Sorting Rocks

By: Leah Lott

Today, your group sorted various rocks into different categories.

Let's share the different ways we sorted our rocks.

There are many different ways you could have sorted your rocks. You could have sorted them by:

SIZE

COLOR

Texture

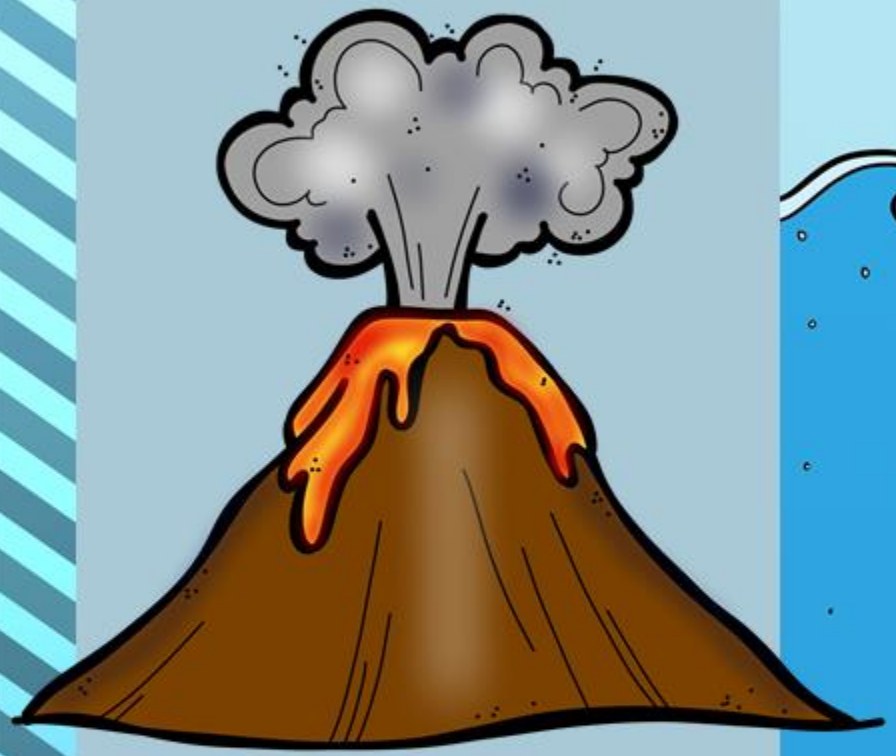
SHAPE

AND MORE!

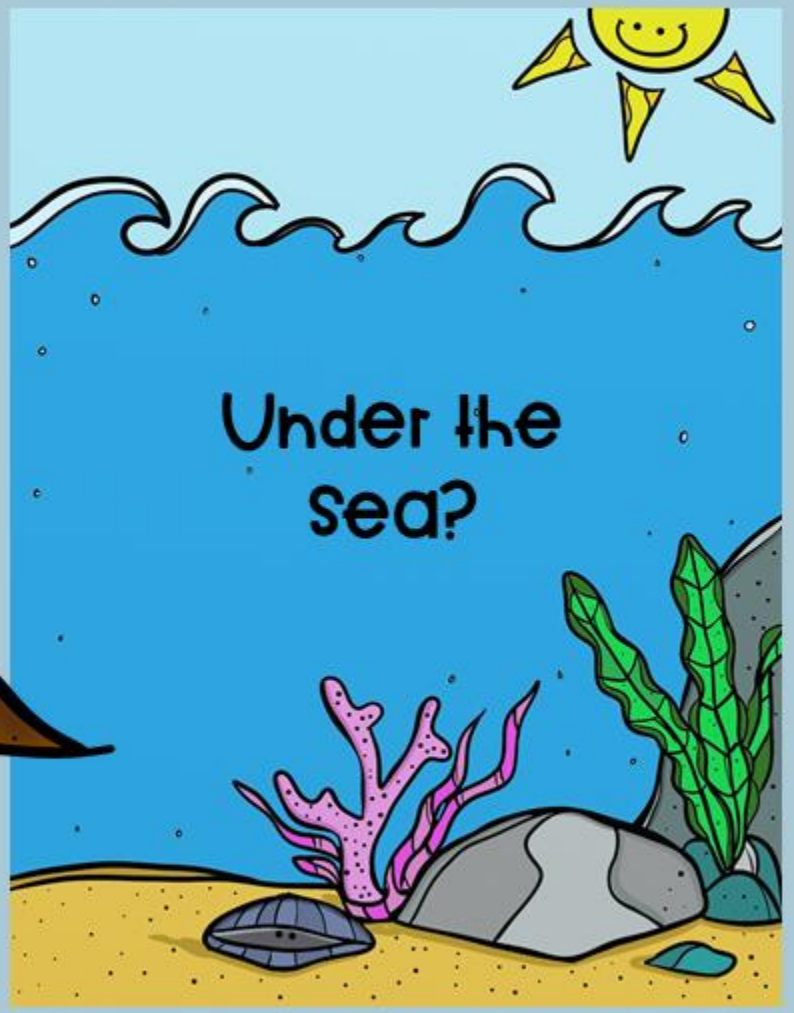
How do geologists sort rocks?

Geologists can sort EVERY SINGLE rock into just 3 categories.

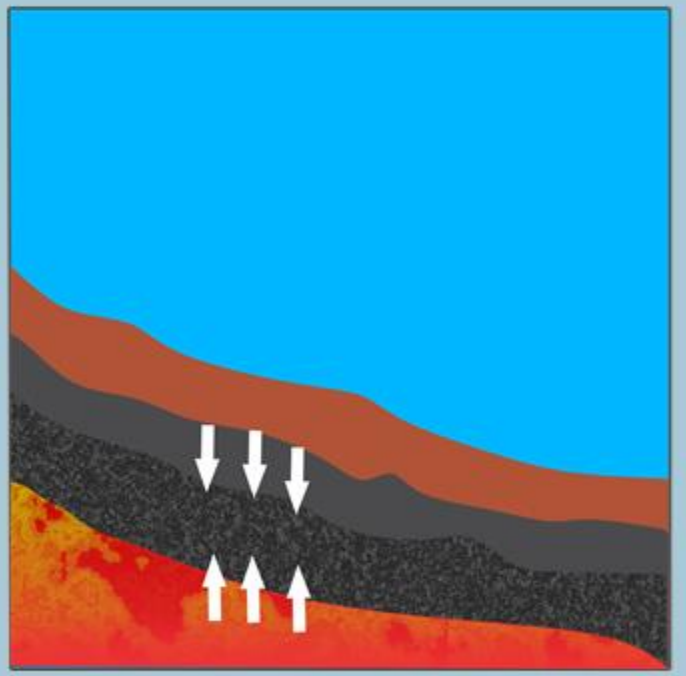
Here's a hint:
It all depends on
HOW the rock
was made.



Was it made near a volcano?



Or was it changed from heat and pressure?



Now that you've been given a hint, can you name the three categories that rocks get sorted into?

Let's see if you were right.

Every Single rock can be Sorted into one of the following categories:

IGNEOUS

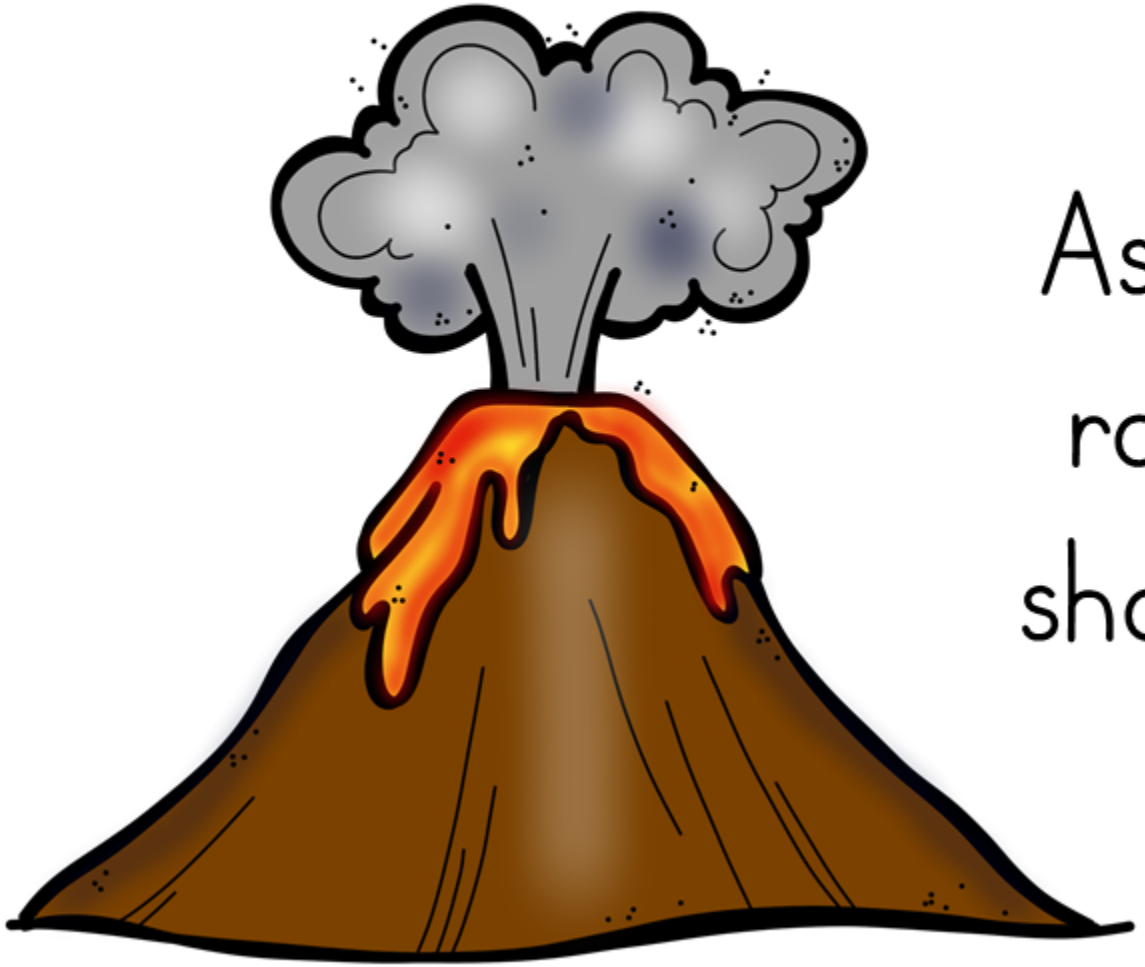
SEDIMENTARY

METAMORPHIC

Type of Rock	How it was made	Characteristics	Examples
IGNEOUS			
SEDIMENTARY			
METAMORPHIC			

We're going to learn how each type of rock gets made, their characteristics, and some examples of each type of rock.

Let's start with igneous



As we learn about igneous rocks, what three things should you be listening for?

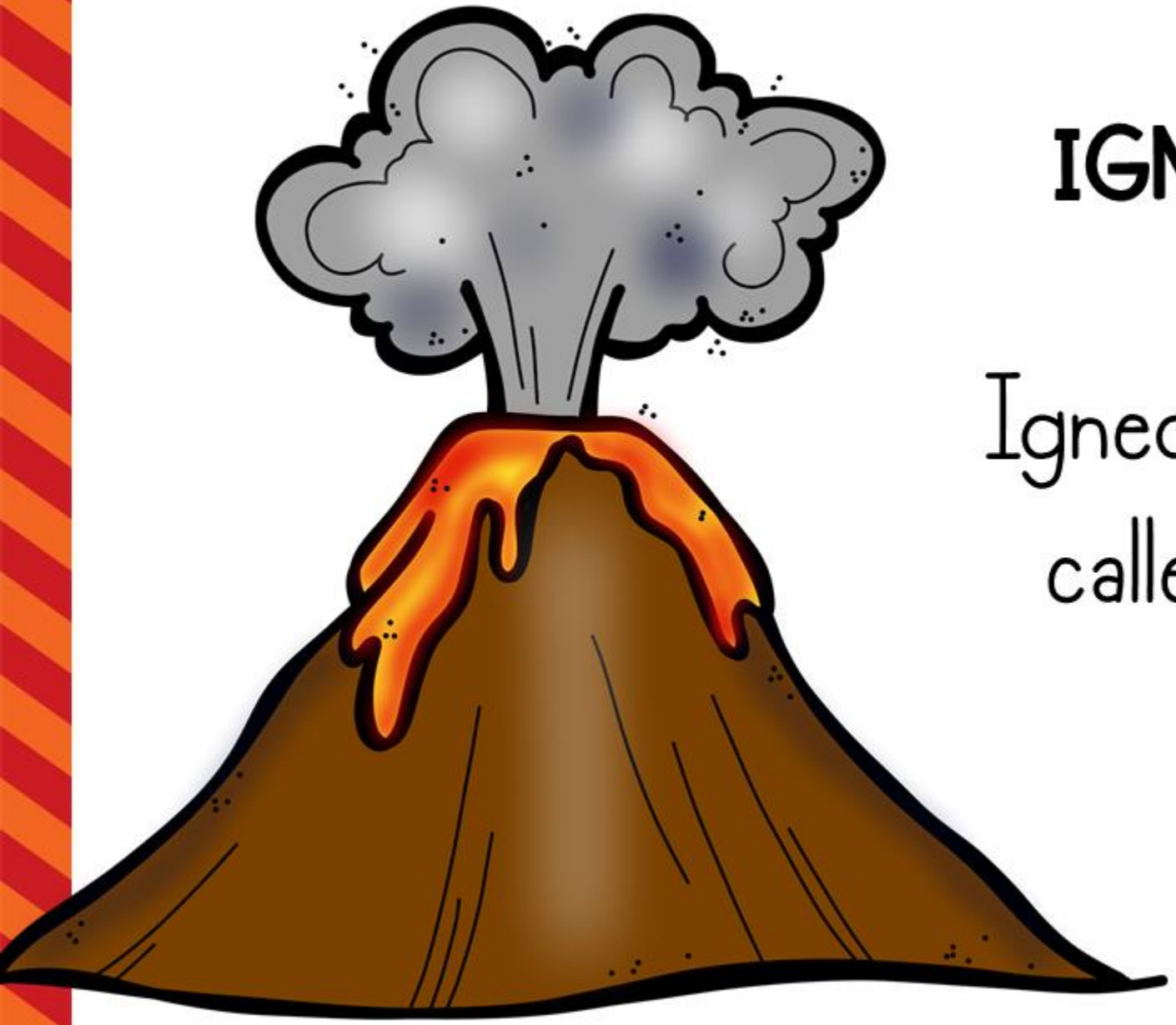
Listen for these three things:

1. How they get made (formation)

2. What their characteristics are (what they look like/feel like)

Type of Rock	How it was made	Characteristics	Examples
IGNEOUS			

3. And some examples



IGNEOUS ROCKS

Igneous rocks are often called volcanic rocks.

