

ROCKS AND MINERALS

find

- 1) content and summary diagrams
- 2) highlighted keywords
- 3) tasks that guide the comprehension of the text and that can be used as a self-learning assessment
- 4) quizzes for self-assessment and check

Questo ppt è stato preparato dalla prof Mariani

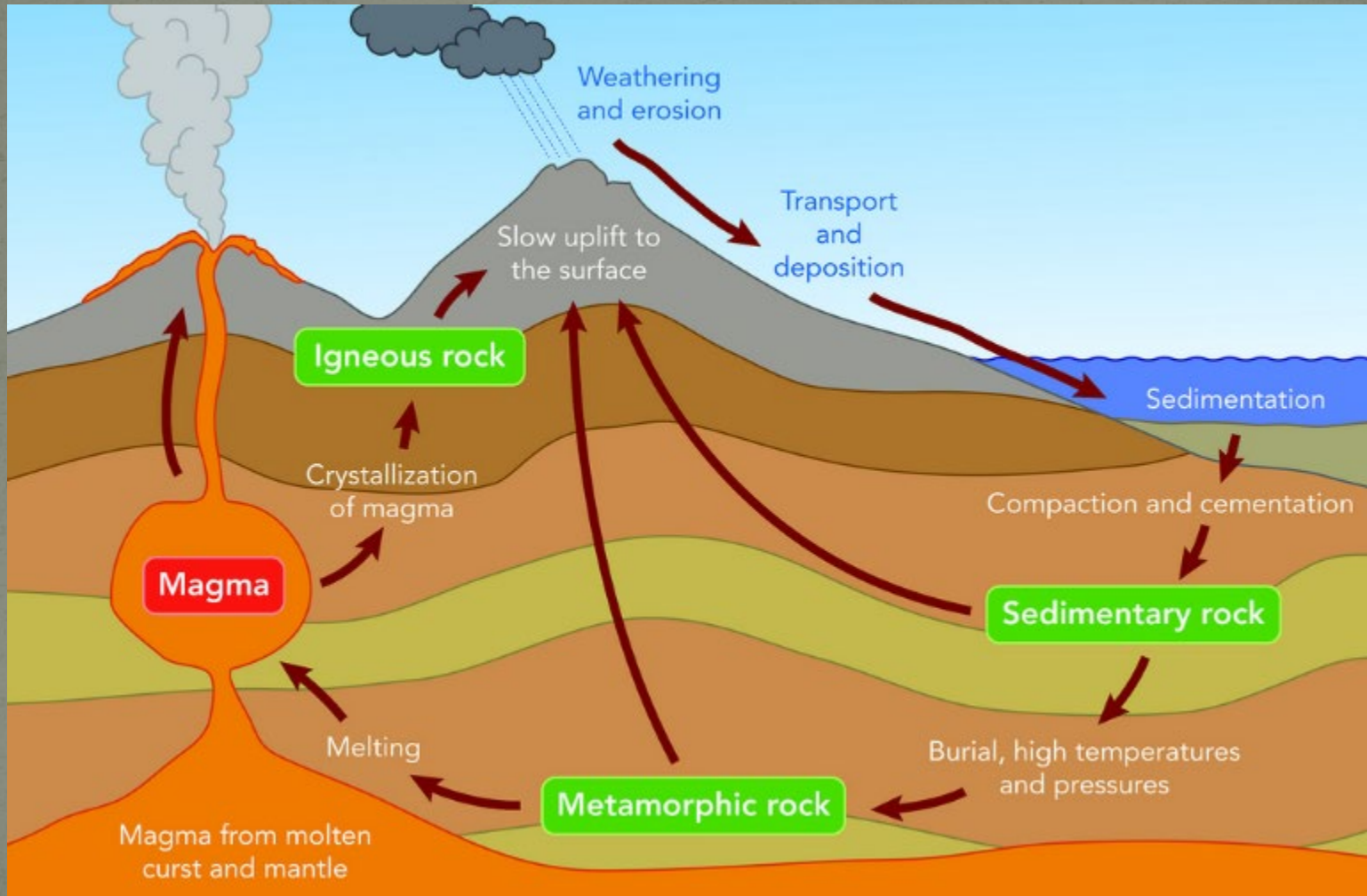
integrando e riadattando il ppt preparato da Prof Degaspero e dall Prof Brochetta

