

CHAPTER 21

IN THE LAST UNIT, YOU LEARNED HOW LARGE PROCESSES CAN CHANGE THE FACE OF THE EARTH. THESE PROCESSES INCLUDE:

**THE MOVEMENT OF TECTONIC PLATES TO FORM VOLCANOES
AND
WEATHERING AND EROSION OF THE LAND**

THESE THINGS DO MUCH MORE THAN CHANGE THE FACE OF THE EARTH... THEY AFFECT EVERYTHING IN OUR LIVES! THIS IS BECAUSE...

**EVERYTHING IN OUR LIVES IS
EITHER GROWN OR MINED**

THINK ABOUT IT... ALL OF THE PLANTS AND ANIMALS WE EAT ARE GROWN. AND MANY OF THE CLOTHES WE WEAR COME FROM PLANTS (LIKE COTTON) OR ANIMALS (LIKE WOOL FROM SHEEP)!

**BUT WHERE DO
ALL OF THE
METALS COME
FROM, OR GLASS,
OR CHEMICALS?**

EVERYTHING WE USE
IN OUR LIFE THAT IS
NOT GROWN IS
TAKEN OUT OF THE
EARTH! BUT IN
ORDER TO GET
SOME OF THESE



YOU ARE
KIDDING ME,
RIGHT?

**BUT WHERE DO ALL OF THE METALS COME FROM, OR GLASS,
OR CHEMICALS? THE ANSWER TO THIS QUESTION CAN BE
FOUND UNDER THE EARTH.**

RESOURCES FROM THE EARTH, WE HAVE TO DIG FOR THEM! THIS IS WHAT IT MEANS WHEN RESOURCES ARE **MINED** OUT OF THE EARTH.

IF YOU THINK THAT EVERYTHING WE USE IN OUR LIFE COMES FROM THE GROCERY STORE OR WAL-MART, YOU ARE VERY WRONG! ALL THINGS COME FROM THE EARTH... THIS MEANS OUR TOOTHPASTE, POP CANS, LIGHT BULBS AND EVEN THE ELECTRICITY WE USE TO MAKE THE LIGHT BULBS WORK... ALL OF THESE THINGS COMES FROM RESOURCES THAT ARE MINED FROM THE EARTH!

OKAY! WHAT ARE THESE RESOURCES YOU ARE TALKING ABOUT?!

NEARLY EVERY NON-LIVING THING THAT YOU USE IN YOUR LIFE COMES FROM TWO THINGS IN THE EARTH:

ROCKS AND **MINERALS**

IN FACT, THE CORE, MANTLE AND CRUST OF THE EARTH IS MADE UP OF ROCKS AND MINERALS... MOST OF THE CRUST IS COVERED BY WATER, SOIL AND ICE. HOWEVER, IF YOU DIG DEEP ENOUGH, YOU WILL ALWAYS FIND A LAYER OF SOLID ROCK. THIS LAYER OF SOLID ROCK IS KNOWN AS **BEDROCK**.



YOU PROBABLY HAVE SEEN ROCKS ALL OVER THE PLACE! THE CONCRETE YOU WALK ON IS MADE OF ROCKS... SO ARE THE BRICKS THAT ARE USED TO BUILD BUILDINGS. ENTIRE MOUNTAINS ARE MADE OF ROCKS!

SO WHAT IS A ROCK MADE OF? GOOD QUESTION!

A **ROCK** IS A MIXTURE OF TWO OR MORE **MINERALS**. A **MINERAL** IS A SOLID THAT IS MADE UP OF A GROUP OF THE SAME ATOMS OR MOLECULES...

(REMEMBER FROM CHAPTER 12 THAT A MOLECULE IS A GROUP OF VERY SMALL BUILDING BLOCKS CALLED ATOMS THAT MAKE UP EVERYTHING IN THE UNIVERSE!)

THIS MEANS THAT IF YOU HAD A LARGE CHUNK OF MINERAL SITTING IN FRONT OF YOU, AND YOU BREAK IT IN HALF... BOTH HALVES WOULD HAVE THE SAME **KINDS** OF ATOMS OR MOLECULES IN THEM!

BUT... IF YOU SPLIT A ROCK IN HALF YOU MAY GET ALL KINDS OF MINERALS IN BOTH OF THE HALVES!