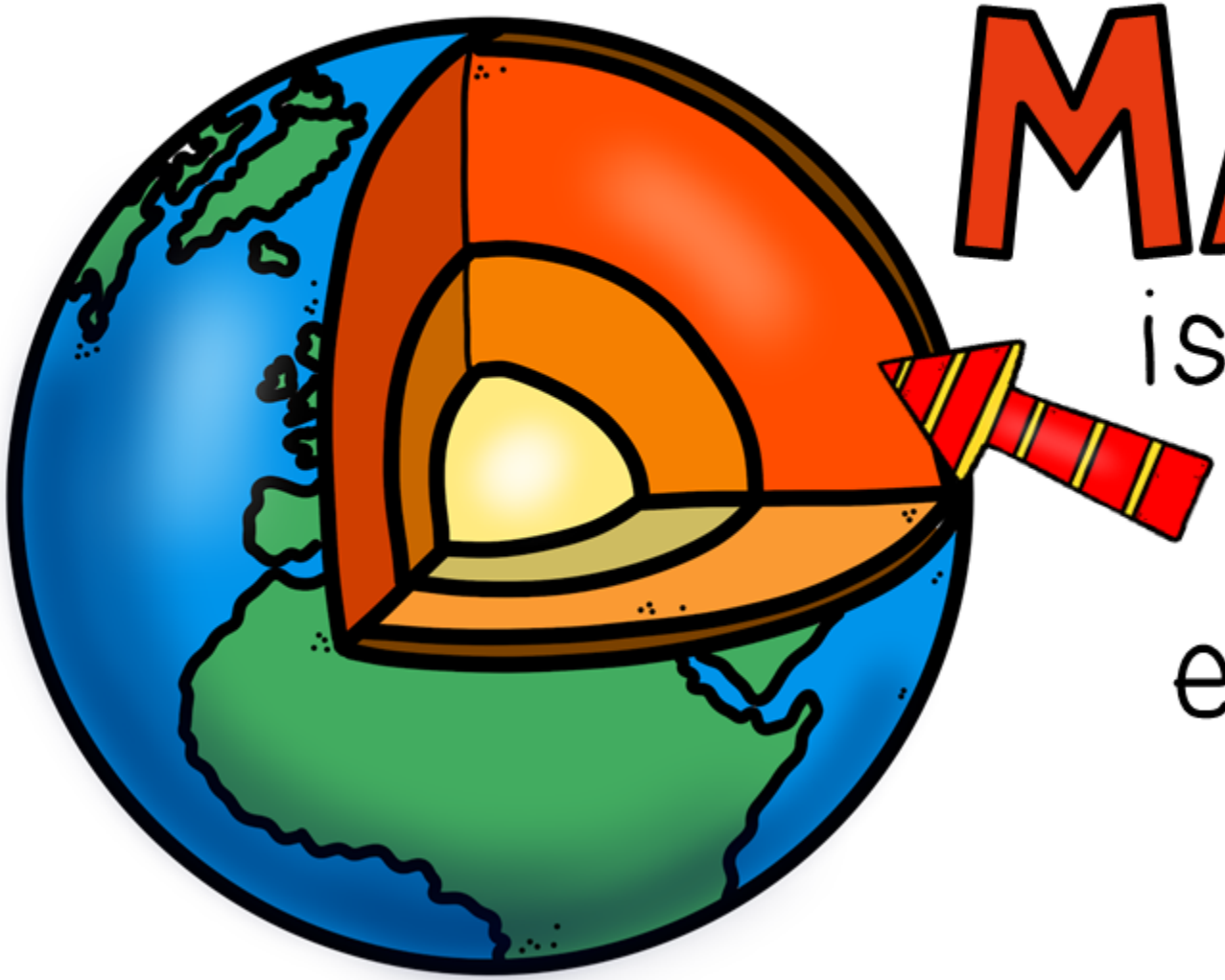
To understand how

IGNEOUS ROCKS

are formed, we need

to understand

Lava and Magma



MAGMA

is melted rock

<u>below</u> the

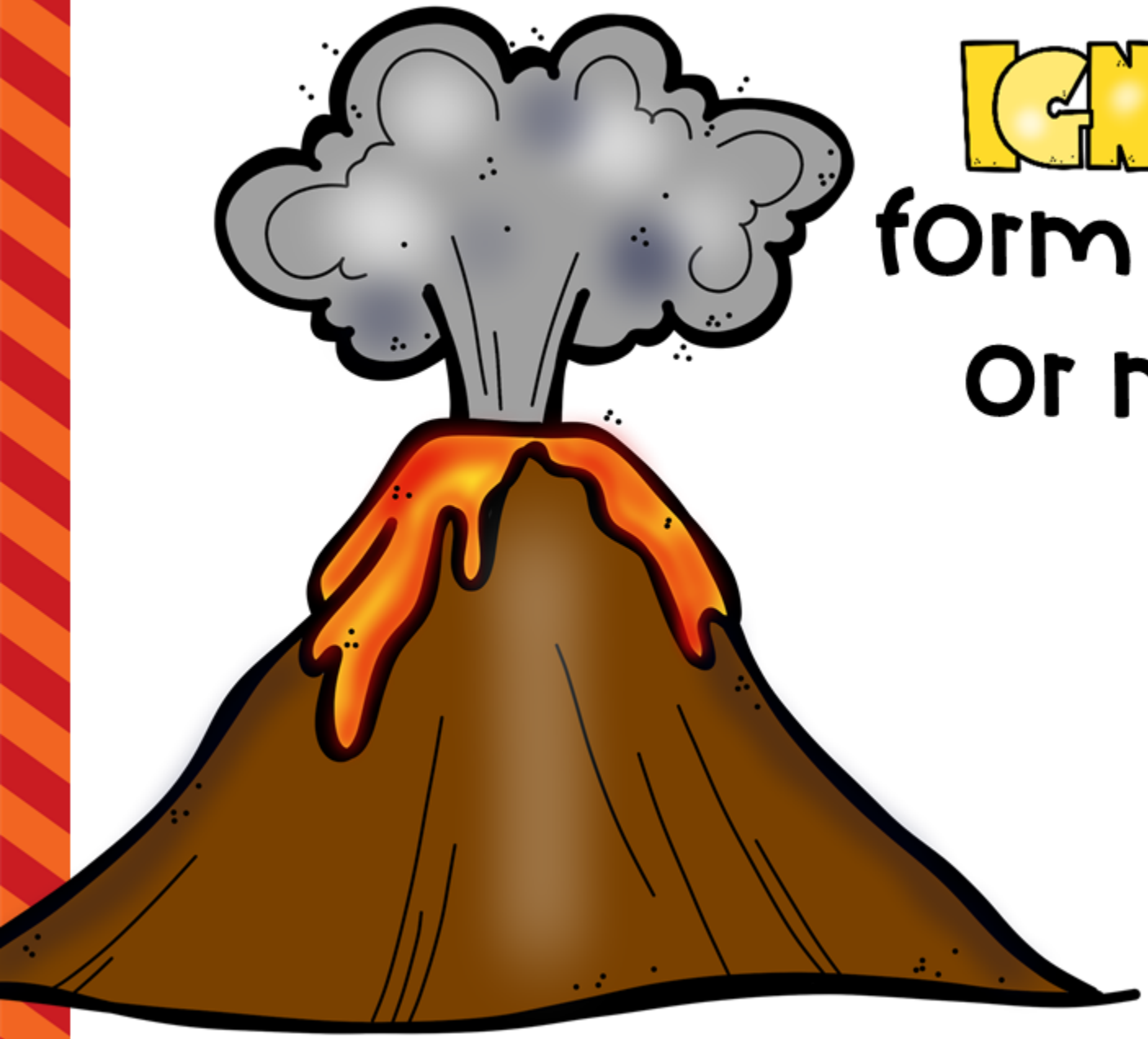
earth's crust

LAVA

is melted rock

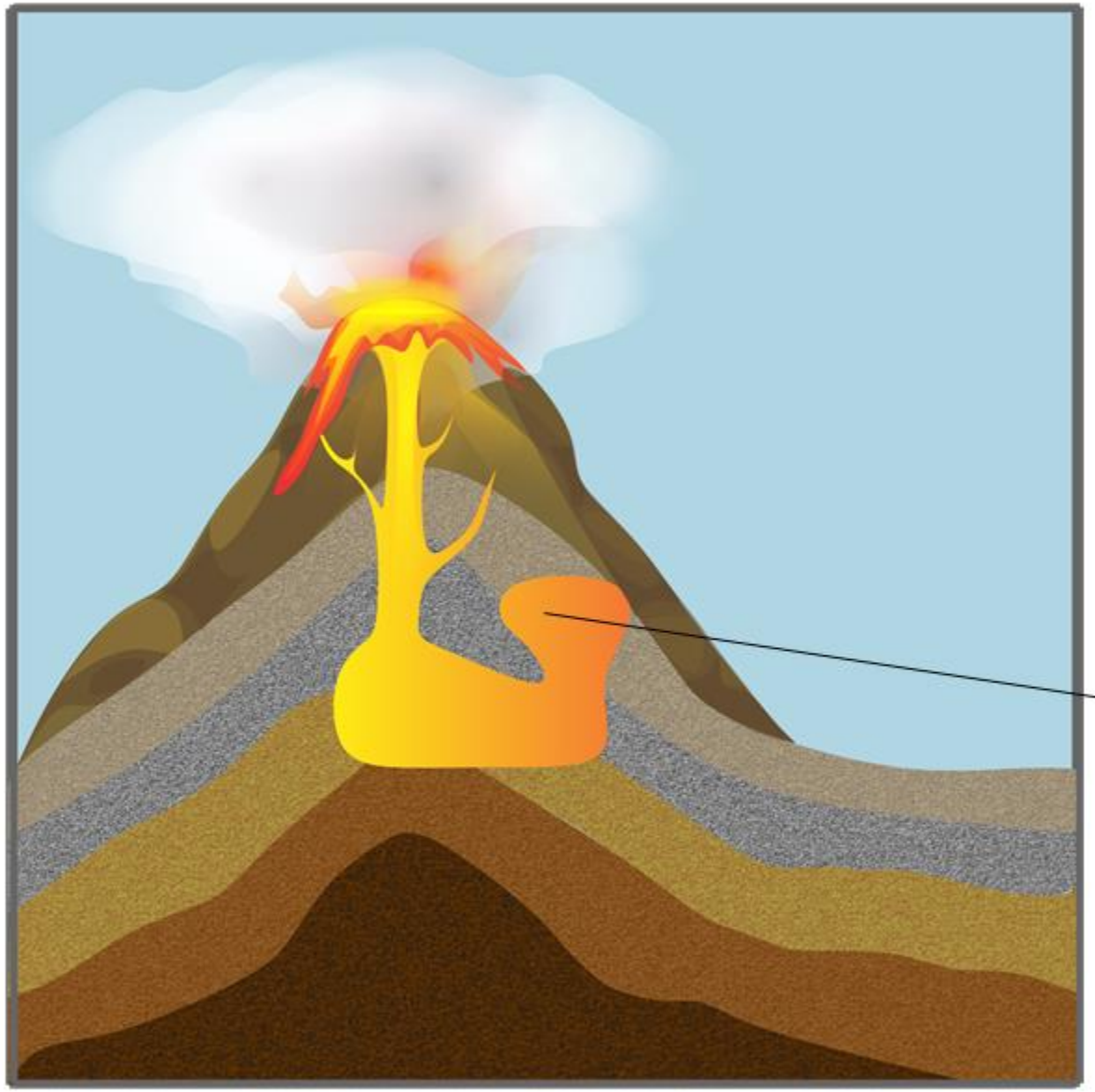
<u>above</u> the

earth's crust



IGNEOUS ROCKS form whenever lava or magma cools.

That's why they are often called volcanic rocks.



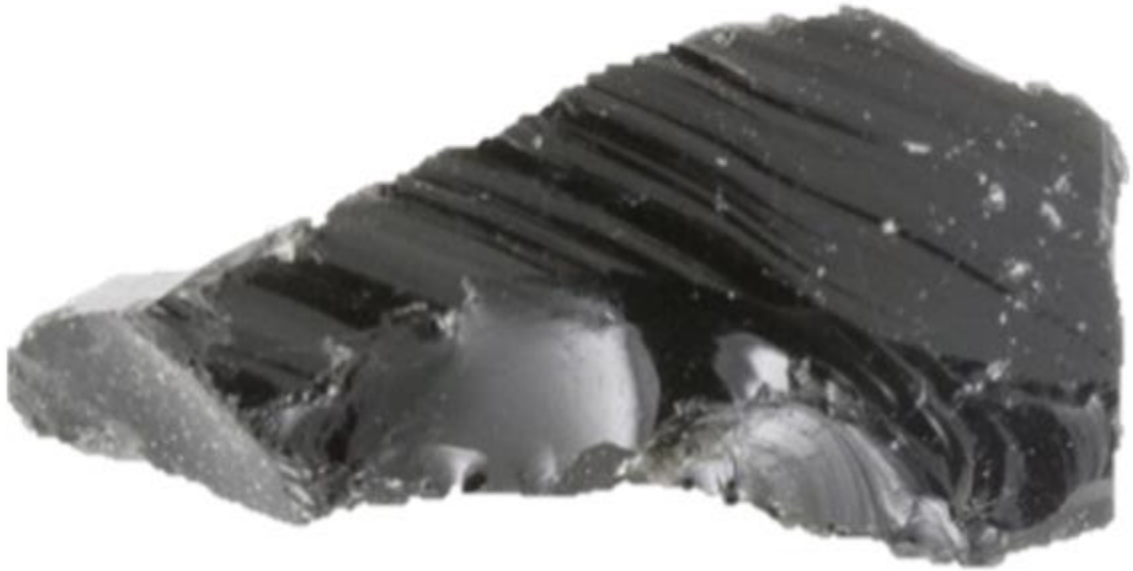
This is granite, it is an intrusive igneous rock

Many modern homes have granite countertops because granite is beautiful, hard to scratch, and low maintenance.

