



FUN WITH CRYSTALS



GROW YOUR OWN CRYSTALS!

YOU WILL NEED:

- 3 HEAPED TABLESPOONS OF SALT
- 125 ML OF HOT WATER (ABOUT HALF A CUP)
- A PIECE OF WOOL OR STRING
- A STICK
- A MUG OR BEAKER



1 POUR THE HOT WATER INTO THE MUG AND ADD THE SALT. STIR UNTIL MOST OF THE SALT HAS DISSOLVED.



2 TIE THE STRING TO THE STICK AND LET THE STRING HANG IN THE SALT-WATER SOLUTION. STAND THIS IN A WARM PLACE FOR A FEW DAYS.



3 AS THE WATER EVAPORATES, YOU WILL SEE SALT CRYSTALS GROWING ON THE STRING. HOLD YOUR CRYSTALS IN THE SUN AND SEE THEM SHINE.

4 YOU CAN ADD FOOD COLOURING TO THE SALT WATER TO GROW CRYSTALS WITH DIFFERENT COLOURS. LEAVE THE STRING FOR A FEW DAYS TO GROW SOME INTERESTING CRYSTAL PATTERNS.

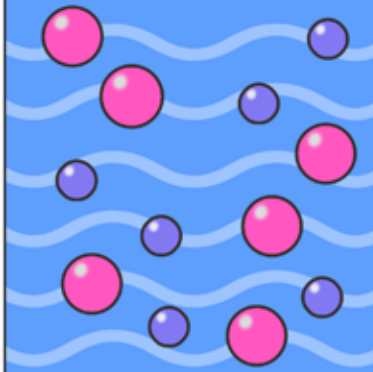


WHAT'S HAPPENING HERE?

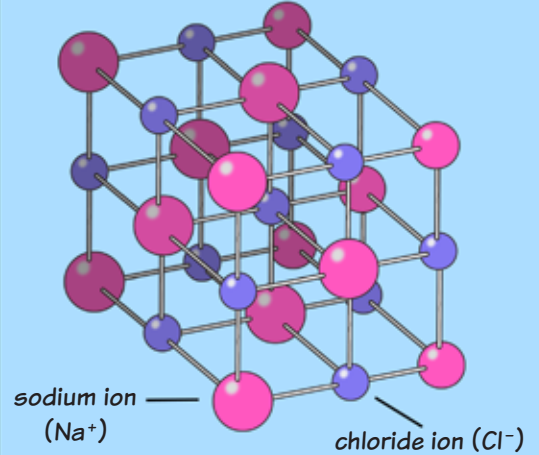
THE CHEMICAL NAME FOR TABLE SALT IS SODIUM CHLORIDE. IT IS MADE UP OF SODIUM AND CHLORIDE IONS THAT ARE HELD TOGETHER BY ELECTROSTATIC FORCES.



IN WATER THE SALT DISSOLVES AND THE IONS COME APART IN A SALT SOLUTION.



AS THE WATER EVAPORATES, THE SALT IONS ARE ARRANGED IN A REPEATING PATTERN, CALLED A CRYSTAL LATTICE.



CRYSTALS MAY FORM MANY DIFFERENT LATTICE SHAPES. DIAMOND IS AN EXAMPLE OF CRYSTAL LATTICE MADE OF CARBON ATOMS.

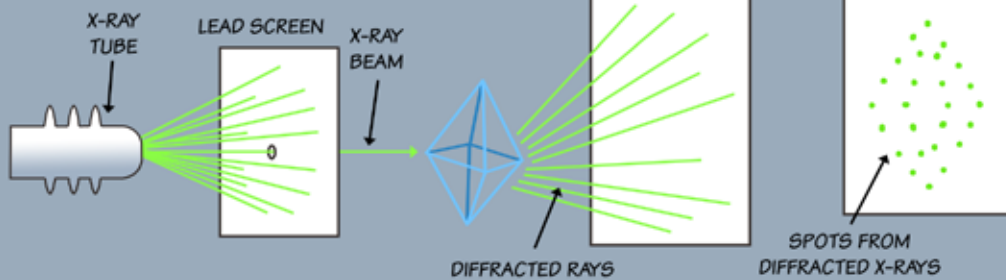


LIGHT ENTERS THE CRYSTAL AND IS REFRACTED CAUSING IT TO SPARKLE IN THE SUN.