THINK OF IT THIS WAY...

A ROCK IS LIKE A CHOCOLATE CHIP COOKIE. THE CHOCOLATE CHIPS, AND BUTTER AND SUGAR THAT YOU USE TO MAKE THE COOKIE ARE THE MINERALS. YOU CANNOT MAKE A ROCK WITHOUT A GROUP OF MINERALS! BUT YOU CAN MAKE A MINERAL WITHOUT ANY ROCKS!

THERE ARE MANY DIFFERENT WAYS THAT MINERALS CAN BE CREATED.

MINERALS CAN BE FORMED...

- WHEN LAVA ERUPTS OUT OF A VOLCANO AND COOLS
- WHEN WATER EVAPORATES, IT LEAVES EVERYTHING (INCLUDING MINERALS) BEHIND
- AND SOME MINERALS CAN ONLY FORM DEEP INSIDE THE EARTH'S CRUST WITH A LOT OF HEAT AND PRESSURE

IF A MINERAL IS GIVEN PLENTY OF ROOM AND TIME TO GROW, IT WILL BEGIN TO LOOK VERY MUCH LIKE CRYSTALS. A **CRYSTAL** IS A SOLID MATERIAL THAT HAS ALL OF ITS MOLECULES LINED UP, IN A PATTERN. SOMETIMES, MINERALS GROW IN AREAS WHERE THERE IS NOT A LOT OF ROOM. WHEN THIS HAPPENS, THE MOLECULES OF THE MINERAL CANNOT LINE UP VERY EASILY. SO, THE MINERAL DOES NOT END UP LOOKING LIKE A CRYSTAL.

THERE ARE ABOUT 3,000 DIFFERENT MINERALS IN THE WORLD. SINCE THERE ARE SO MANY OF THESE MINERALS, A FEW OF THEM CAN BE FORMED INTO A CRYSTAL SHAPE MUCH FASTER THAN THE OTHERS... SALT IS ONE OF THESE MINERALS. THE MINERAL NAME FOR SALT IS **HALITE** ("HAL-ITE"). WITH A LITTLE SALT AND WATER, YOU CAN MAKE SALT (HALITE) CRYSTALS IN JUST A FEW DAYS!



EVERY MINERAL HAS ITS OWN PROPERTIES THAT MAKE IT ONE OF A KIND! LET'S SAY YOU HAD A LARGE CHUNK OF MINERAL AND YOU WANTED TO FIGURE OUT WHAT IT WAS. TO DO THIS, YOU WOULD NEED TO BE A STUDENT OF **GEOLOGY** ("GEE-AUL-O-GEE"; THE STUDY THE EARTH AND ITS ROCKS AND MINERALS). HERE IS WHAT YOU WOULD LOOK FOR ON YOUR MINERAL:

THE CRYSTAL'S SHAPE	COLOR
CLEAVAGE	STREAK
FRACTURE	LUSTER
HARDNESS	

THE **SHAPE OF THE CRYSTAL** CAN MAKE OUT THE KIND OF MINERAL.



WHEN YOUR MINERAL IS BROKEN, THE SIDES THAT USED TO BE TOGETHER CAN LOOK FLAT AND SMOOTH WHICH IS KNOWN AS **CLEAVAGE** "KLEE-VUH-J" OR THEY CAN LOOK ROUGH AND JAGGED WHICH IS KNOWN AS **FRACTURE** "FRAK-CHUR".

TO TEST THE **HARDNESS** OF YOUR MINERAL YOU WOULD SEE HOW HARD IT IS TO SCRATCH ITS SURFACE WITH A METAL NAIL!

IT IS EASY TO FIGURE OUT SOME MINERALS BY THEIR OWN **COLOR!**

SOME MINERALS CAN BE USED LIKE CHALK AND RUBBED AGAINST A WHITE OBJECT. THE COLOR OF THE **STREAK** ("STREEK") IT LEAVES ON THE OBJECT WILL SHOW WHAT KIND OF MINERAL YOU HAVE!

THE WAY THE SURFACE OF THE MINERAL SHINES, WHICH IS KNOWN AS **LUSTER**, CAN SHOW YOU WHICH MINERAL YOU ARE STUDYING.