This is pumice. It is an extrusive igneous rock. It is very light. It is known for being the only rock that can float on water.

Because of its coarse texture, pumice is often used to scrub off the calluses on people's feet.

Obsidian is fairly easy to identify due to its dark color (usually black but sometimes green), sharp edges, and conchoidal fractures (meaning, it breaks into "c" shapes).

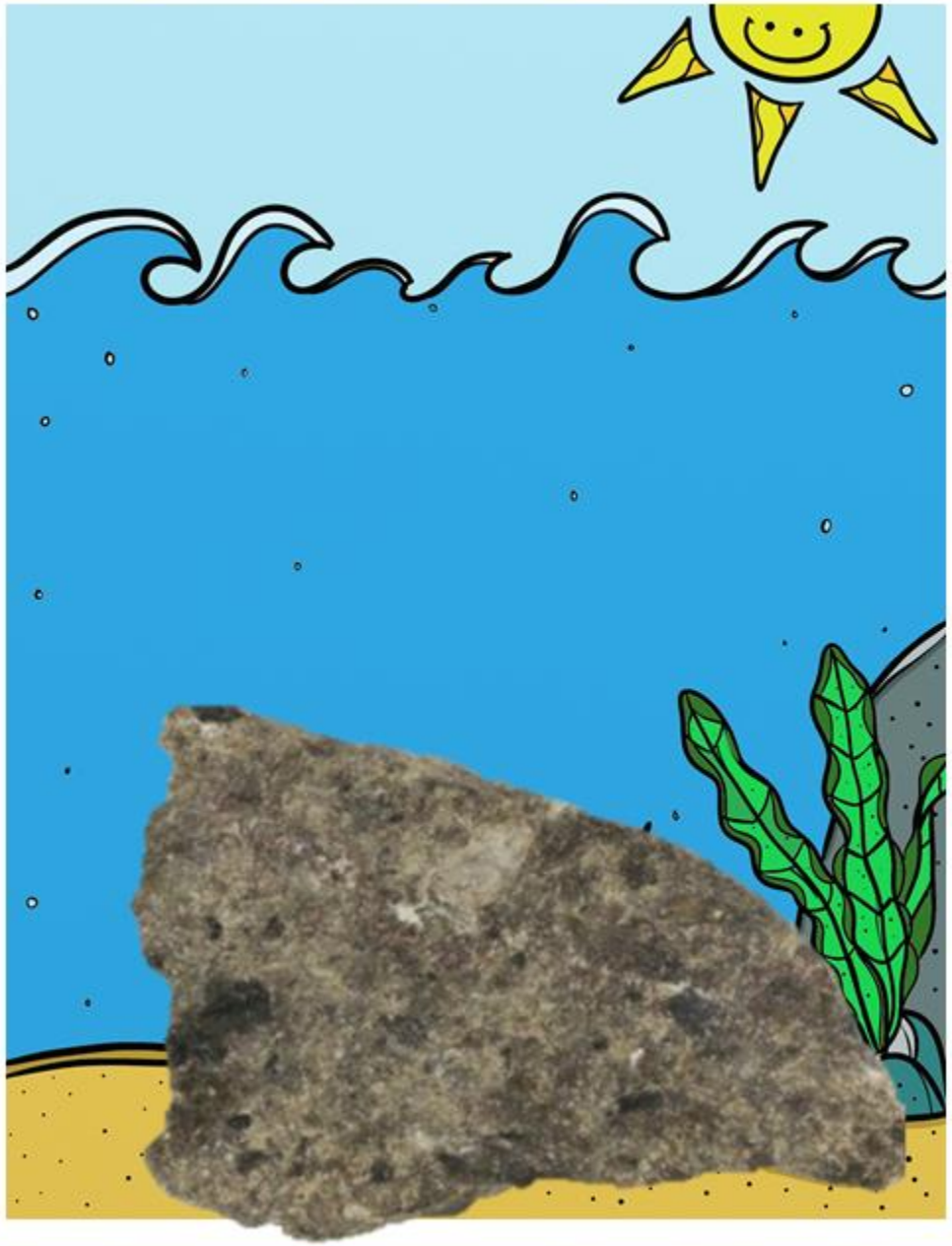


Obsidian was a very useful tool in the Stone Age because it could be chipped to make knives, arrowheads, spear points, scrapers, and many other weapons and tools.

Nowadays, people use obsidian for jewelry, decorative pieces, and even surgeries. It is said to be thinner and sharper than modern tools, making it a very handy tool during surgery.

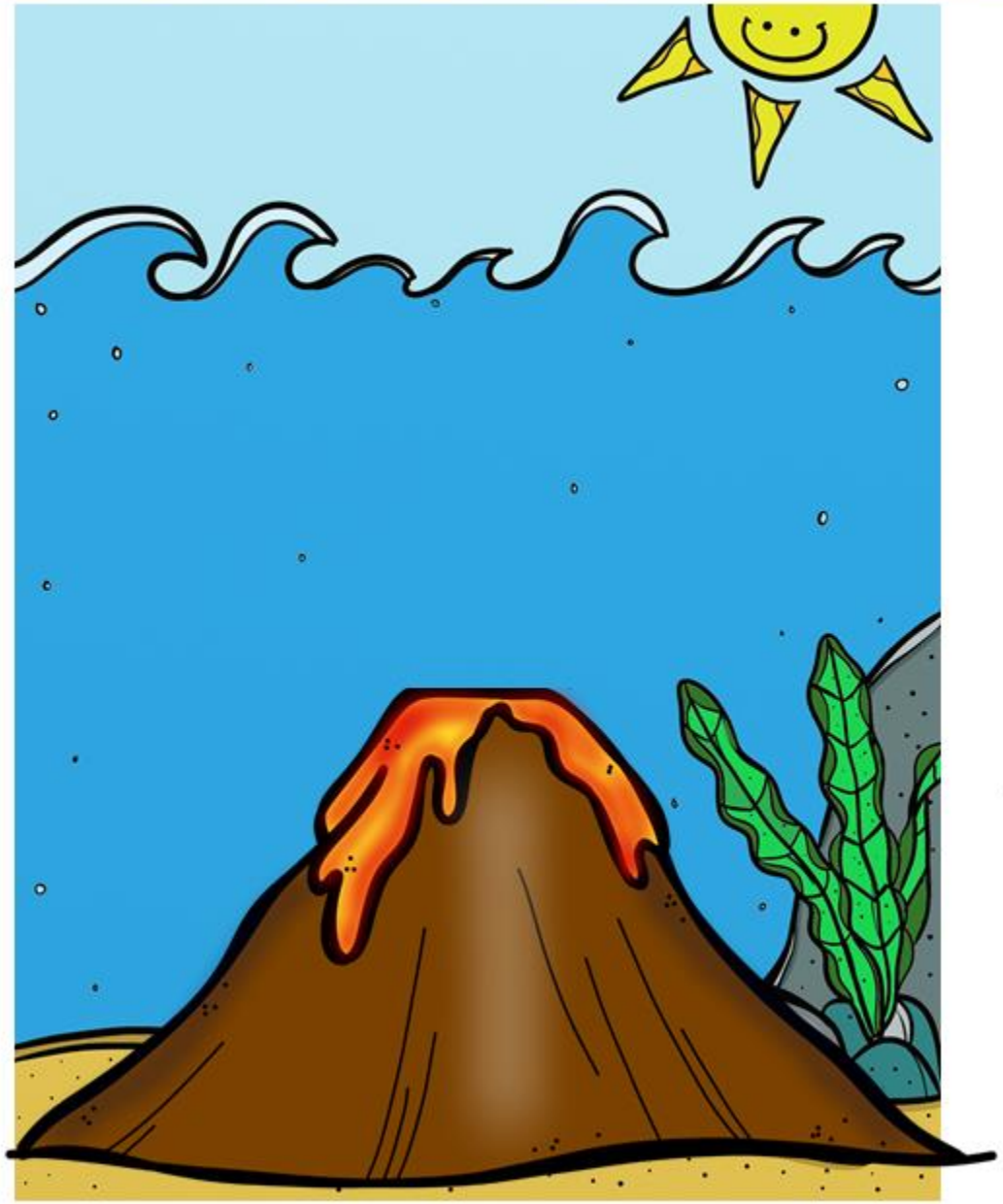
This is basalt, another extrusive igneous rock.

Basalt is the most common rock on earth. A lot of it is under water. Most of the ocean floor is basalt.



You might be thinking, "Wait a minute, if basalt is magma that has cooled, then that means that magma must have been under water. How did magma get under water?"

Does anyone know how magma gets at the bottom of the ocean?



It's because there are many volcanos under water!

Volcanos don't just erupt through the continental crust. Many volcanos occur on the oceanic crust, especially around the "Ring of Fire."

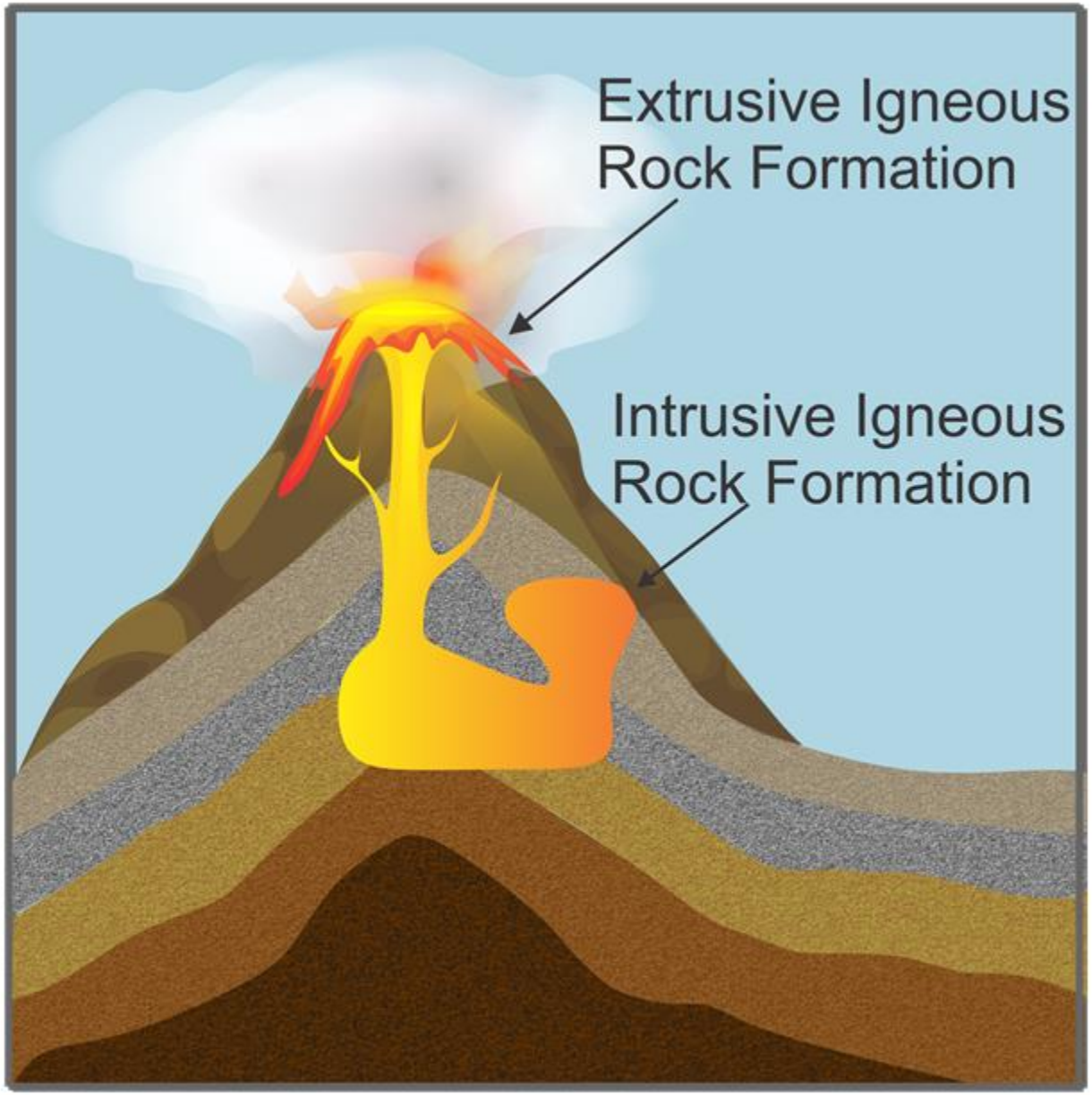
Basalt is most commonly used in construction. It is often crushed into pieces, combined with other materials, and then used for roads, concrete, asphalt, and many other manufacturing purposes.

There's one more characteristic that all igneous rocks share, intrusive or extrusive. Look at the following rocks and discuss with your neighbors. What do you think all igneous rocks have in common?

Here's a hint: it's something they all DON'T have

They all don't have LAYERS!

Let's review igneous rocks.



Igneous rocks can be intrusive or extrusive.

Intrusive igneous rocks are formed when magma cools underneath the Earth's crust.