CRYSTALS IN THE WORLD

SCIENTISTS USE SPECIAL METHODS LIKE X-RAY CRYSTALLOGRAPHY, TO WORK OUT THE SHAPE OF THE LATTICE.



THE X-RAYS BOUNCE OFF THE REPEATING PATTERNS AND REVEAL THE SHAPE OF THE CRYSTAL.

CRYSTALLOGRAPHY HAS LOTS OF IMPORTANT USES.

IT HAS BEEN USED TO EXAMINE SOILS ON MARS..



...TO IMPROVE MATERIALS FOR SPORTS GEAR...



...AND TO STUDY DISEASES TO MAKE BETTER MEDICINES.



Knowledge is NCAH!



WOMEN IN SCIENCE

ROSALIND FRANKLIN, A BRITISH BIOPHYSICIST AND X-RAY CRYSTALLOGRAPHER, HELPED DISCOVER THROUGH X-RAY DIFFRACTION THAT DNA WAS MADE OF A DOUBLE HELIX (OR SPIRAL). THIS LED TO A NOBEL PRIZE FOR TWO SCIENTISTS CALLED WATSON AND CRICK.



CAREERS

THERE ARE GREAT JOB OPPORTUNITIES, SUCH AS:

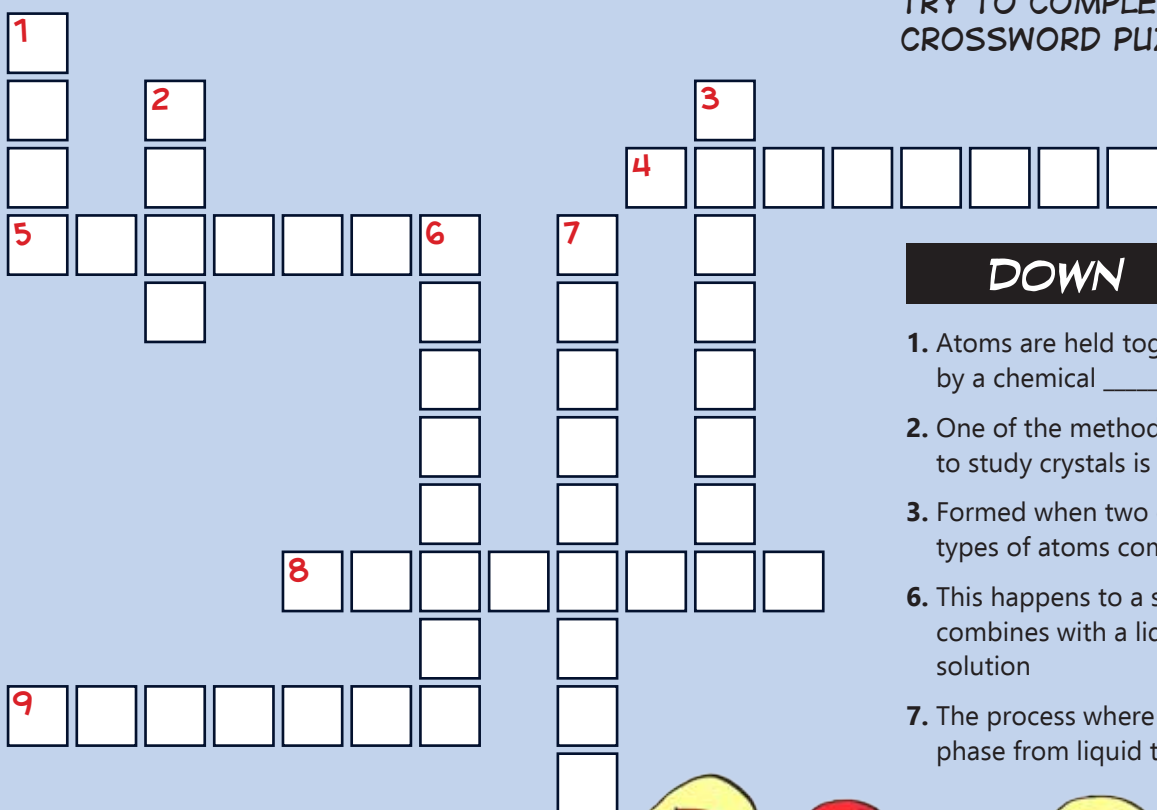
- MINERALOGY AND MINERAL PROCESSING
- SCIENTISTS WHO FIND NEW KINDS OF MATERIALS
- INVENTORS WHO DEVELOP NEW OR IMPROVED PRODUCTS