Un quiz è stato preparato da una alunna di 3B in fase di attività didattica a distanza

alcune immagini sono tratte dal libro Gateway; altri riferimenti

https://www.usgs.gov/news/earthword-rock-vs-mineral?utm_source=dlvr.it&utm_medium=google

ROCKS AND THE ROCK CYCLE

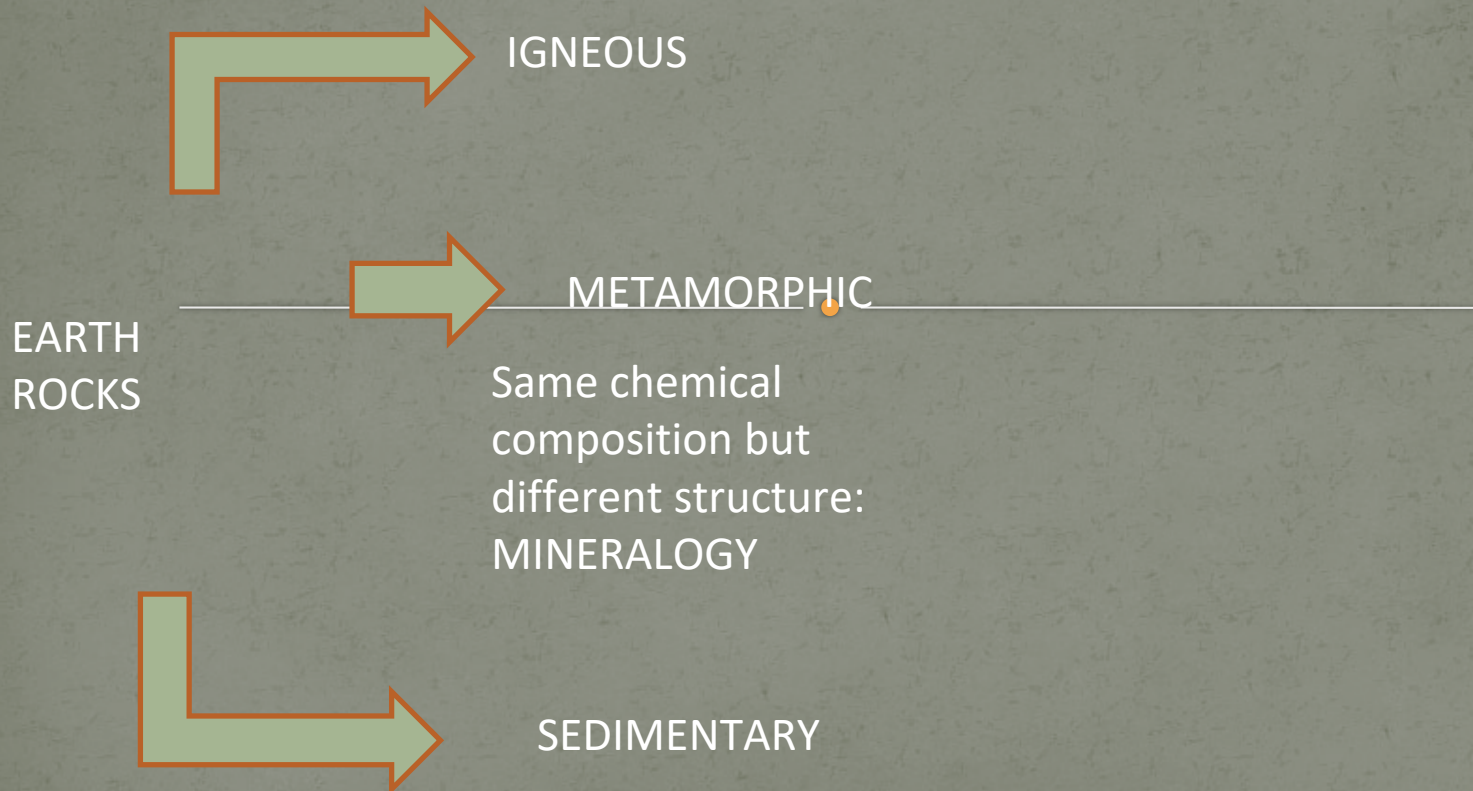


TASKS _ STUDY SCAFFOLDING

1. WHAT ARE ROCKS?
2. HOW ARE ROCKS CLASSIFIED?

ROCKS

MAIN CLASSIFICATION



HOW ARE ROCKS CLASSIFIED?

