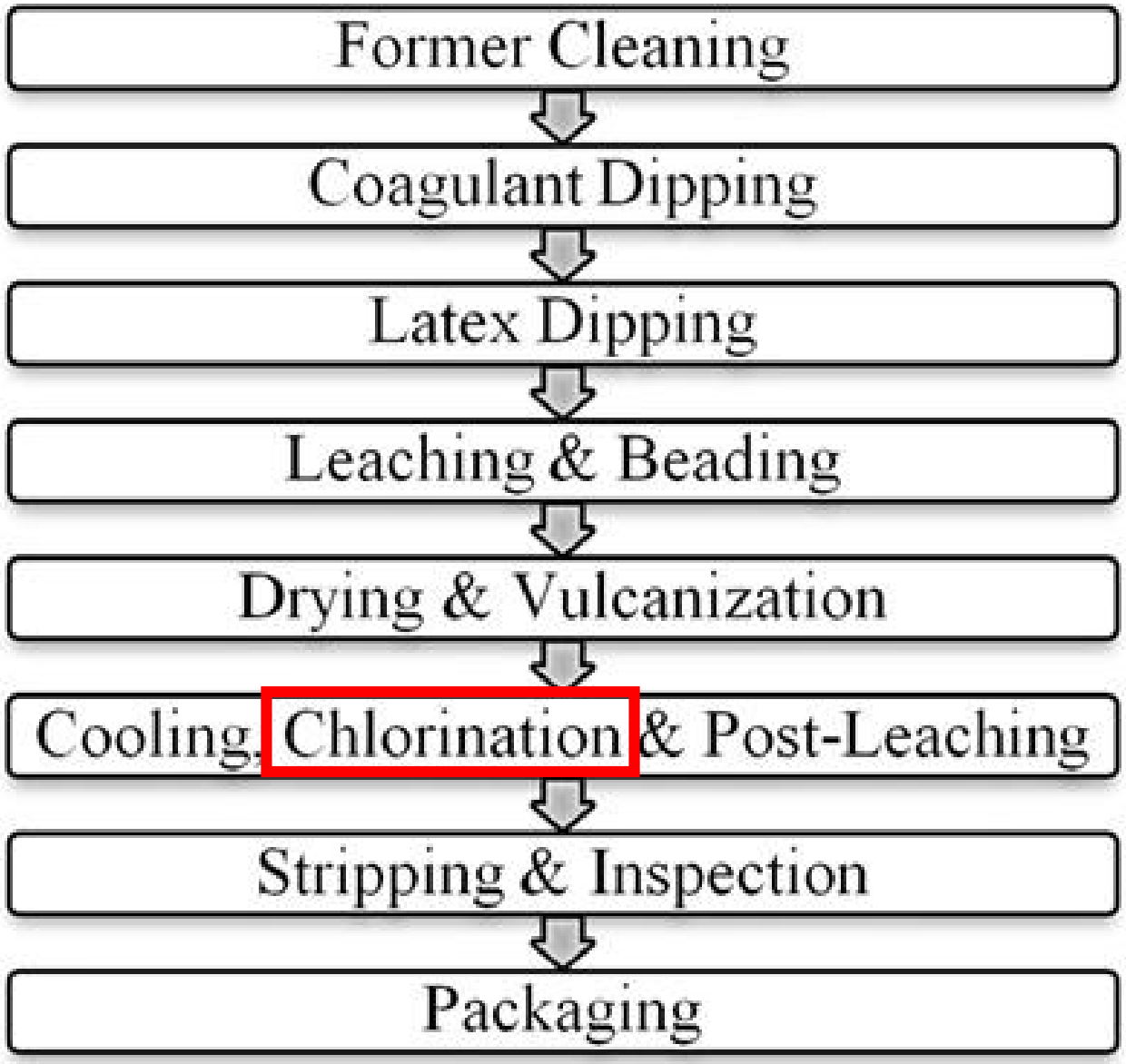


TYPICAL GLOVE PRODUCTION PROCESSES

https://onlinelibrary.wiley.com/doi/10.1002/ceat.201800476

3 GLOVE FACTORIES

TO EASE DONNING AND DOFFING GLOVES



THAT'S THE CHLORINATION PROCESS

https://onlinelibrary.wiley.com/doi/10.1002/ceat.201800476

3 GLOVE FACTORIES

MAIN CONCERN IS ON THE CHLORINATION PROCESS

https://www.ansell.com/ca/en/life-sciences/critical-insight/na_the-importance-of-the-cleanroom-glove-manufacturing-process