CURRICULUM LINKS

- GRADE 8 AND 9 **MATTER & MATERIALS** (COMPOUNDS, PHASES OF MATTER)
- GRADE 10 **CHEMICAL CHANGE** (IONS IN AQUEOUS SOLUTION)
- GRADE 10 **MATTER & MATERIALS** (CHEMICAL BONDING)

PUZZLE YOUR MIND!!!

USE THE CLUES GIVEN TO TRY TO COMPLETE THE CROSSWORD PUZZLE BELOW.



DOWN

1. Atoms are held together in a molecule by a chemical ____
2. One of the methods that scientists use to study crystals is __ crystallography
3. Formed when two or more different types of atoms combine
6. This happens to a solid when it combines with a liquid to become a solution
7. The process where water changes phase from liquid to gas

ACROSS

4. Salt dissolved in water forms a ____
5. An example of a crystal lattice made from carbon
8. The chemical name for table salt is sodium ____
9. When atoms that are arranged in a repeating pattern, this is called a crystal ____



WHAT PHASE OF MATTER ARE CRYSTALS AN EXAMPLE OF?

down: 1. bond, 2. X-ray, 3. compound, 6. dissolve, 7. evaporate
across: 4. solution, 5. diamond, 8. chloride lattice

Knowledge is NCAH!





MATHS AND CRYSTALLOGRAPHY

What is the biggest number of atoms that can be packed into the smallest space?

Mathematics has provided answers to this and other big questions in crystallography.

2014 IS THE **INTERNATIONAL YEAR OF CRYSTALLOGRAPHY** (IYCR2014), BECAUSE IT IS A HUNDRED YEARS SINCE THE DISCOVERY OF X-RAY DIFFRACTION. SCIENTISTS FROM AROUND THE WORLD ARE ENCOURAGING YOUNG PEOPLE TO LEARN MORE ABOUT CRYSTALLOGRAPHY.

FOR MORE INFO VISIT: WWW.IYCR2014.ORG

SCIENCE SPAZA CELEBRATES **NATIONAL SCIENCE WEEK**, AN INITIATIVE OF THE DEPARTMENT OF SCIENCE AND TECHNOLOGY, IMPLEMENTED BY SAASTA, A BUSINESS UNIT OF THE NATIONAL RESEARCH FOUNDATION.



FOR MORE INFORMATION VISIT WWW.DST.GOV.ZA OR WWW.SAASTA.AC.ZA

START YOUR OWN SCIENCE SPAZA



REGISTER NOW TO RECEIVE **FREE** RESOURCES AND SUPPORT. YOU WILL NEED:

1 A GROUP OF FRIENDS WHO ARE EXCITED ABOUT SCIENCE!

2 A PARENT OR TEACHER TO ASSIST YOU

3 A TIME AND PLACE TO MEET



4 SOME **CURIOSITY** AND AN INTEREST IN FINDING OUT MORE ABOUT THE WORLD!

SCIENCE SPAZA APPLICATION FORM

Name of school: _____

Municipality: _____

Province: _____

Name of your science club:

Name of contact person: _____

Telephone number: _____

Email address: _____

Postal address: _____

To be filled in by responsible adult (parent/teacher)

Name: _____

Surname: _____

Position: _____

ID Number: _____

Signature (parent/teacher):

Date: _____

Send to PO Box 22106, Mayor's Walk, 3208 Fax to 086 610 5453 email: info@sciencespaza.org or submit your application online at www.sciencespaza.org