A rock is a mixture of different minerals, volcanic glass, **organic matter** and/or some other materials.

Rocks are **classified** by how they form.

TASKS _ STUDY SCAFFOLDING

3. WHAT IS THE PRINCIPLE OF SUPERPOSITION?
4. IGNEUS ROCKS: WHAT ARE IGNEUS ROCKS? HOW ARE THEY FORMED? WHERE CAN YOU USALLY FIND THEM? DO YOU KNOW THE NAME OF SOME IGNEUS ROCKS? CAN YOU DESCRIBE ONE OF THEM?

THE PRINCIPLE OF SUPERPOSITION

This important principle says that as layers accumulate over time, the rock at the bottom is older than the rock toward the top.

Scientists use the locations of the layers to date rocks.

IGNEOUS rocks form when molten rock uplifts close to the Earth's surface, cools and gets hard.

As magma cools, atoms crystallize and form mineral grains.

They are often found **associated to volcanoes**.

Obsidian (**effusive**) formed by quick-cooling lava, has almost **no grain** and looks almost like glass.



Basalt (**effusive**) is a dark-colored, fine-grained



IGNEUS ROCKS CAN BE

- **INTRUSIVE ROCK** (plutonic rock) is formed when magma penetrates existing rocks, crystallizes and solidifies **underground**. One example is **GRANITE**



- **EFFUSIVE ROCK** is
- volcanic rock formed by a nonexplosive outpouring of lava in molten or plastic form;



TASKS _ STUDY SCAFFOLDING

5. SEDIMENTARY ROCKS: WHAT ARE SEDIMENTARY ROCKS? HOW ARE THEY FORMED? WHERE CAN YOU USALLY FIND THEM? DO YOU KNOW THE NAME OF SOME IGNEOUS ROCKS? CAN YOU DESCRIBE ONE OF THEM?
6. METAMORPHIC ROCKS: WHAT ARE METAMORPHIC ROCKS? HOW ARE THEY FORMED? WHERE CAN YOU USALLY FIND THEM? DO YOU KNOW THE NAME OF SOME METAMORPHIC ROCKS? CAN YOU DESCRIBE ONE OF THEM?

SEDIMENTARY are formed by the accumulation of sediments

Sedimentary rocks form when tiny bits of rock, shells, and part of dead plants and animals are pressed together in layers. Under large amounts of **pressure, the sediment compacts** and cements into sedimentary rocks.

You can find fossils in sedimentary rocks.

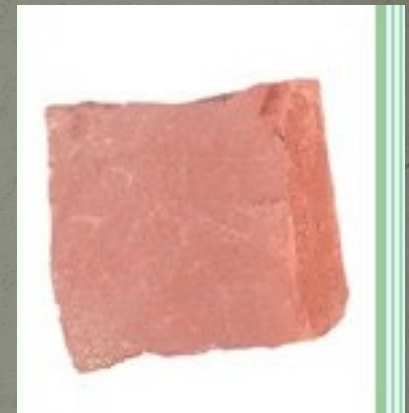
You can find sedimentary rocks **associated to rivers and oceans.**

Examples of sedimentary rocks

- **Sandstone** (arenaria) is sand grains cemented together into solid stone.



Siltstone(rocce clastiche) is made from silt (limo)particles cemented together.



Shale is made from silt particles cemented together. It is similar to siltstone but with even finer grain size,



METAMORPHIC rocks form when **heat and pressure** change one kind of rock into another kind of rock. Heat and pressure from the earth can squeeze and deform rock into metamorphic rock.

You can find metamorphic rocks **deep inside Earth**

METAMORPHIC ROCKS

They depend from a protolith (parent rock) and metamorphic grade



Gneiss



Phyllite

ade



Greenschist



Garnet mica schist

METAMORPHIC ROCKS

They depend from a protolith (parent rock) They depend from a protolith (parent rock) and metamorphic grade