**ALL OF THIS SOUNDS NEAT, BUT I DON'T SEE HOW I USE ALL
OF THESE ROCKS AND MINERALS EVERYDAY! WHERE ARE
THEY?!**

YOU USE ALL KINDS OF ROCKS AND MINERALS EVERY DAY
OF YOUR LIFE! IN THE NEXT CHAPTER, YOU ARE GOING
TO LOOK AT...

**THE GEOLOGY OF
YOUR HOME!**

CHAPTER 22

IN THE LAST CHAPTER, YOU LEARNED ABOUT THE DIFFERENCE BETWEEN ROCKS AND MINERALS. THIS WEEK, YOU ARE GOING TO SEE WHERE THESE MATERIALS ARE FOUND IN YOUR LIFE. YOU COULD LOOK ANYWHERE TO SEE ROCKS AND MINERALS... BUT THIS WEEK, YOU ARE GOING TO EXPLORE...

THE GEOLOGY OF YOUR HOME!

THAT'S RIGHT! THIS WEEK, YOU ARE GOING TO STUDY THE ROCKS AND MINERALS THAT YOU CAN FIND IN YOUR HOME!

LET'S START BY LOOKING AT THE OUTSIDE OF YOUR HOME. I KNOW THAT EVERYONE'S HOME IS DIFFERENT, BUT THERE ARE SOME THINGS THAT ARE THE SAME.



FOR SALE:

SMALL AMOUNT OF WORK NEEDED FOR THIS
BEAUTIFUL HOME. CHEAP OFFERS WELCOME!
SOLD AS IS!

FOR EXAMPLE, I WOULD GUESS THAT EVERYONE HAS A DOOR TO THEIR HOME, RIGHT?!

THAT DOOR IS NOT JUST LEANING AGAINST YOUR HOME, IS IT? I DON'T THINK SO. YOUR DOOR IS PROBABLY ATTACHED TO YOUR HOME WITH METAL NAILS OR SCREWS THAT HAVE BEEN MADE OUT OF **IRON, LEAD OR ZINC**. ALL OF THESE MATERIALS ARE MINERALS!

AS YOU WALK INSIDE YOUR HOME YOU REMEMBER THAT IT IS TIME TO MAKE SOME LUNCH! SO, YOU HEAD INTO THE KITCHEN...

IT SURE IS DARK IN THE KITCHEN... YOU BETTER TURN ON SOME LIGHTS! AS YOU TURN ON THE SWITCH, THE LIGHT BULBS IN YOUR KITCHEN BEGIN TO GLOW! YOU CAN THANK THE MINERALS – **COPPER**, **BERYLLIUM** ("BUR-ILL-E-UM") AND **TUNGSTEN** ("TUNG-STIN") FOR ALL OF THIS LIGHT! THE SWITCH YOU TURNED ON IS CONNECTED TO WIRES MADE OUT OF COPPER! THESE WIRES ARE CONNECTED TO YOUR LIGHT BULBS TO GIVE THEM THE ENERGY THEY NEED TO GLOW! AND, IF YOU HAVE EVER LOOKED INSIDE A LIGHT BULB BEFORE, YOU PROBABLY SAW LITTLE PIECES OF METAL INSIDE THEM! THESE SMALL PIECES OF METAL, ARE WHAT MAKE YOUR LIGHT BULB GLOW AND ARE MADE UP OF EITHER BERYLLIUM OR TUNGSTEN!

NOW THAT YOU CAN SEE WHAT YOU ARE DOING, LET'S START TO MAKE A SANDWICH... **OH NO! ALL OF THE DISHES ARE DIRTY! THEY NEED TO BE WASHED!**

YOU HAD BETTER GET THE SOAP AND TURN ON THE WATER! THE SOAP IS A MIXTURE OF ALL KINDS OF MINERALS! YOU CAN FIND

SILICA ("CIL-IH-KAH") OR **TITANIUM** ("TIE-TANE-E-UM") IN ALMOST EVERY SOAP! THESE MINERALS ARE USED TO HELP SCRAPE FOOD AND DIRT OFF OF OUR PLATES, HANDS AND EVEN OUR TEETH! THAT'S RIGHT, SILICA AND TITANIUM CAN BE FOUND INSIDE YOUR TOOTHPASTE TOO!