3 GLOVE FACTORIES

WHERE CHLORINE TANK FILLED WITH CHLORINATED WATER IS USED

SWIMMING POOL
2.0 – 4.0 ppm of free chlorine

CHLORINATION TANK
~1000 ppm of chlorine

3 GLOVE FACTORIES

AS THE POOL CONTAINS HIGH CHLORINE CONCENTRATION

https://chlorine.americanchemistry.com/Chlorine/Pool-Treatment-101; Photo by **Matthias Cooper** from **Pexels**/; https://www.youtube.com/watch?v=_R8MySME6XQ

3 GLOVE FACTORIES

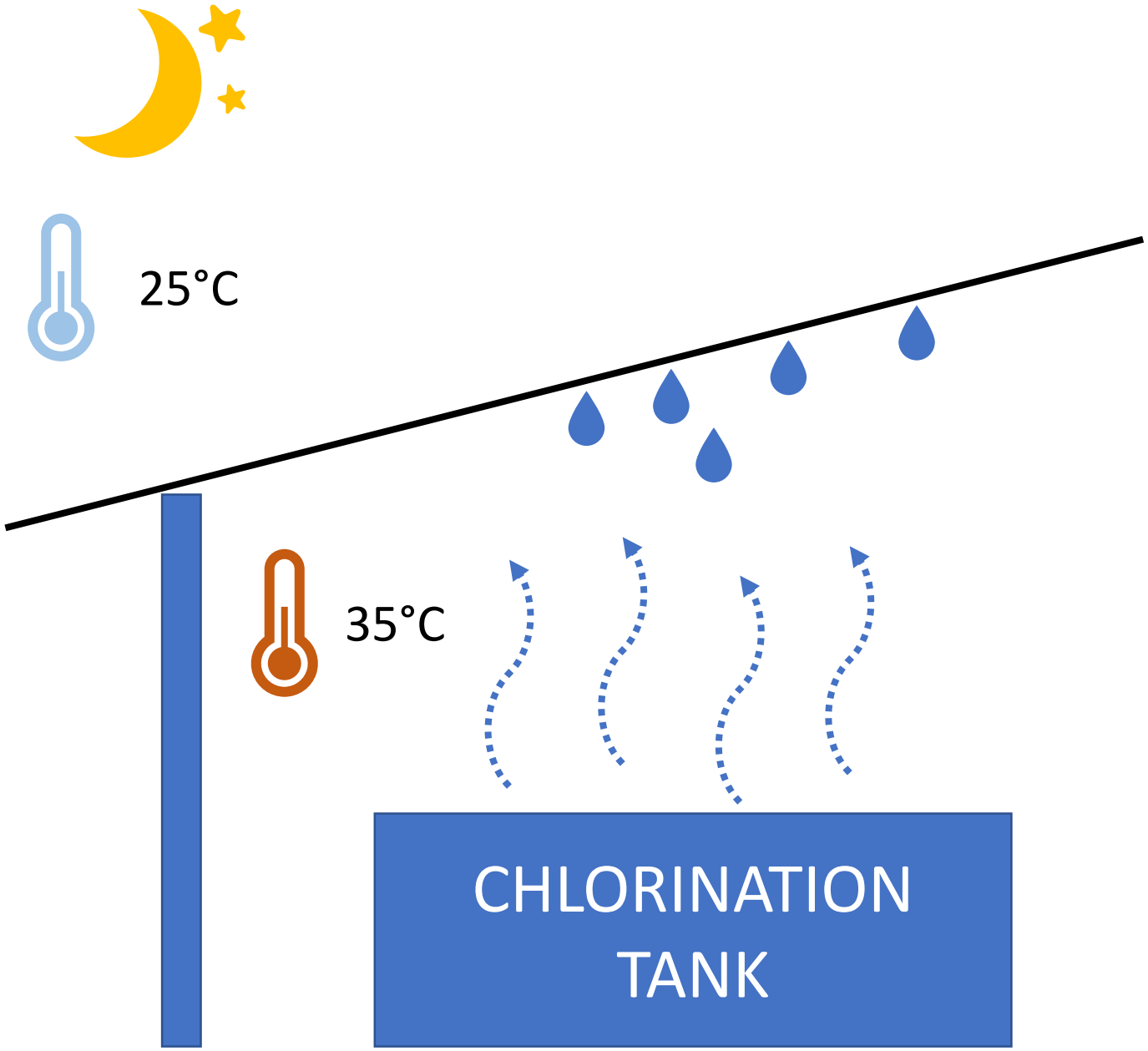
CAUSING INTERNAL ENVIRONMENT TO BE VERY CORROSIVE

3 GLOVE FACTORIES

THE CHLORINE TANK NORMALLY IS LOCATED ON THE HIGHEST FLOOR

https://polydamic.com.my/product/online-chlorination-system/

OPERATION FOR TYPICAL FACTORIES



3 GLOVE FACTORIES

WHERE TEMPERATURE DIFFERENCE WOULD CAUSE MORE PREVALENT INTERNAL CONDENSATION

3 GLOVE FACTORIES

ALLOWING CHLORINE TO READILY CONDENSE ON THE REVERSE SIDE OF THE ROOFING SHEET