Extrusive igneous rocks are when magma reaches the earth's surface (on land or under the sea), erupts or flows as lava, cools quickly, and then forms rock.

If you find a rock that has...

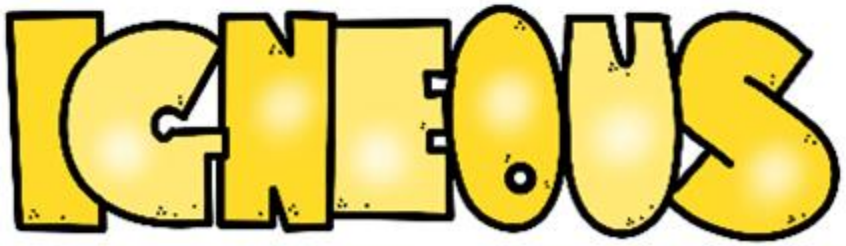
air pockets

large crystals

NO LAYERS

or looks like glass

think



Examples of

INTRUSIVE IGNEOUS ROCKS

Examples of

EXTRUSIVE IGNEOUS ROCKS

scoria

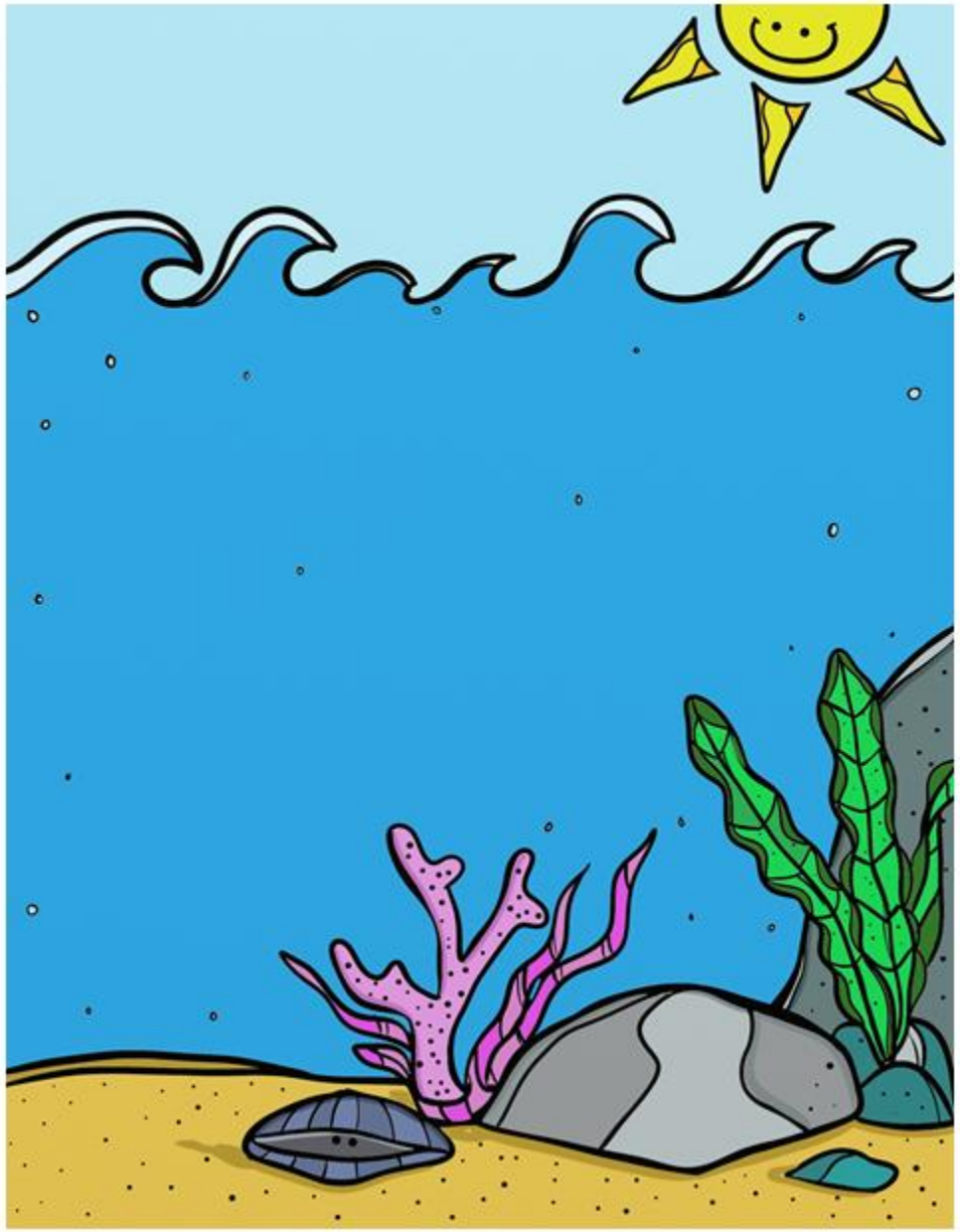
obsidian

pumice

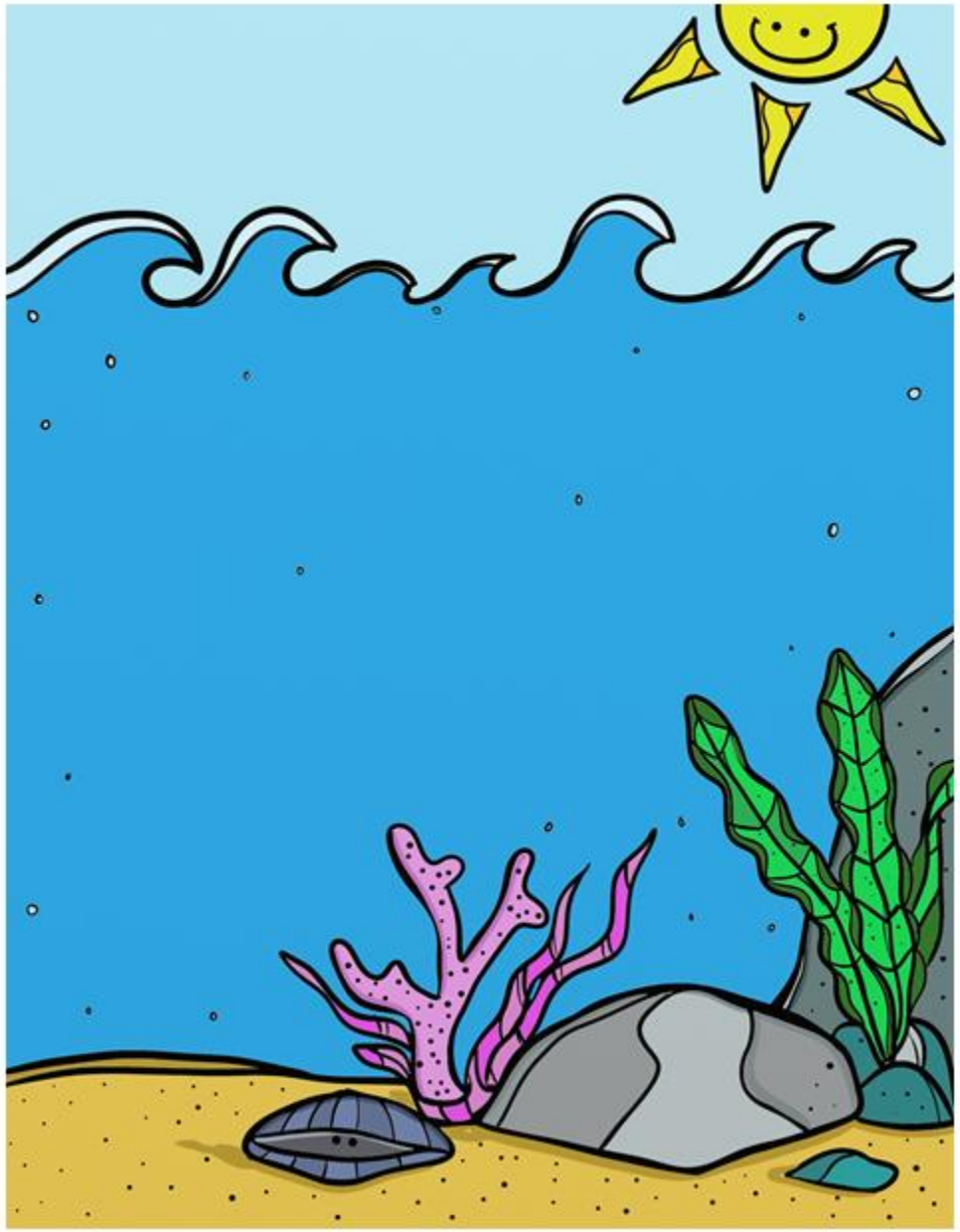
basalt

Let's write down what we learned.

Type of Rock	How it was made	Characteristics	Examples
	Magma or lava that has cooled Intrusive: magma that has cooled inside the earth Extrusive: lava that has cooled outside the earth	Igneous rocks are NOT layered Intrusive: large crystals Extrusive: Glass-like Air pockets	Intrusive: granite, diorite, gabbro Extrusive: pumice, obsidian, basalt, scoria



Now we're going to learn about sedimentary rocks



As we learn about sedimentary rocks, what three things should you be listening for?

Listen for these three things:

1. How they get made (formation)

2. What their characteristics are (what they look like/feel like)

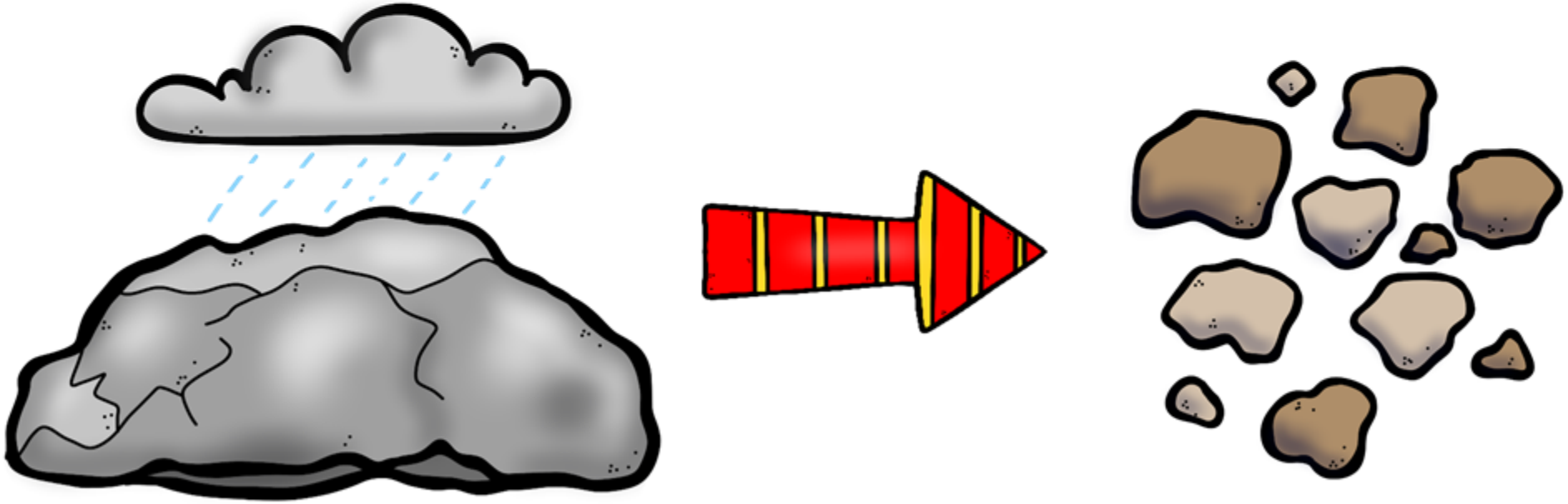
Type of Rock	How it was made	Characteristics	Examples
SEDIMENTARY			

3. And some examples

To understand how SEDIMENTARY ROCKS are formed, we need to understand

sediments

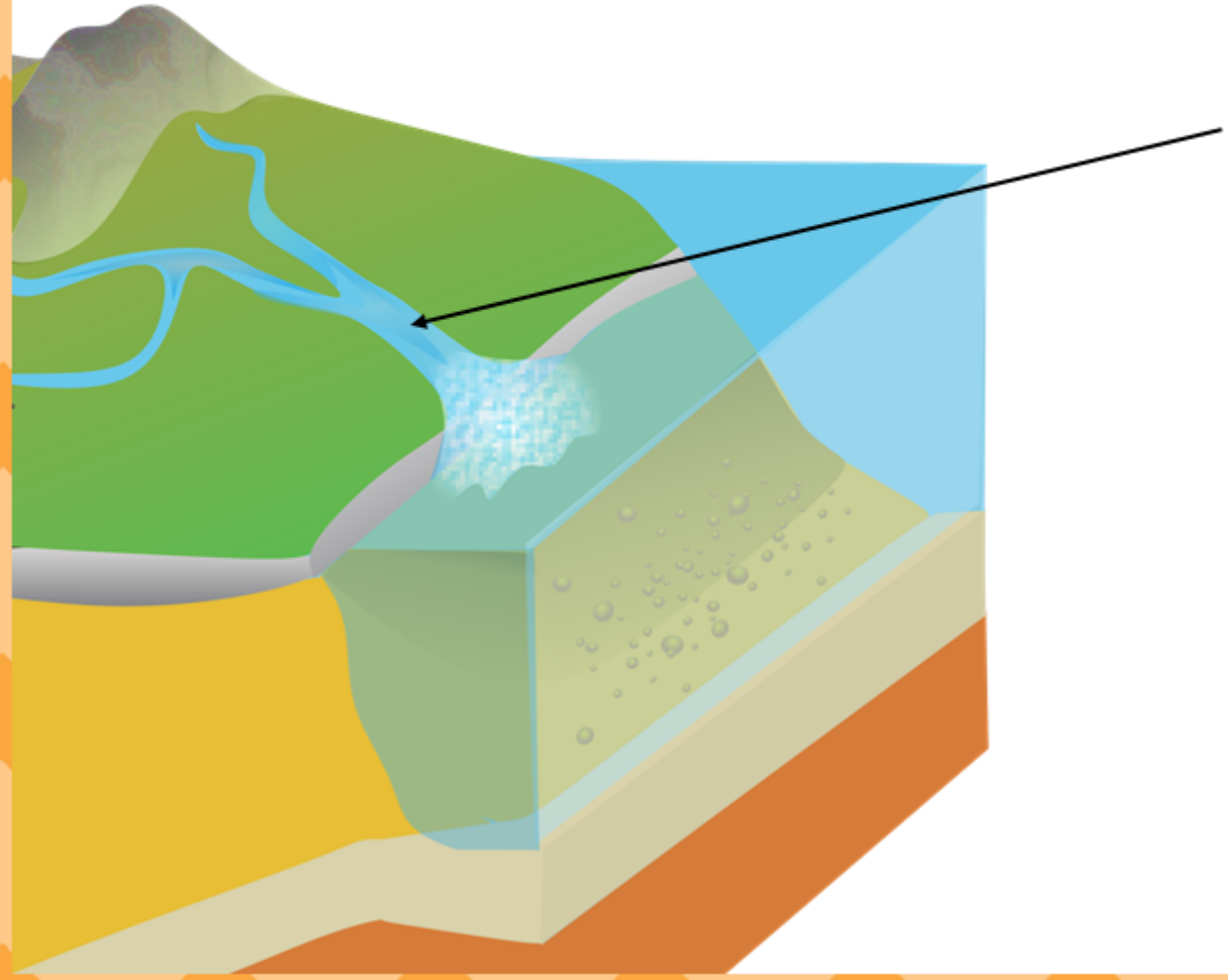
Water and wind are very powerful forces that can break rocks into small pieces.