AS YOU TURN THE HANDLE ON THE WATER FAUCET AND START TO WASH YOUR FORKS AND SPOONS, YOU ARE USING THE MINERAL **CHROMIUM** ("KRO-ME-UM"). CHROMIUM IS A MINERAL YOU CAN FIND IN MOST SHINY METAL OBJECTS ON OUR CARS, BICYCLES, KITCHENS... THIS INCLUDES KITCHEN FAUCETS AND INSIDE YOUR FORKS AND SPOONS! IN FACT, WHY DO YOU THINK YOUR FORKS, KNIVES AND SPOONS ARE CALLED "SILVERWARE"? IT IS BECAUSE THE MOST EXPENSIVE FORKS, KNIVES AND SPOONS ARE MADE OUT OF THE MINERAL CALLED **SILVER**!

OKAY... THE DISHES ARE WASHED AND IT'S TIME TO FIND THE LAST PIECE OF PIZZA IN THE REFRIGERATOR! YOU MOVE THE MILK JUG OUT OF THE WAY AND THE BOTTLE OF KETCHUP AND... THERE IT IS! THE LAST PIECE OF PIZZA WRAPPED UP IN A SHINY METAL FOIL MADE FROM **ALUMINUM** ("A-LOOM-EH-NUM")! THAT'S RIGHT... ALUMINUM IS ANOTHER MINERAL!

MMMMM! THAT PIZZA TAKES GOOD! BUT NOT AS GOOD AS DINNER TASTED LAST NIGHT! LAST NIGHT YOU ATE STEAK, POTATOES AND A BIG SALAD! YOU MAY REMEMBER THAT YOU PUT A LITTLE SALT ON YOUR BAKED POTATO TO MAKE IT TASTE A LITTLE BETTER, RIGHT?

WHAT YOU MAY NOT KNOW IS... YOU JUST ATE ALL KINDS OF MINERALS IN YOUR DINNER LAST NIGHT!

DON'T PANIC!!



FOR EXAMPLE, THE STEAK YOU ATE IS A GOOD SOURCE OF **IRON** AND **ZINC** ("ZING-K"). BOTH OF THESE ARE MINERALS YOUR BODY USES EVERY DAY! ZINC IS USED BY YOUR IMMUNE SYSTEM TO HELP YOU STAY HEALTHY. IRON IS USED BY YOUR BLOOD TO CARRY OXYGEN ALL OVER YOUR BODY!

IF YOU REMEMBER FROM EARLIER IN THIS CHAPTER, ZINC IS A MINERAL THAT IS USED TO MAKE NAILS AND SCREWS. THERE ARE MANY MINERALS THAT HAVE MORE THAN ONE USE! IN FACT, THERE ARE SO MANY OF THEM, WE WOULD NOT HAVE TIME TO LIST THEM ALL HERE! OKAY... BACK TO LAST NIGHT'S DINNER...

YOUR BAKED POTATO AND SALAD ARE GOOD SOURCES FOR THE MINERALS **CALCIUM** ("KAL-SEE-UM") AND **POTASSIUM** ("PO-TASS-E-UM"). THE POTASSIUM IN YOUR POTATO HELPS KEEP YOUR MUSCLES STRONG AND THE CALCIUM IN THE SALAD HELPS TO BUILD STRONG BONES IN YOUR BODY! IN FACT, THE COLD GLASS OF MILK YOU HAD WITH YOUR DINNER WAS A HUGE SOURCE OF CALCIUM FOR YOUR BODY!

YOU LEARNED FROM THE LAST CHAPTER THAT EVEN THE SMALL AMOUNT OF SALT YOU PUT ON YOUR FOOD COMES FROM THE MINERAL **HALITE**. JUST BE CERTAIN NOT TO EAT TOO MUCH OF THIS MINERAL! THAT IS NOT GOOD FOR YOU!

AND YOU CAN THANK THE MINERAL **PHOSPHATE** ("FOZ-FATE") FOR HELPING TO GROW YOUR POTATO AND THE VEGETABLES IN YOUR SALAD! PHOSPHATE IS AN IMPORTANT NUTRIENT THAT PLANTS USE TO GROW!