INCLUDE ADDITIONAL NON-REACTIVE BARRIER

3 GLOVE FACTORIES

INCLUDE ADDITIONAL NON-REACTIVE BARRIER

3 GLOVE FACTORIES

DESIGN FOR TALLER FLOOR SPACE TO ALLOW FOR BETTER VENTILATION

https://polydamic.com.my/product/online-chlorination-system/

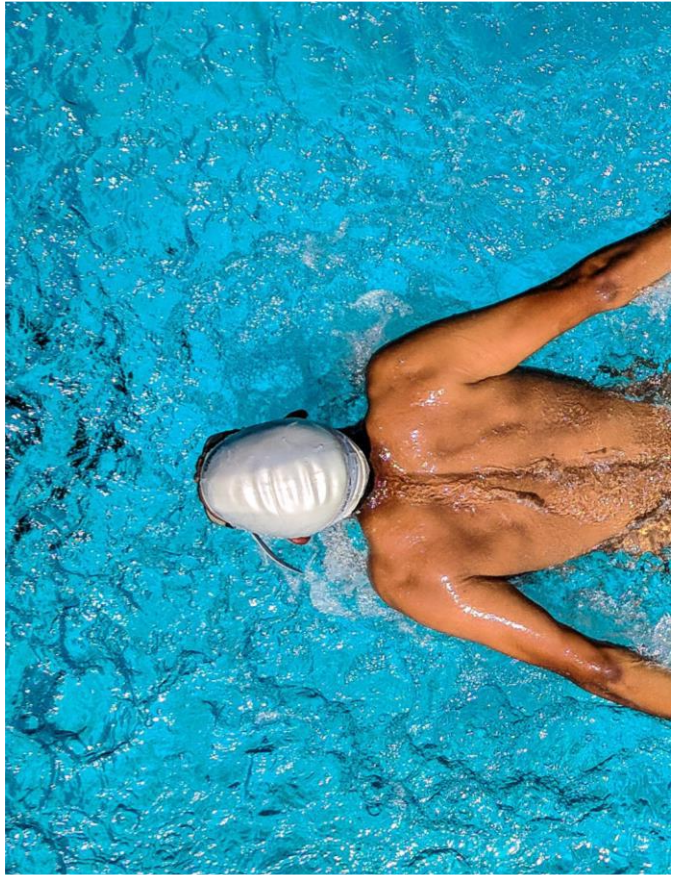
INTRODUCE MECHANICAL EXHAUST SYSTEMS AT CHLORINATION PROCESS

Vhttps://polydamic.com.my/product/online-chlorination-system/

INTRODUCE MECHANICAL EXHAUST SYSTEMS AT CHLORINATION PROCESS

3 GLOVE FACTORIES

INCLUDE SCRUBBER SYSTEMS TO NEUTRALIZE THE CORROSIVE SUBSTANCES



SUMMARY

1. SEAWATER

2. SWIMMING POOLS

3. GLOVE FACTORIES

QUESTION & ANSWER SESSION

Source: BlueScope

BLUESCOPE

steel CONNECT

Colorbond® VERMOE™ Zincalume® TrueCore®

events@bluescope.com.my

nsbluescope.com/my

BlueScope Malaysia

NS BlueScope Malaysia