Ecoglyte



Marble de



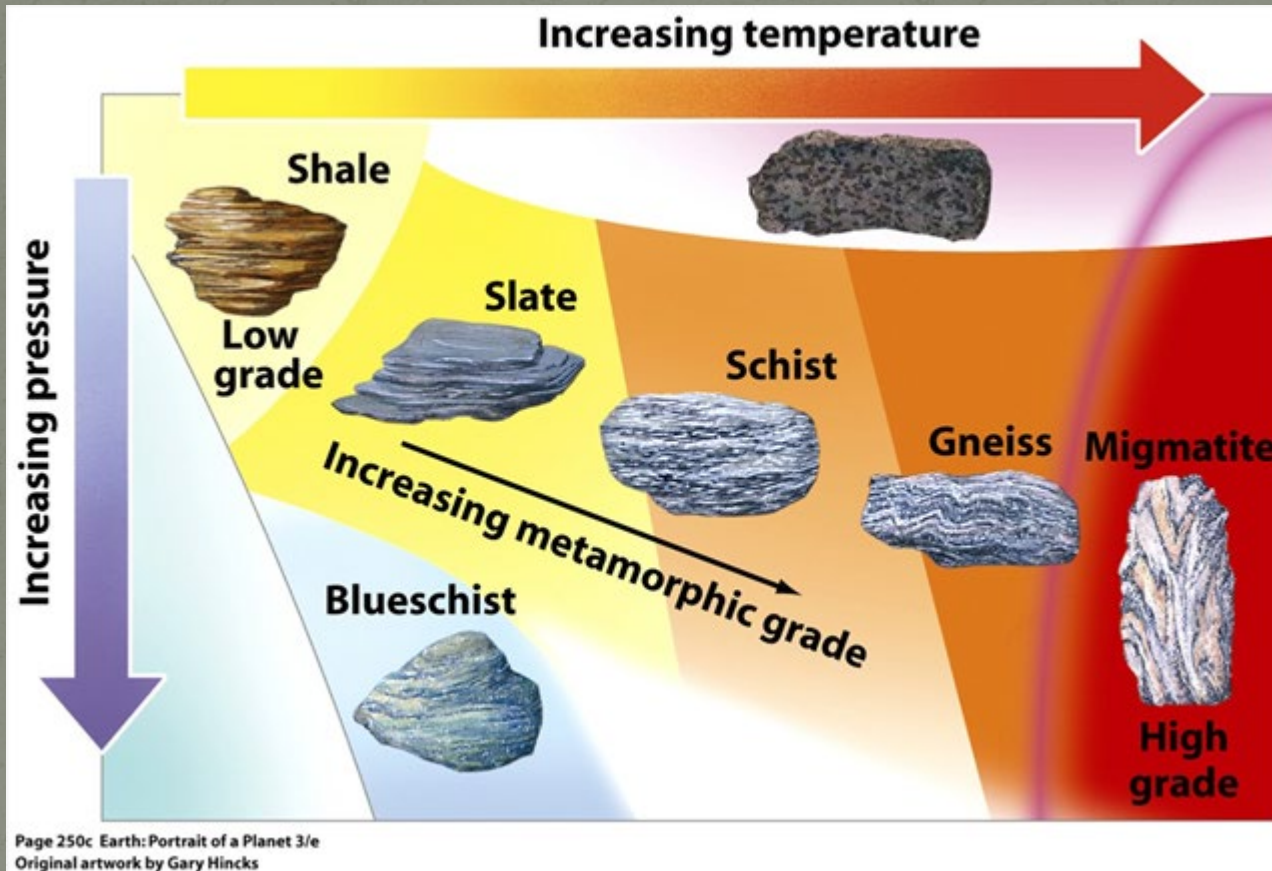
Slate



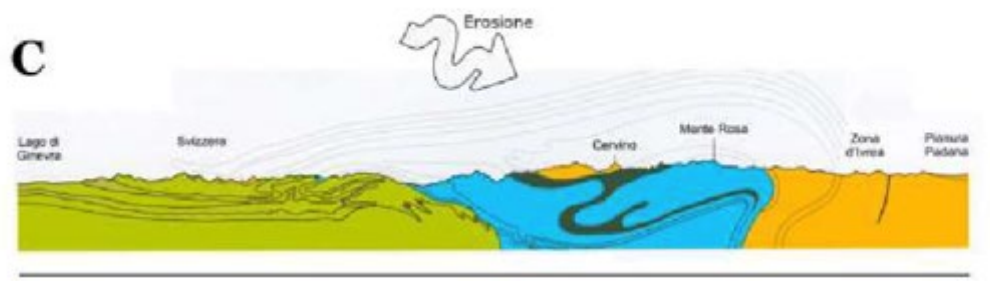
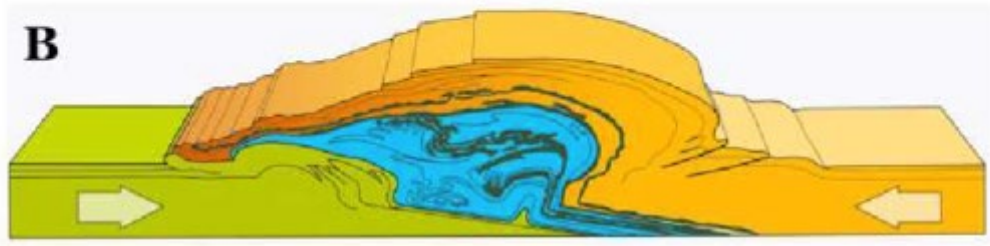
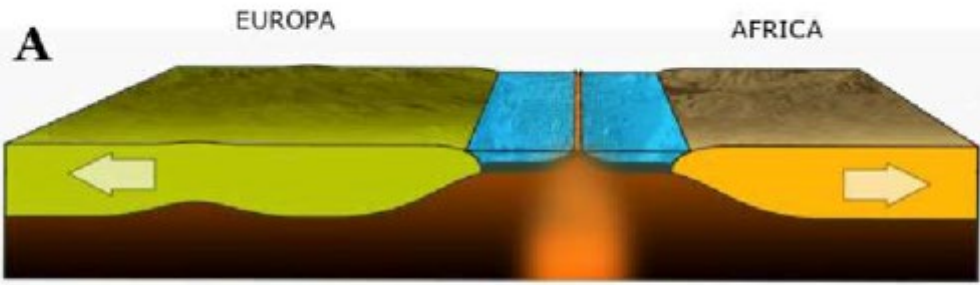
Marble



METAMORPHIC GRADE



We can directly observe a small part of rocks of the world (sedimentary, metamorphic, and igneous) in the mountain chains. They are made under high lithostatic pressure or under the sea. They are the result of continental collision and uplift of crustal blocks.



Europa Dominio Elvetico-Delfinese	Oceano Ligure-Piemontese Dominio Pennidico	Africa Dominio Austroalpino
Rocce del margine continentale europeo	Sedimenti dell'Oceano Ligure-Piemontese	Rocce del margine continentale africano
	Crosta oceanica (ofioliti)	

L4 TASK 1

B VOCABULARY IN CONTEXT

Choose words from the box to complete the paragraph.

minerals	marble	quartz-	sedimentary rock
metamorphic rock	diamond	crystals	sandstone (arenaria)
igneous rock	granite		

Example: The mineral quartz is made of silicon and oxygen.

(1) _____ are solids found naturally on Earth. Some minerals, like quartz and (2) _____, are (3) _____. All rocks are made of minerals. One kind of rock is formed when bits of sand, soil, and shells are pressed together. It is called (4) _____. (5) _____ is a sedimentary rock. A second kind of rock is formed when melted rock cools. It is called (6) _____. (7) _____ is an igneous rock. A third kind of rock is formed when rocks get very hot and are pressed together deep underground. It is called (8) _____. (9) _____ is a metamorphic rock.

SELF CHECK

- 1 MINERALS
- 2 DIAMOND
- 3 CRYSTALS
- 4 SEDIMENTARY ROCK
- 5 SANDSTONE
- 6 IGNEOUS ROCK
- 7 GRANITE
- 8 METAMORPHIC ROCK
- 9 MARBLE