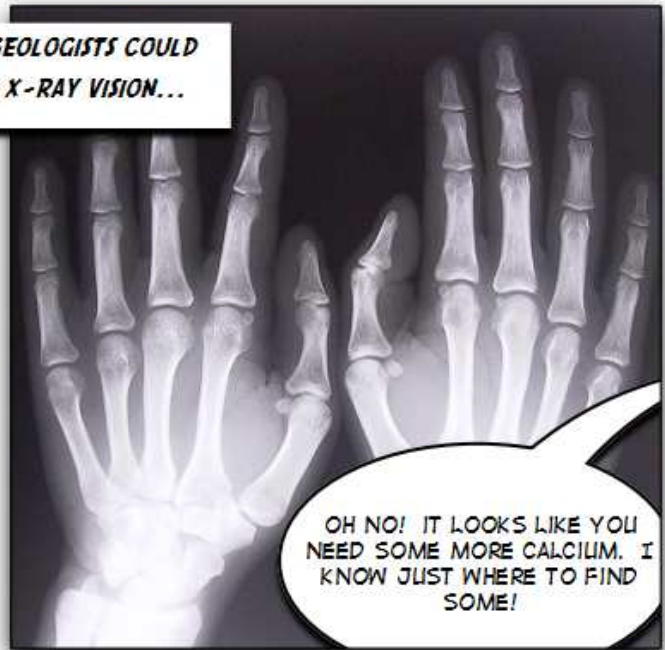
THESE ARE JUST A FEW OF THE MINERALS THAT YOU USE EVERY DAY!
REMEMBER...

EVERYTHING IN OUR LIVES IS EITHER GROWN OR MINED

WE USE EACH OF THE 3,000 MINERALS THAT CAN BE MINED FROM THE EARTH! FINDING THESE MINERALS IS NOT VERY EASY! THIS IS BECAUSE MOST MINERALS ARE FOUND INSIDE OF ROCKS WITHIN THE EARTH!

UNFORTUNATELY,
GEOLOGISTS DO NOT HAVE
SUPER POWERS... THEY
CANNOT LOOK THROUGH A
MOUNTAIN TO SEE WHAT
MINERALS EXIST INSIDE THE
ROCK! IT TAKES A LOT OF
TIME TO FIND AN AREA
WHERE A GEOLOGIST
THINKS THEY CAN FIND A
LOT OF MINERALS. MANY
TIMES THEIR GUESSES ARE
WRONG!

IF GEOLOGISTS COULD
USE X-RAY VISION...



BUT WHEN A GEOLOGIST IS CORRECT, A LARGE SOURCE OF MINERALS CAN BE FOUND INSIDE THE ROCKS THEY ARE STUDYING. THIS IS WHEN A COMPANY MUST MINE THE ROCK OUT OF THE GROUND.

ONCE THIS ROCK IS TAKEN OUT OF THE GROUND, IT MUST BE **PROCESSED**. THIS MEANS THAT THE MINERALS ARE TAKEN OUT OF THE ROCK. THIS CAN BE DONE MANY DIFFERENT WAYS. MOST OF THE TIME, THE PROCESSING OF ROCKS BEGINS WITH THEM BEING CRUSHED AND GROUND INTO SMALLER PIECES! THIS MAKES IT EASIER TO SEPARATE THE MINERALS INSIDE THE ROCK!

AFTER A MINERAL IS PROCESSED OUT OF THE ROCK, IT CAN BE USED TO MAKE SILVERWARE, OR SALT, OR SCREWS, OR SALADS!

SO FAR, YOU HAVE ONLY EXPLORED A FEW OF THE MINERALS THAT ARE USED EVERY DAY. IN THE NEXT CHAPTER, YOU ARE GOING TO DIG DEEP INTO THE EARTH TO SEE HOW THESE MINERALS GET STUCK TOGETHER TO MAKE UP ROCKS!

CHAPTER 23

YOU KNOW THAT A ROCK IS A MIXTURE OF TWO OR MORE MINERALS.

YOU KNOW THAT EVERYTHING WE USE IN OUR LIVES IS EITHER GROWN OR MINED.

YOU KNOW THAT MINERALS ARE FOUND IN OUR FOOD, OUR HOMES AND OUR BODIES.

AND... **YOU KNOW** THAT MOST MINERALS ARE FOUND INSIDE OF ROCKS WITHIN THE EARTH!