Those small pieces of rock are called

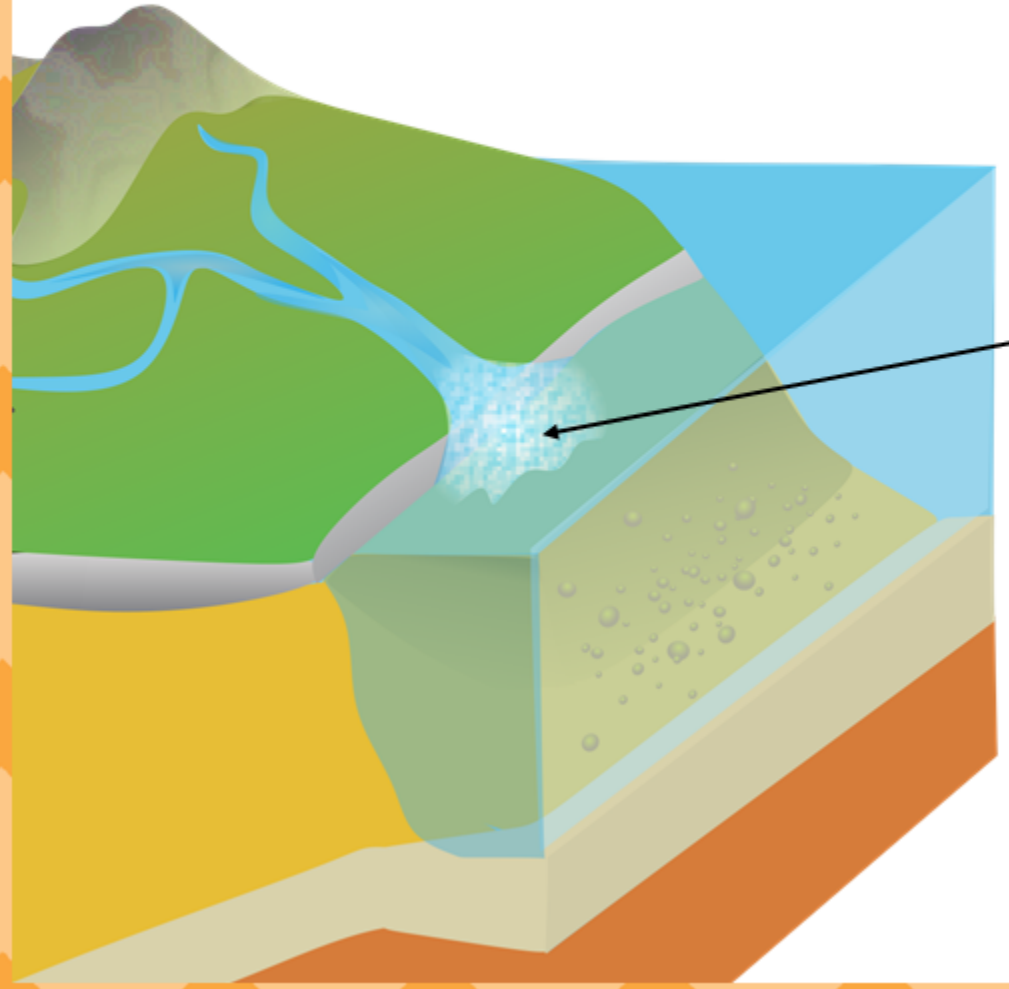
sediments

SEDIMENTARY



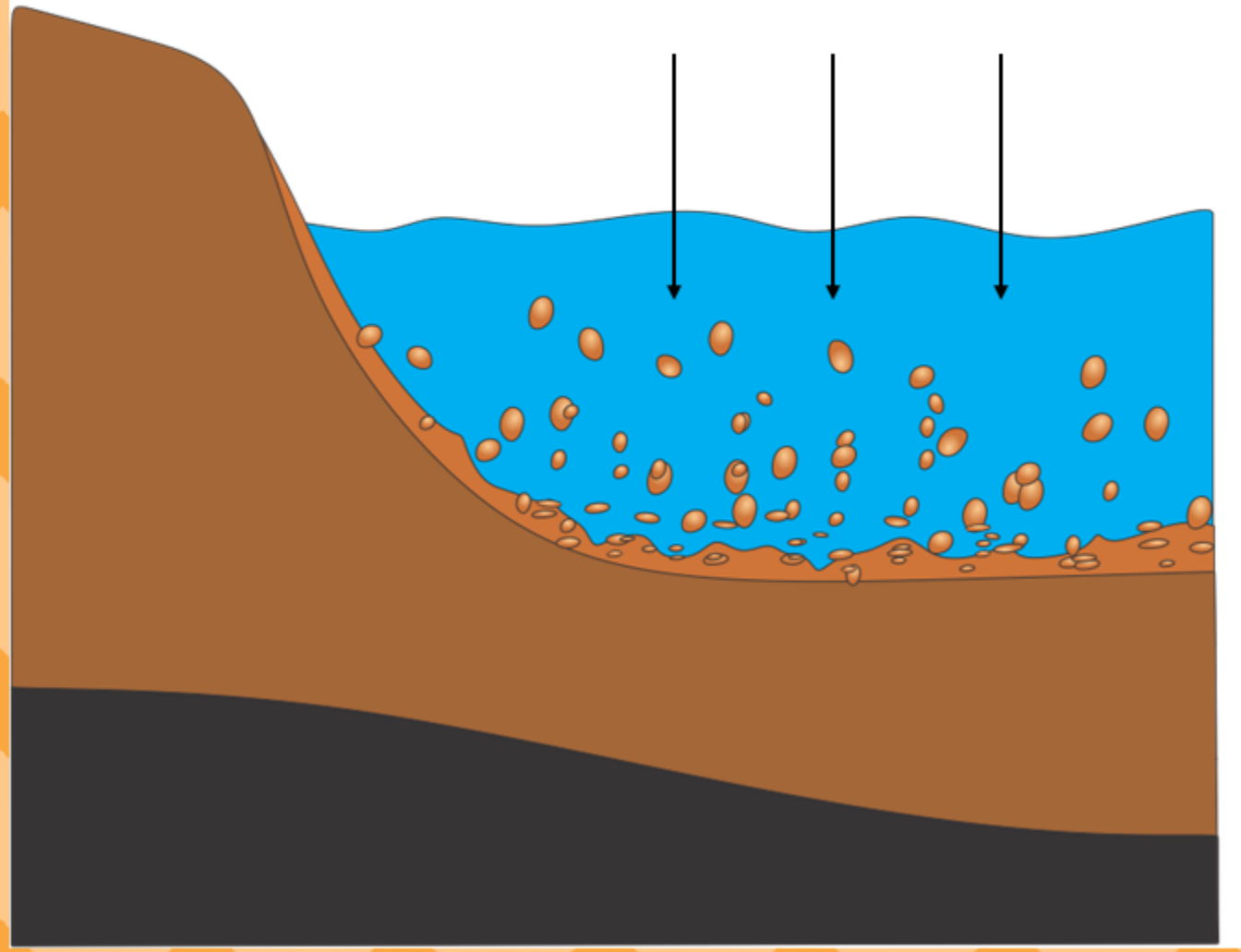
Rivers transport sediments with them as they make their way towards the ocean.

SEDIMENTARY



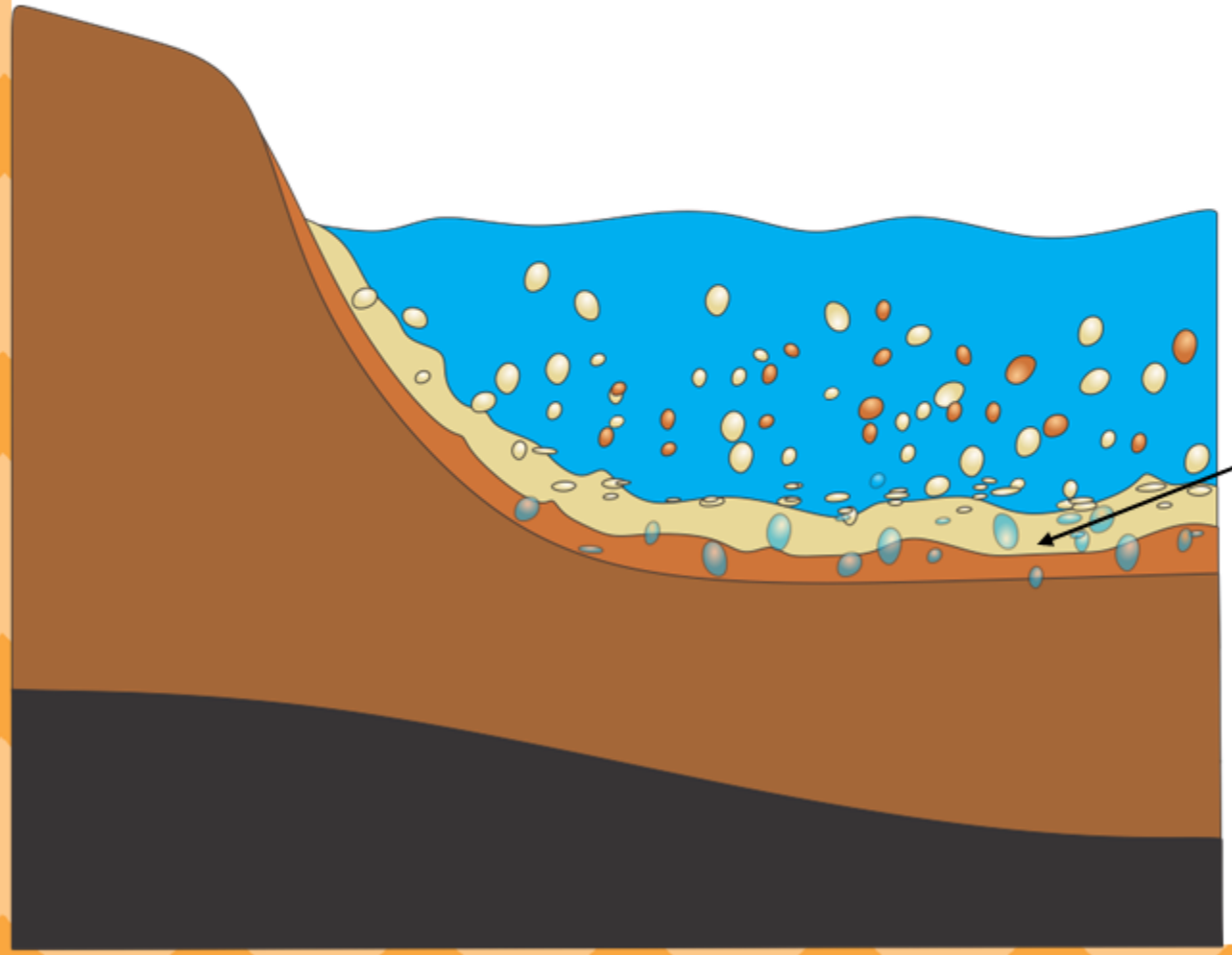
When the sediments reach the ocean, they are no longer carried by the river and sink to the bottom of the ocean floor.