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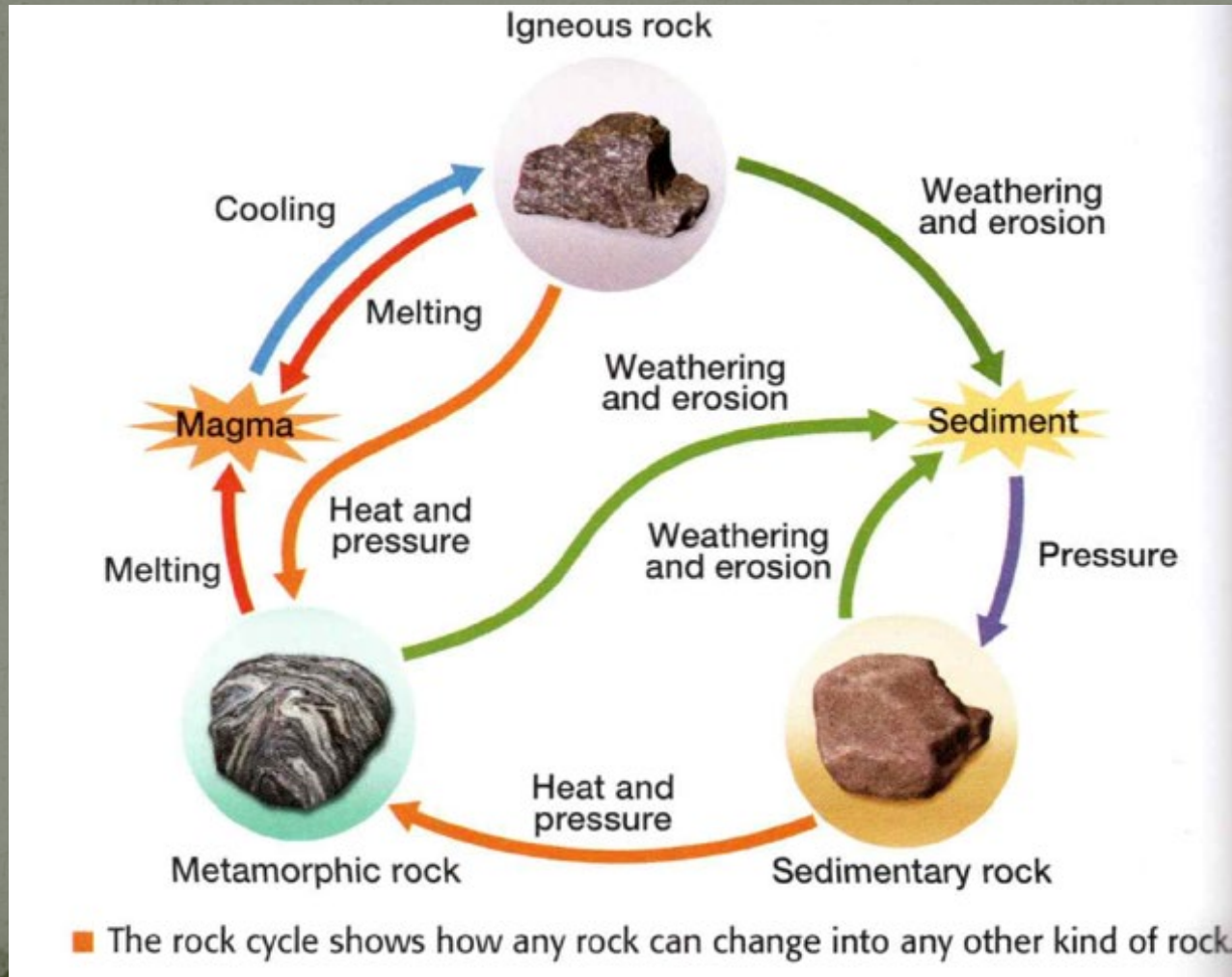
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TASKS _ STUDY SCAFFOLDING

7. WHAT DOES THE ROCK CYCLE SHOW?
8. DESCRIBE THE ROCK CYCLE
9. HOW DOES IGNEOUS ROCK CHANGE INTO METAMORPHIC ROCK?
10. HOW DO HEAT AND PRESSURE CHANGE SEDIMENTARY ROCK?
11. WHAT CHANGES METAMORPHIC ROCK INTO SEDIMENTARY ROCK?

THE ROCK CYCLE

The rock cycle shows how rocks are formed and how they change.