BUT IF YOU WANT TO LEARN ABOUT HOW THESE MINERALS ARE GROWN, YOU HAVE TO STUDY HOW ROCKS ARE FORMED! THAT IS WHAT YOU ARE GOING TO EXPLORE THIS WEEK!

THERE ARE THREE DIFFERENT KINDS OF ROCK:

IGNEOUS
METAMORPHIC
AND **SEDIMENTARY**

EACH OF THESE KINDS OF ROCK IS NAMED FOR THE WAY IN WHICH THEY ARE MADE!



IGNEOUS ROCK ("IG-NEE-US") IS FORMED WHEN MOLTEN ROCK (MAGMA) IS COOLED AND HARDENED. THIS CAN TAKE PLACE IN TWO DIFFERENT WAYS:

MAGMA CAN COOL
DOWN WHILE IT IS
MOVING INSIDE THE
EARTH'S MANTLE

OR

AS MAGMA PASSES
THROUGH THE
EARTH'S CRUST AND
BECOMES LAVA, IT
CAN COOL VERY
QUICKLY AND
HARDEN INTO ROCK

WOW! IT'S HOT
OUT HERE! DOES
ANYONE HAVE
SOME SLTAN
LOTION? I THINK
I'M BEGINNING
TO PEEL.



IN ANY CASE, WHEN MELTED ROCK COOLS AND HARDENS, A MIXTURE OF MINERALS HARDENS TOGETHER TO MAKE IGNEOUS ROCK!

GEOLOGISTS HAVE PLACED MANY DIFFERENT KINDS OF IGNEOUS ROCKS INTO GROUPS. ROCK THAT ARE MADE UP OF THE MINERALS QUARTZ, FELDSPAR AND MICA IS CALLED **GRANITE** ("GRAN-IT")! MOST MOUNTAINS IN THE WORLD ARE MADE UP OF GRANITE WHICH IS A VERY HARD ROCK!

NOT ALL ROCKS ARE VERY HARD! SOMETIMES, WHEN LAVA ERUPTS OUT OF A VOLCANO, THIS MELTED ROCK CAN BE FILLED WITH POCKETS OF GAS... WHEN THIS LAVA COOLS AND HARDENS, THE AIR POCKETS STAY INSIDE THE ROCK... JUST LIKE A LOAF OF BREAD! THIS KIND OF ROCK IS CALLED **PUMICE** ("PUM-ISS"), AND IT IS THE ONLY ROCK THAT CAN FLOAT ON TOP OF A CONTAINER OF WATER!

SEDIMENTARY ROCK ("SAID-EH-MEN-TARY") IS FORMED IN A MUCH DIFFERENT WAY THAN IGNEOUS ROCK. THIS KIND OF ROCK IS FORMED FROM WEATHERING, EROSION AND DEPOSITION OF THE EARTH'S CRUST. IF YOU REMEMBER FROM AN EARLIER UNIT:

WEATHERING IS A NATURAL METHOD THAT BREAKS APART LARGE ROCKS INTO SMALLER ROCKS! THE MOVEMENT OF THESE SMALLER PIECES (EROSION) CAN BE DROPPED OFF AT DIFFERENT PLACES (DEPOSITION).

AS WATER ERODES THE EARTH'S CRUST, IT CARRIES TINY ROCKS AND MUD (ALSO KNOWN AS **SEDIMENTS**) TO AREAS WHERE THEY SETTLE DOWN AND SINK TO THE BOTTOM.

AS DEPOSITION CONTINUES, LAYERS OF SEDIMENTS BEGIN TO GROW... ONE ON TOP OF EACH OTHER!

OVER TIME, THE LAYERS OF SAND AND MUD AT THE BOTTOM OF THE WATER ARE TURNED INTO SEDIMENTARY ROCKS.



BUT HOW DOES THIS HAPPEN?

THINK OF EACH LAYER OF SEDIMENTS AS A PAGE IN A TELEPHONE BOOK. ONE SINGLE PAGE IS NOT VERY HEAVY, IS IT? NO!

BUT SEVERAL TELEPHONE BOOKS STACKED ON TOP OF YOU WOULD START TO GET VERY HEAVY! YOU COULD GET SQUISHED VERY EASILY!

THIS IS WHAT HAPPENS WITH LAYERS OF SEDIMENT. ALL OF THE LAYERS STACKED ON TOP OF EACH OTHER ARE SO HEAVY...