SEDIMENTARY



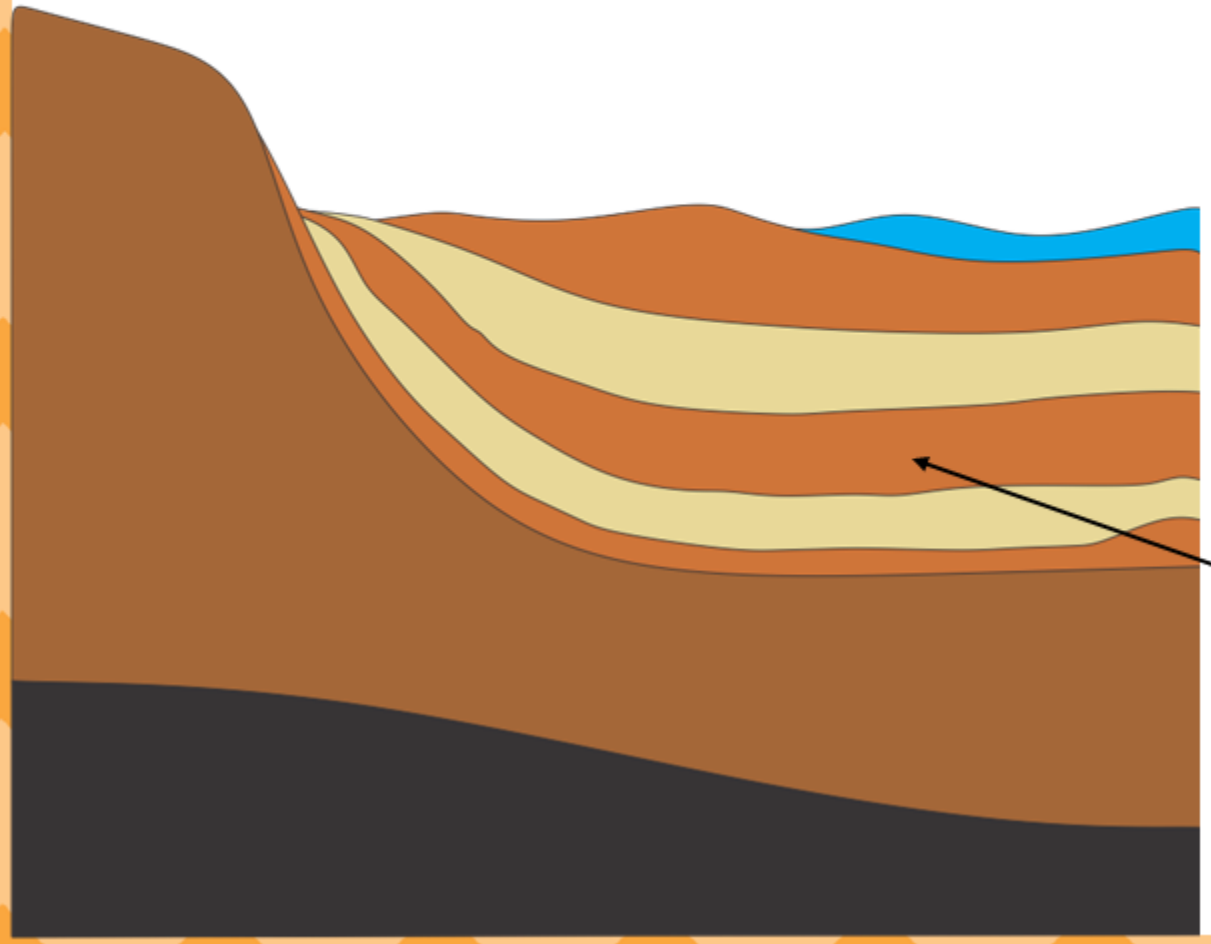
As they fall to the bottom of the ocean floor, they create layers of sediments.

SEDIMENTARY



As the layers of sediments pile on top of each other, the layers on the bottom get compacted together, reducing the amount of space in between the sediments.

SEDIMENTARY



After thousands of years, the sediments begin to stick together and then stay together. The layers are cemented together, forming sedimentary rock.

Sedimentary rocks are often found along cliffs. That is because these cliffs used to be submersed under a lake or the ocean.

Many parts of the Grand Canyon are sedimentary rock.

Can you see all the layers? The layers on bottom are the oldest.

Sedimentary rocks can be identified by their layers, grains, and cemented particles. Another way you can tell if a rock is sedimentary, is if you find fossils.

Here are some examples of sedimentary rocks

See the layers?

See the grains?

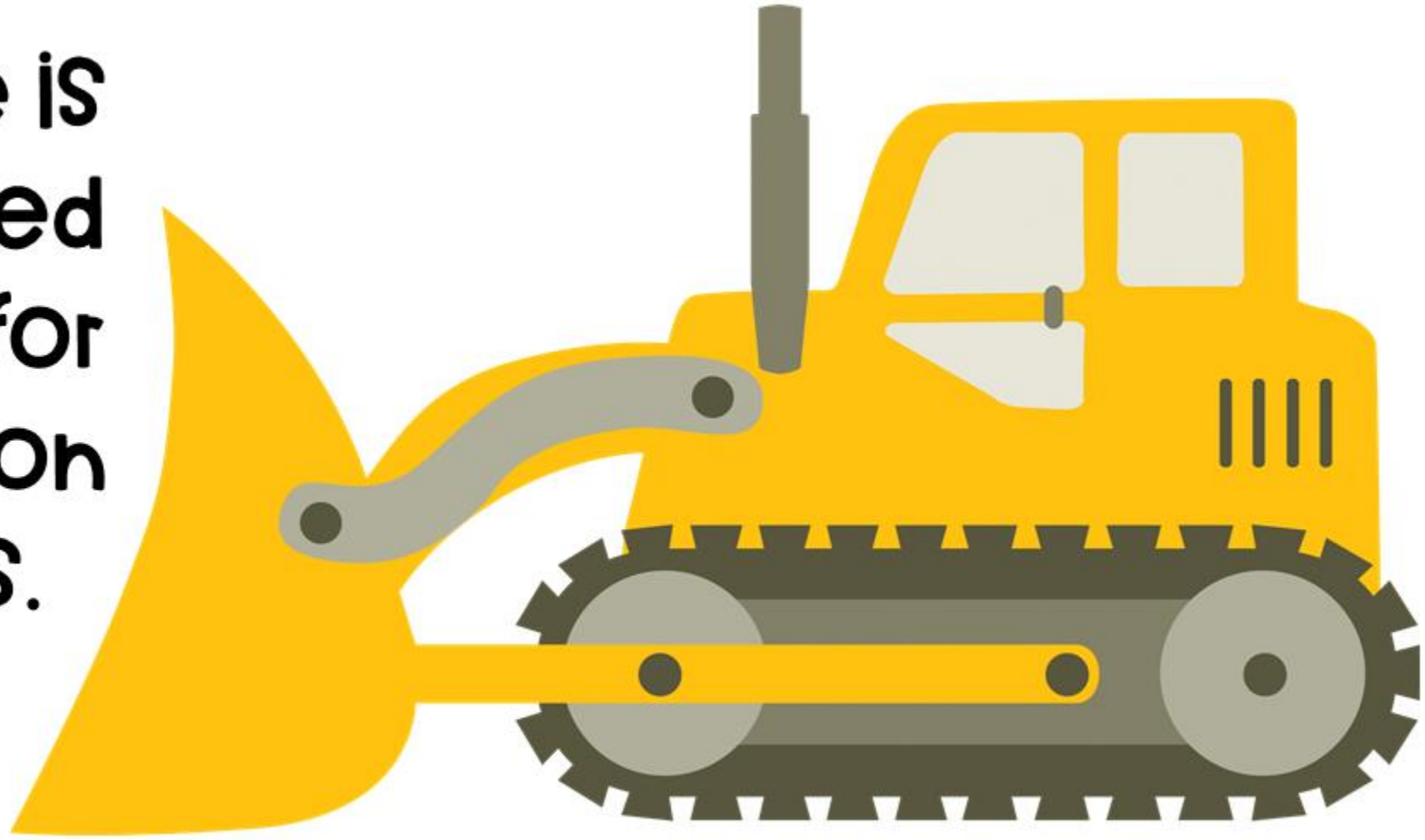
See the cemented particles?

See the fossils?

This is limestone. Limestone is formed from the compaction and cementation of shells, coral, and skeletons of marine animals.

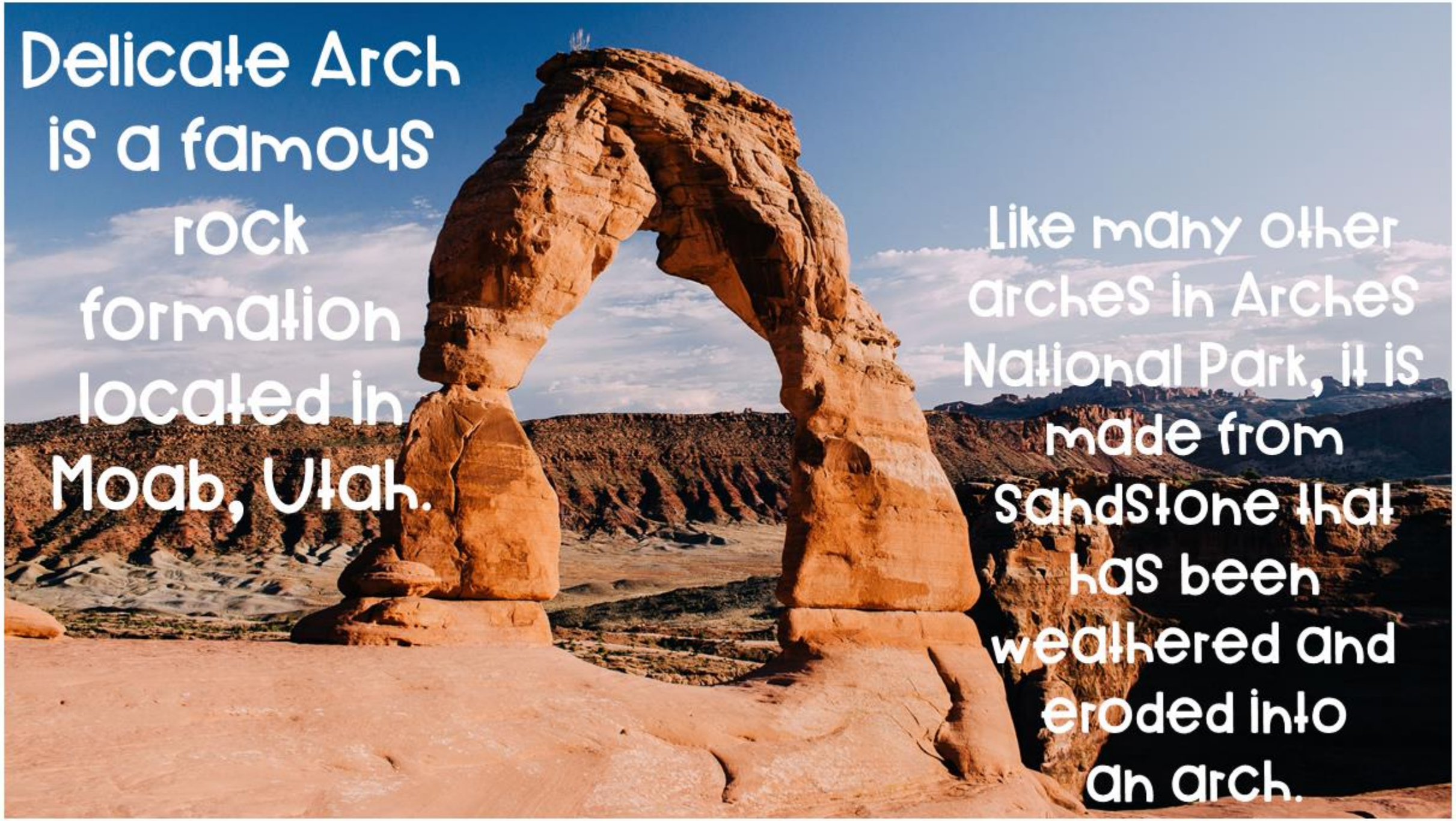
When you are holding limestone, you are holding dead marine plants and animals!

Limestone is often mined and used for construction purposes.



It is also added to toothpaste, plastics, tiles, paint, and paper to make it look white. Plus, it's an inexpensive filler.

This is sandstone. It is formed when layers of sand are compacted and cemented together.


Delicate Arch is a famous rock formation located in Moab, Utah.
Like many other arches in Arches National Park, it is made from sandstone that has been weathered and eroded into an arch.

Like limestone, sandstone is often mined and used for construction purposes.

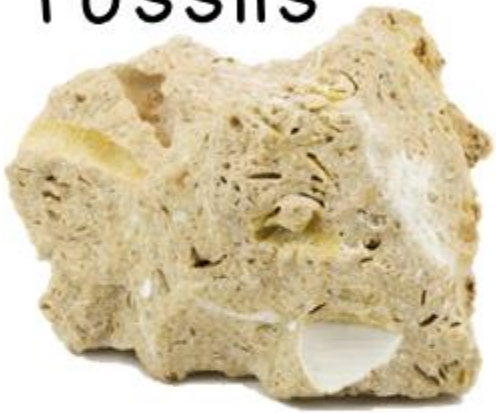
Let's review Sedimentary rocks

Sedimentary rocks form when sediments get compacted for thousands of years and then cemented together.

If you find a rock that has

layers

fossils



particles that have been cemented together

grains

Or no crystals

Think

SEDIMENTARY

Examples of sedimentary rocks

conglomerate

limestone

coal

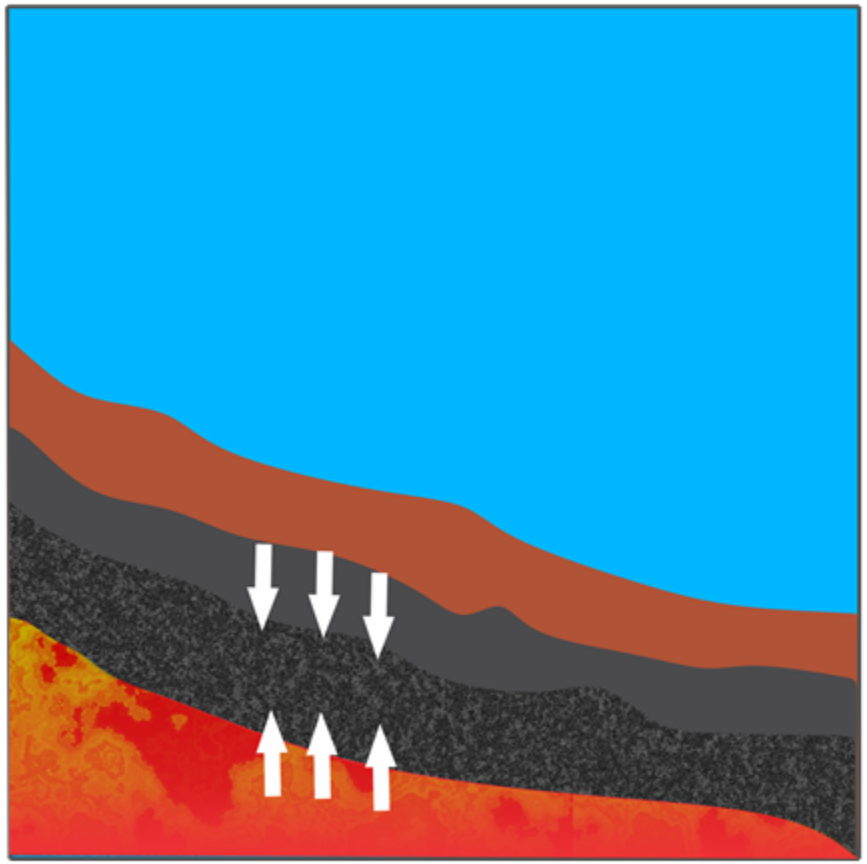
sandstone

shale

Let's write down what we learned.