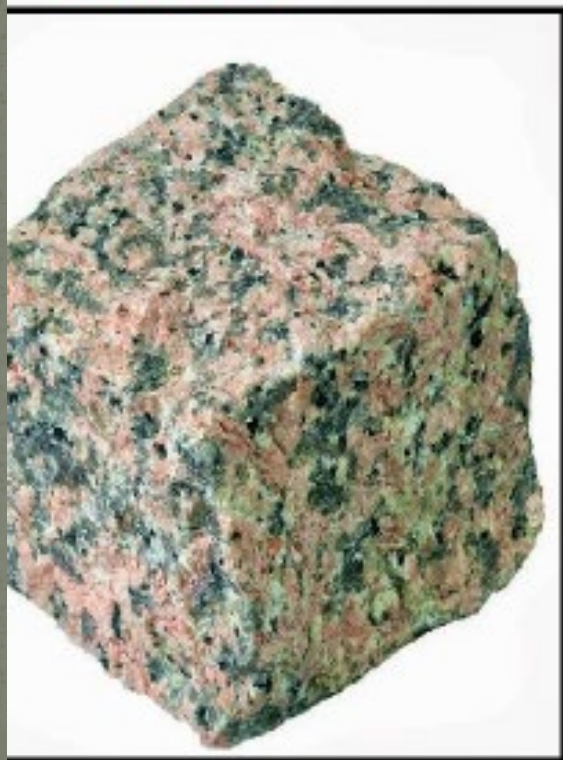


WEATHERING (the effects of weather) breaks down rocks into tiny pieces. These pieces are **SEDIMENTS**. Rivers carry this sediment away. This is called **EROSION**. Over time, layers of sediment are pressed together. The result is sedimentary rock. Metamorphic rock can later melt and harden to form igneous rock. All of these processes can happen in any order.

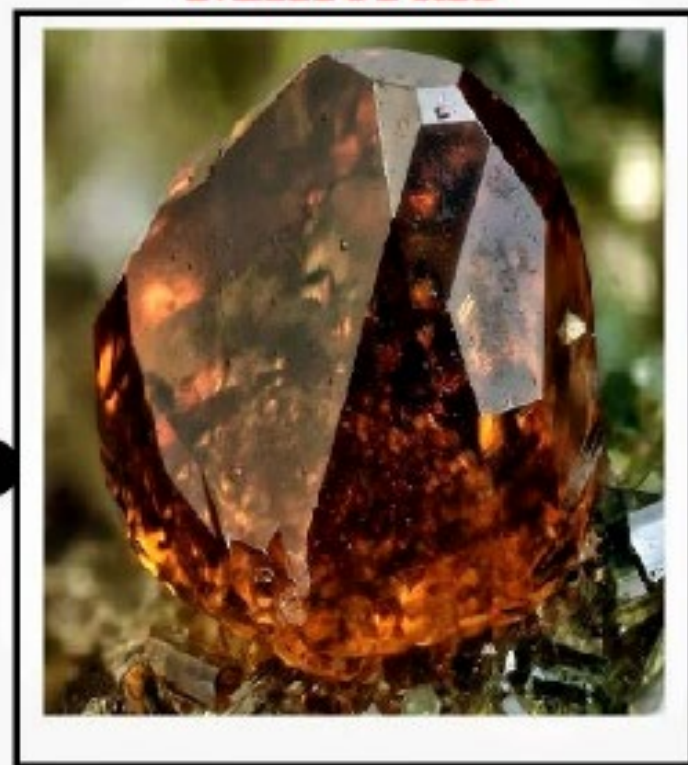


12. WHAT IS THE DIFFERENCE BETWEEN A ROCK
AND A MINERAL?

Rocks



Minerals



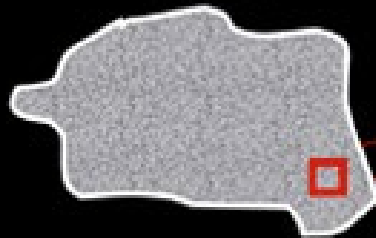
VS.

Geology 

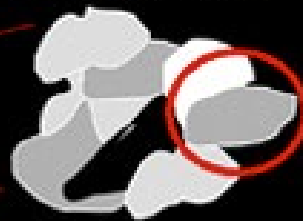
What is the difference between a rock and a mineral?

- **A mineral** has a **unique chemical composition**, defined by its chemical crystalline structure. It has an **orderly internal structure, form, and physical properties**.
- Common minerals include quartz, feldspar, mica, amphibole, olivine, and calcite.
- A rock is a mixture of different minerals, volcanic glass, organic matter and/or some other materials.
- Common rocks include granite, basalt, limestone, and sandstone.

rock



minerals



elements



a **granite** is made of

quartz + feldspar + biotite

quartz =
silicon + oxygen

CRYSTAL STRUCTURE

The crystal structure of minerals depends on its composition, on temperature and pressure at the time of its formation. TIME is also important to define crystal structure.