...THEY EASILY SQUASH THE BOTTOM LAYERS TOGETHER INTO THE FORM OF A ROCK!



A TYPE OF SEDIMENTARY ROCK THAT IS FOUND ALL OVER THE WORLD IS CALLED **LIMESTONE!** BECAUSE OF THE WAY ITS ATOMS ARE STUCK TOGETHER, LIMESTONE IS USED FOR MANY DIFFERENT THINGS. SOME OF THESE INCLUDE THE MAKING OF CONCRETE, TOOTHPASTE, SOAP, PAPER, CLAY, GLASS, PAINT AND THOUSANDS OF OTHER THINGS WE USE EVERY DAY!

IN FACT, THERE IS PROBABLY A FEW TONS OF LIMESTONE SURROUNDING YOU RIGHT NOW! IT IS IN YOUR WALLS, AND FLOOR AND SIDEWALKS AND DRIVEWAYS! YOU USE A LOT OF LIMESTONE IN YOUR EVERYDAY LIFE!

THE THIRD TYPE OF ROCK YOU ARE GOING TO EXPLORE, **METAMORPHIC ROCK** ("MET-A-MORF-ICK"), HAS A SPECIAL RELATIONSHIP WITH THE OTHER TWO KINDS OF ROCKS YOU HAVE EXPLORED...

***METAMORPHIC ROCKS COME FROM
IGNEOUS AND SEDIMENTARY ROCKS !***

IN ORDER TO CHANGE A ROCK, YOU NEED A LOT OF ENERGY. THIS ENERGY IS FOUND INSIDE THE EARTH! SOMETIMES, THE HUGE AMOUNT OF HEAT AND PRESSURE INSIDE THE EARTH CAN CHANGE IGNEOUS AND SEDIMENTARY ROCKS A GREAT DEAL! THESE ROCKS CAN BE BAKED, SQUEEZED AND FOLDED MANY TIMES.

WHEN THIS HAPPENS, THE SEDIMENTARY OR IGNEOUS ROCKS CAN GO THROUGH A **METAMORPHOSIS** ("MET-A-MORF-O-SIS"; WHICH MEANS, "A CHANGE") INTO A DIFFERENT KIND OF ROCK.



THERE ARE NOT AS MANY METAMORPHIC ROCKS IN THE EARTH AS THERE ARE SEDIMENTARY OR IGNEOUS. HOWEVER, MANY METAMORPHIC ROCKS ARE FOUND NEAR AREAS WHERE THE EDGES OF TECTONIC PLATES MEET. IN THESE PLACES, THE MOVEMENT OF THE EARTH'S PLATES CAUSES THE HUGE PRESSURE NEEDED TO CREATE A METAMORPHIC ROCK!

WHEN LIMESTONE IS CHANGED IN THIS WAY, IT FORMS A KIND OF METAMORPHIC ROCK CALLED **MARBLE**. MARBLE IS USED TO CREATE BEAUTIFUL BUILDINGS AND STATUES. SOME OF THE TILES THAT YOU MAY HAVE IN YOUR BATHROOMS OR KITCHENS MAY BE MADE OF MARBLE TOO!

SOME METAMORPHIC ROCKS CAN ALSO BE CHANGED INTO DIFFERENT METAMORPHIC ROCKS WITH ENOUGH PRESSURE. FOR EXAMPLE...

ANOTHER SEDIMENTARY ROCK, CALLED **SHALE**, CAN BE SQUEEZED INTO A METAMORPHIC ROCK CALLED **SLATE!** SQUEEZING SLATE WILL MAKE ANOTHER METAMORPHIC ROCK CALLED **PHYLITE** ("FI-LIGHT"). SQUEEZING PHYLITE CAN MAKE **SCHIST** (THAT'S RIGHT... ANOTHER METAMORPHIC ROCK!) AND SQUEEZING SCHIST HARDER CAN MAKE ANOTHER METAMORPHIC ROCK CALLED **GNEISS** ("NEESE")!

**IT MAY SOUND
LIKE ALL OF THESE
ROCKS ARE
CONSTANTLY
CHANGING
FORMS...
BECAUSE THEY
ARE!**



**AND... IN THE NEXT CHAPTER, YOU ARE GOING TO EXPLORE
HOW THIS WORKS!**