Type of Rock	How it was made	Characteristics	Examples
	Sediments get deposited at the bottom of the ocean and get **compacted** together. After many years, the layers get **cemented** together.	Layers Grains Particles that have been cemented together Fossils They typically DO NOT have crystals	Limestone Sandstone Conglomerate Shale Coal

The last type of rock we're going to learn about is metamorphic.



As we learn about metamorphic rocks, what three things should you be listening for?

Listen for these three things:

1. How they get made (formation)

2. What their characteristics are (what they look like/feel like)

Type of Rock	How it was made	Characteristics	Examples
METAMORPHIC			

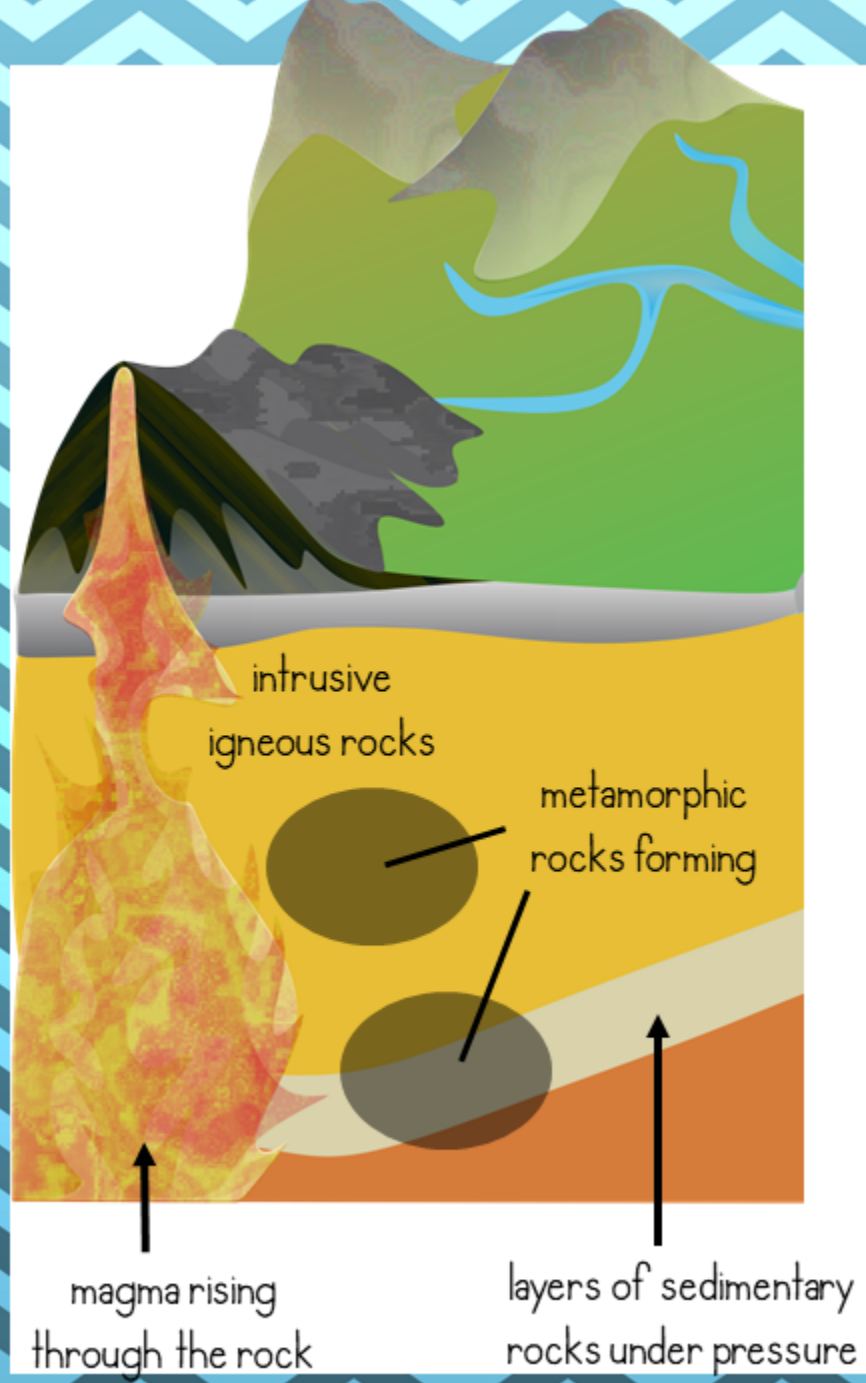
3. And some examples

To understand how METAMORPHIC ROCKS are formed, we need to understand the word, "Morph."

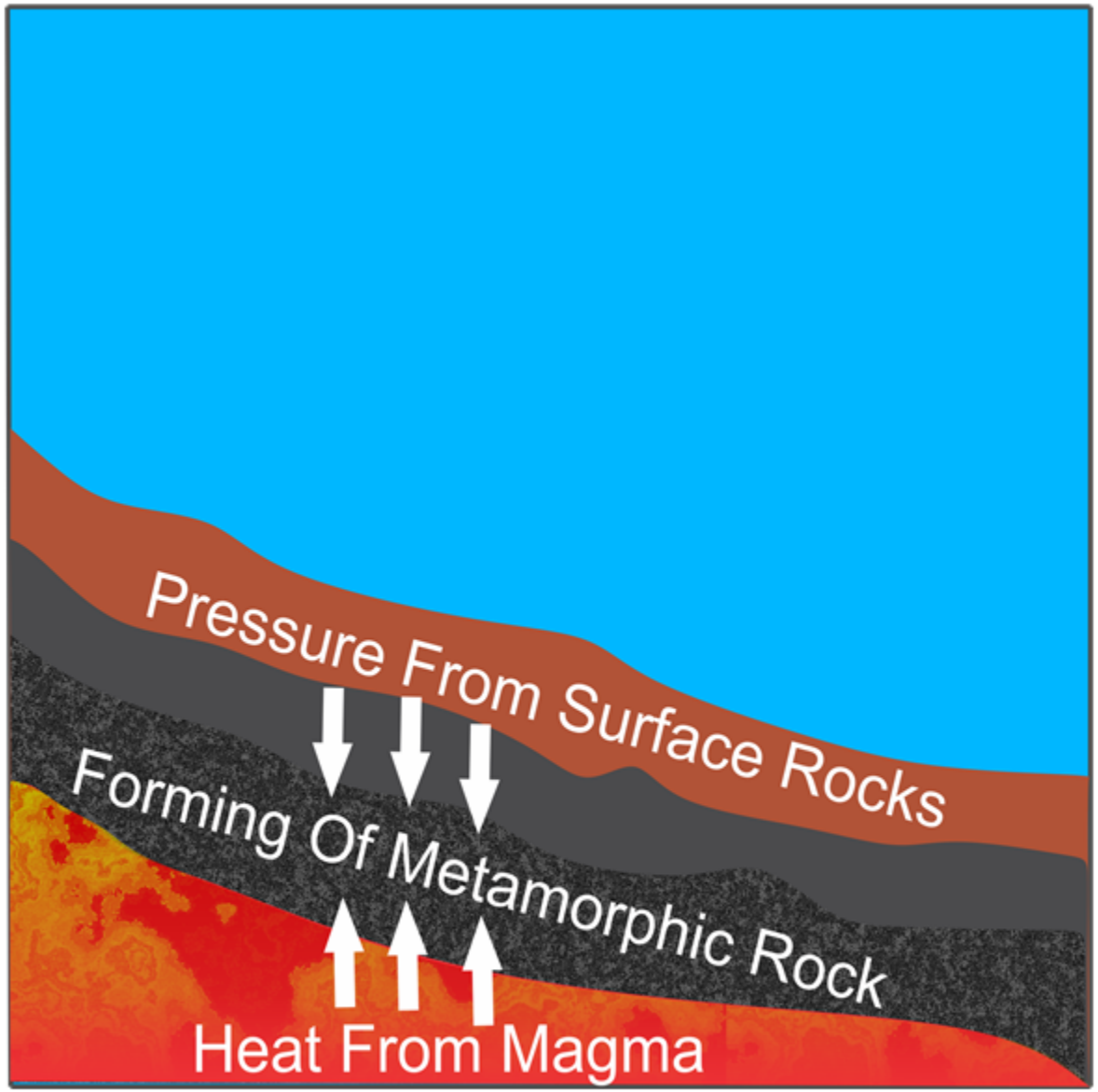
The word, "Morph," means to undergo transformation, or to change

METAMORPHIC ROCKS

are changed rocks. They used to be igneous or sedimentary and then they transformed into a whole new rock.



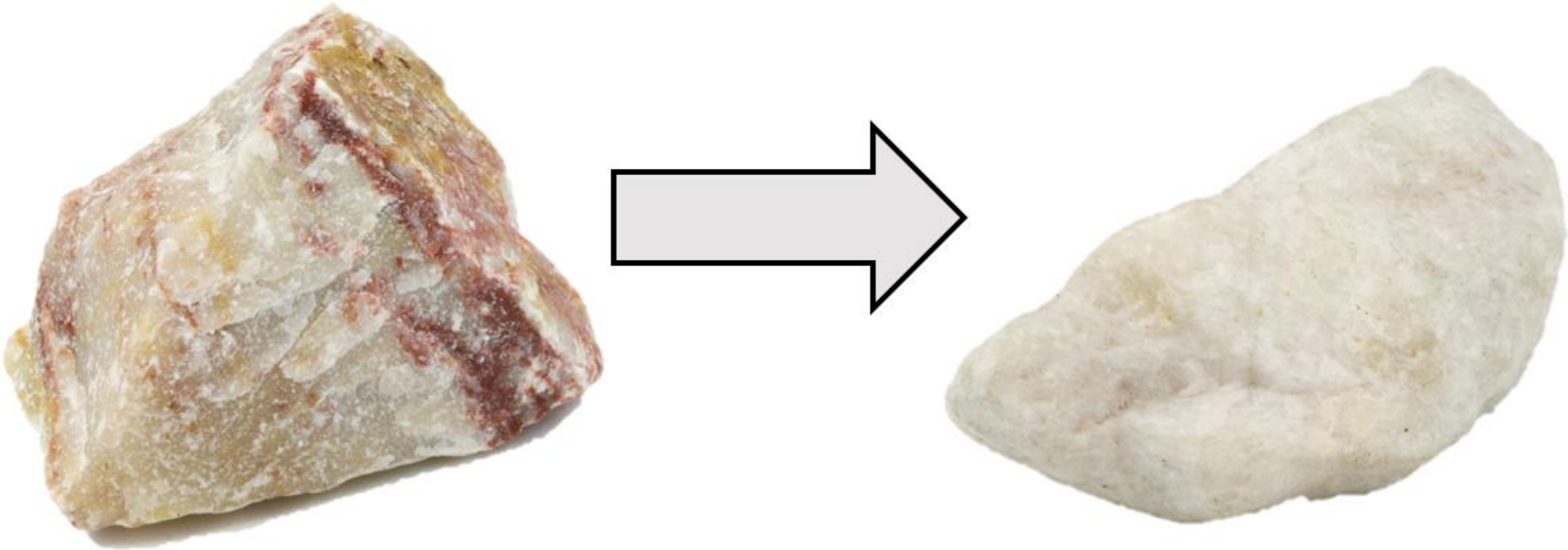
Intrusive igneous rocks and sedimentary rocks that are underground and near magma, receive heat from the magma, and pressure from the layers above.



When rocks undergo heat and pressure, metamorphic rocks are formed.

Heat and pressure make rocks more beautiful and much stronger. Rocks that were once dull, grow beautiful crystals. Rocks that were once fragile, become difficult to break.

For example, limestone changes into marble



Marble, a metamorphic rock, is often used for countertops and monuments.