Feldspar



Plagioclase



Orthoclase

Mica



Muscovite



Biotite

Quartz



Quartz



**(Igneous)
GRANITE**



**(Sedimentary)
SANDSTONE**



A fluorite set in surrounding rock

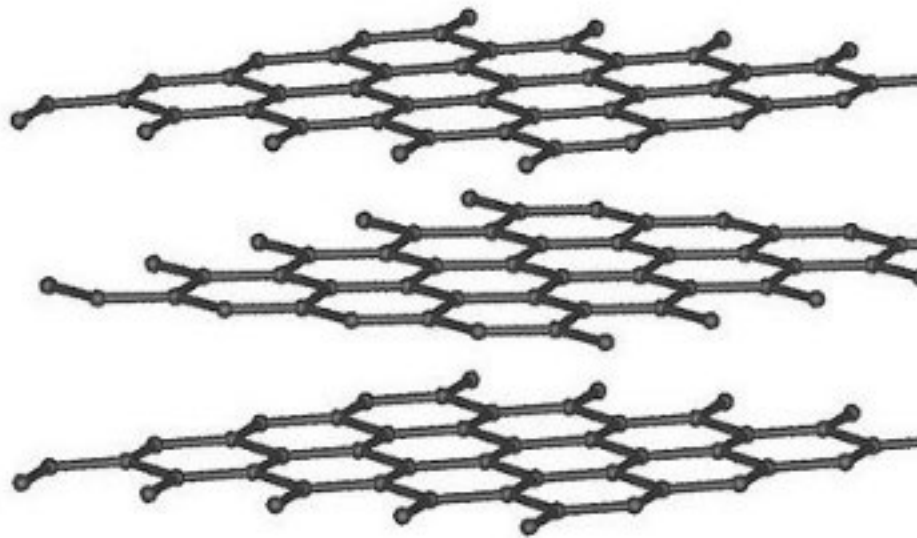
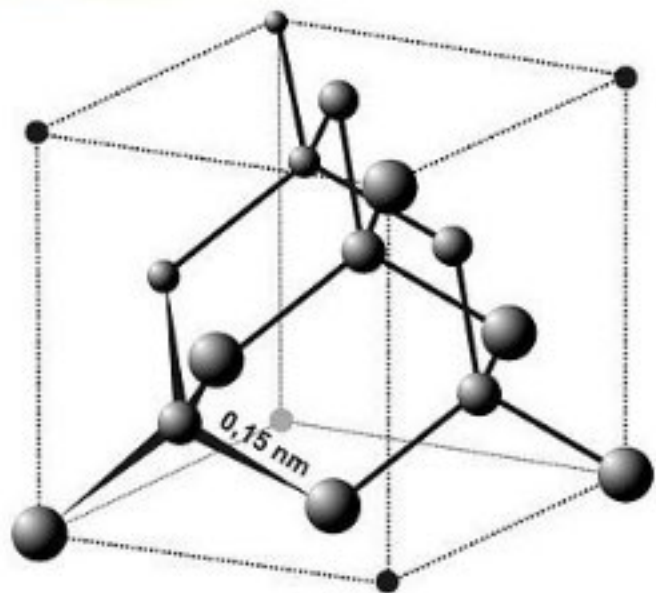


calcite



QUARTZ





Diamante e Grafite: minerali con la stessa composizione chimica, ma diverso reticolo cristallino (Credit:Wikipedia)

SCAFFOLDING

NOUNS	ADJECTIVES	VERBS
ROCK	METAMORPHIC	TO FORM
WEATHERING	IGNEOUS	TO MELT
SEDIMENT	SEDIMENTARY	TO FIND
EROSION		TO BE PRESSED
COOLING		TO BREAK DOWN
MELTING		TO CARRY
HEAT		TO TRANSFORM
PRESSURE		TO HARDEN
UPLIFT		TO UPLIFT
COMPACTION		TO COMPACT
CEMENTATION		TO CEMENT
BURIAL		TO BURY
SHELL		
BURIAL		
MINERALOGY		

SELF- CHECK

- <https://www.quia.com/quiz/695828.html>
- <https://docs.google.com/forms/d/e/1FAIpQLSeFeDzQrgJQkCZVqzbhBRnuRhKKoAuSF51280CDP4pRcxEcmA/viewform>