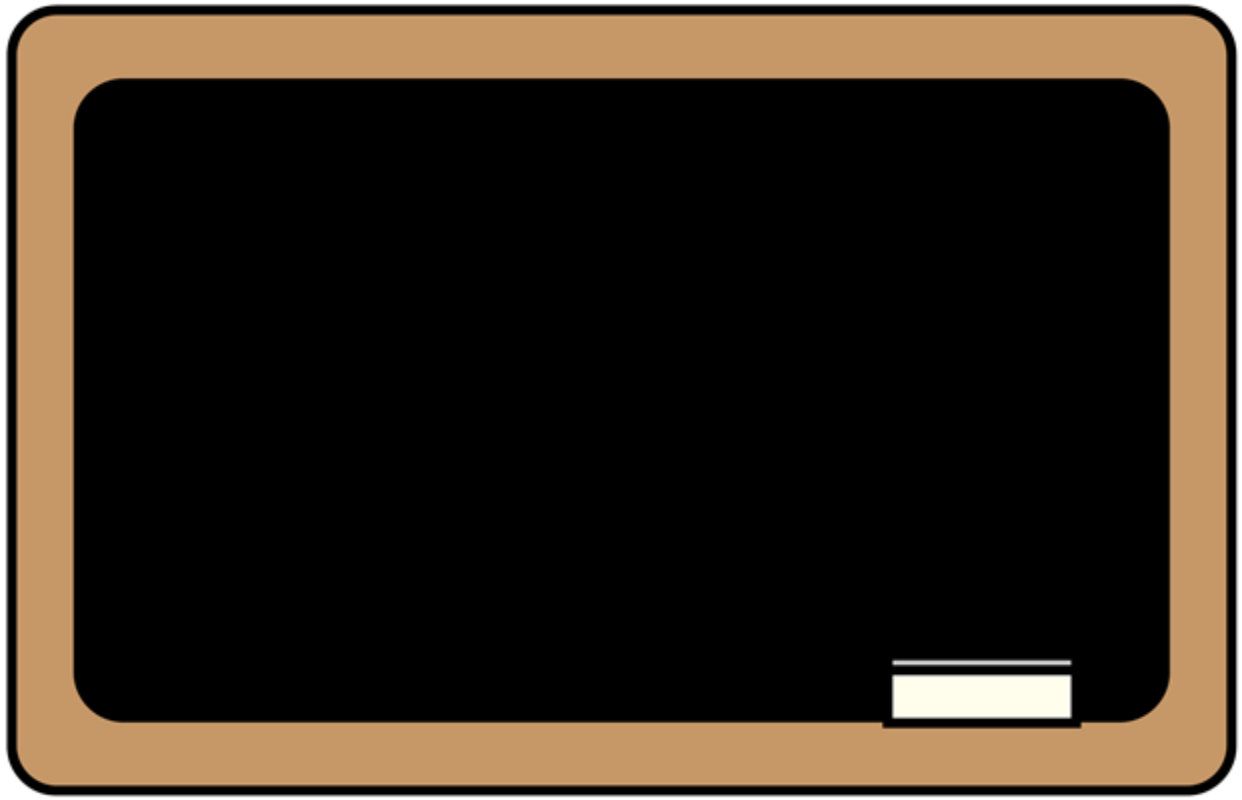
The Lincoln Memorial located in Washington, D.C. is primarily made out of marble.

Shale changes into Slate

Remember how Shale was too fragile to build with?

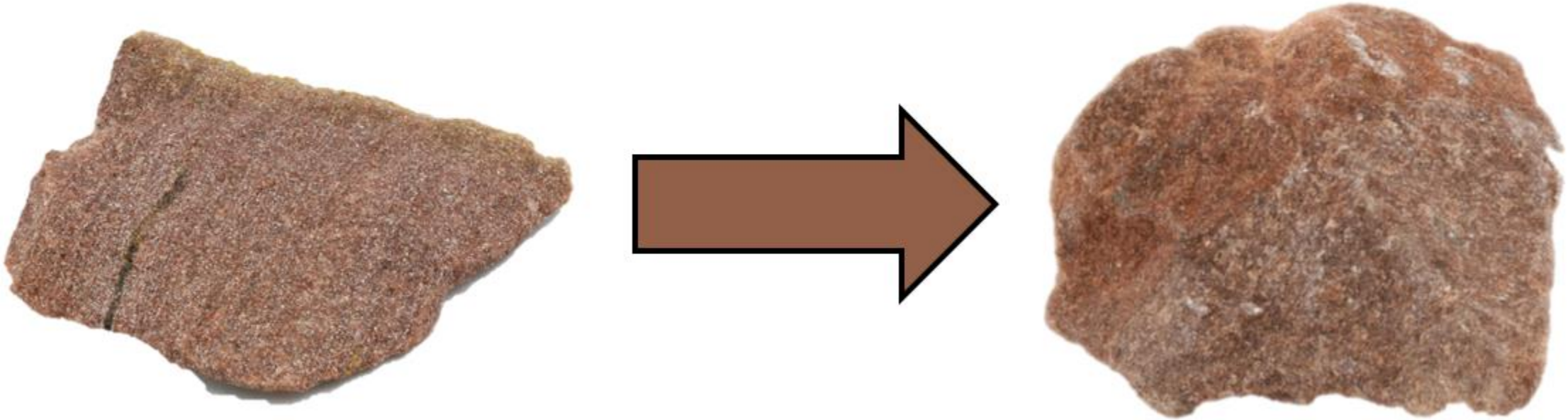
Well not Slate!

Slate has many uses. Because it is so strong and durable, it is used for roofing, flooring, gravestones, and if you top it off with some felt, it makes a great pool table.

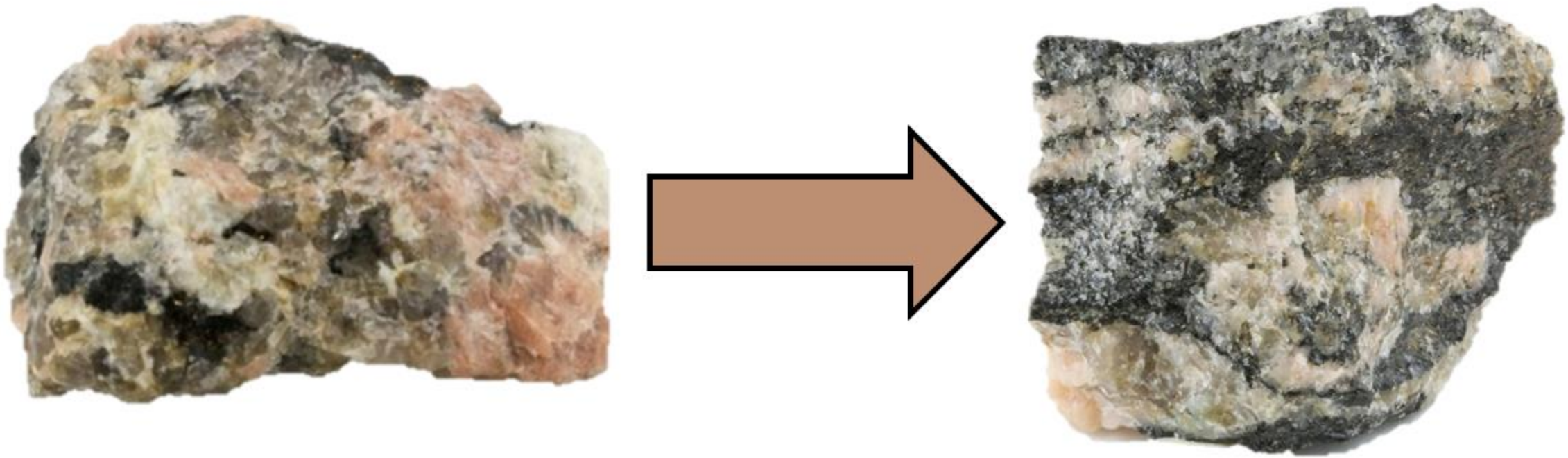


Years ago, it was commonly used for school chalkboards.

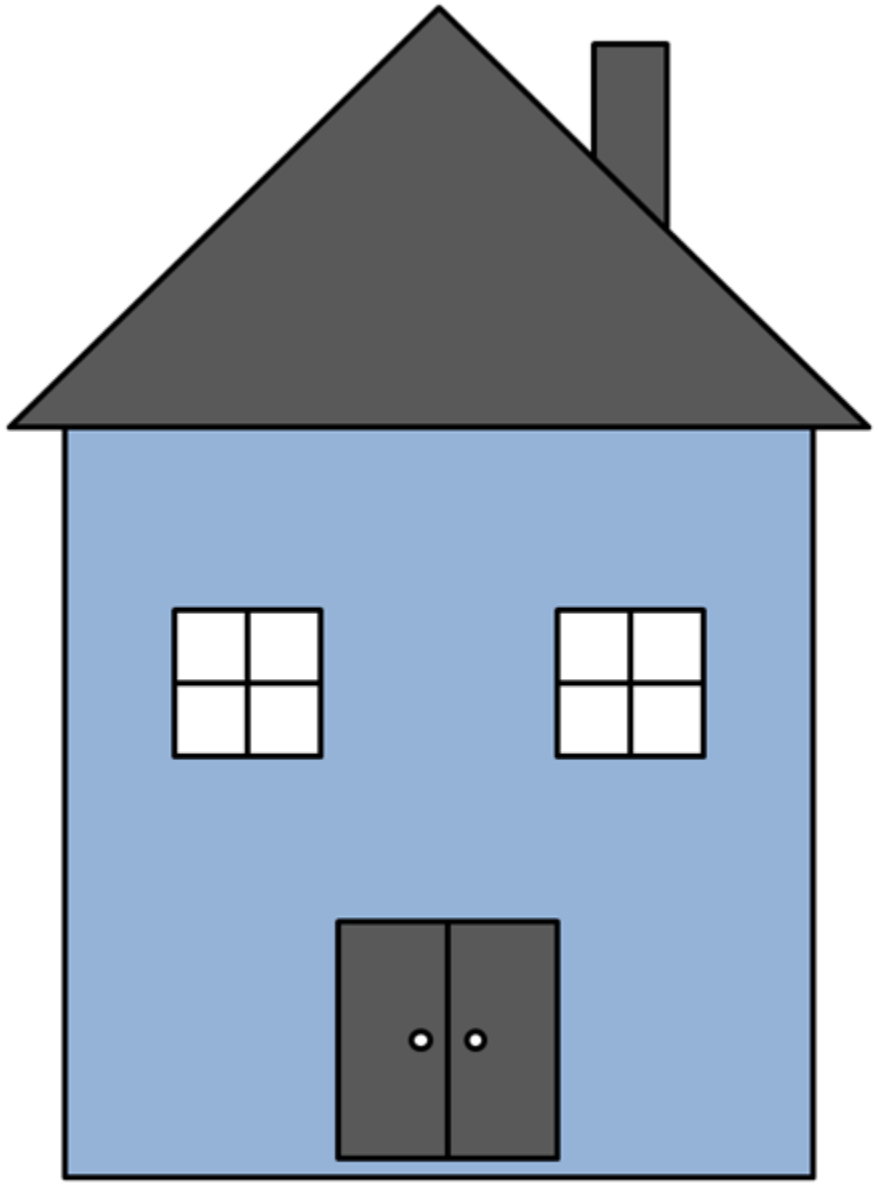
Sandstone changes into quartzite



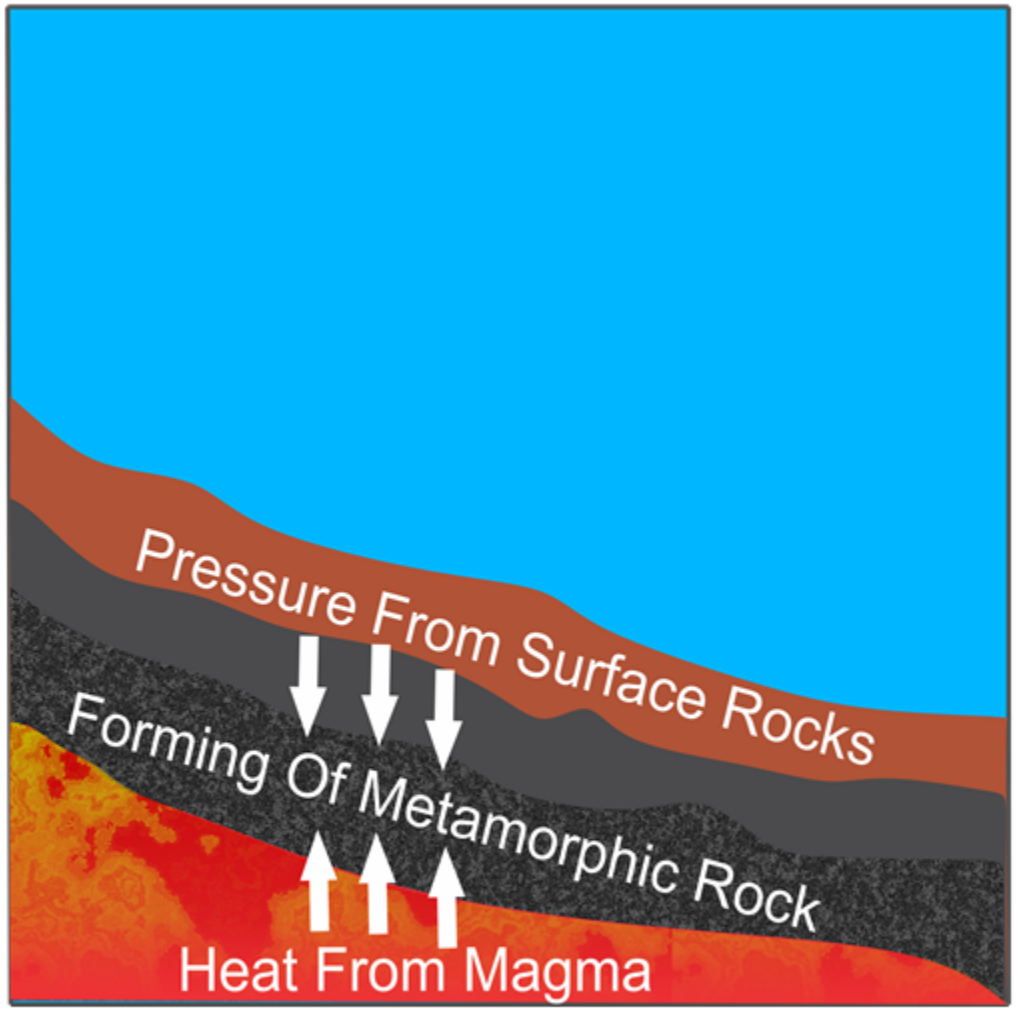
Granite changes into gneiss



Gneiss is also commonly used for countertops, roofing, flooring, and gravestones.



Let's review metamorphic rocks.



When other rocks undergo heat and pressure, metamorphic rocks are formed. A metamorphic rock is a changed rock.

If you find a rock that has

Layers AND crystals

and it's hard

Think

METAMORPHIC

Examples of Metamorphic rocks

gneiss

slate

quartzite

marble

Let's write down what we learned.

Type of Rock	How it was made	Characteristics	Examples
METAMORPHIC	Heat and pressure. It used to be another rock that changed due to heat and pressure.	Hard Crystals that are aligned. In other words, it has crystals AND layers.	Marble (used to be limestone) Slate (Used to be shale) Quartzite (used to be sandstone) Gneiss (used to be granite)