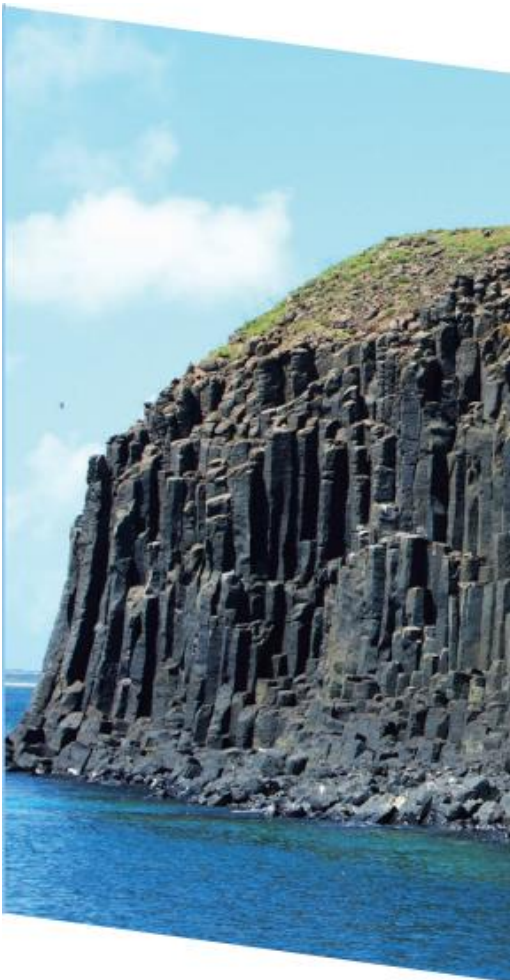


3 大地的奧祕



活動 1 多變的大地景觀

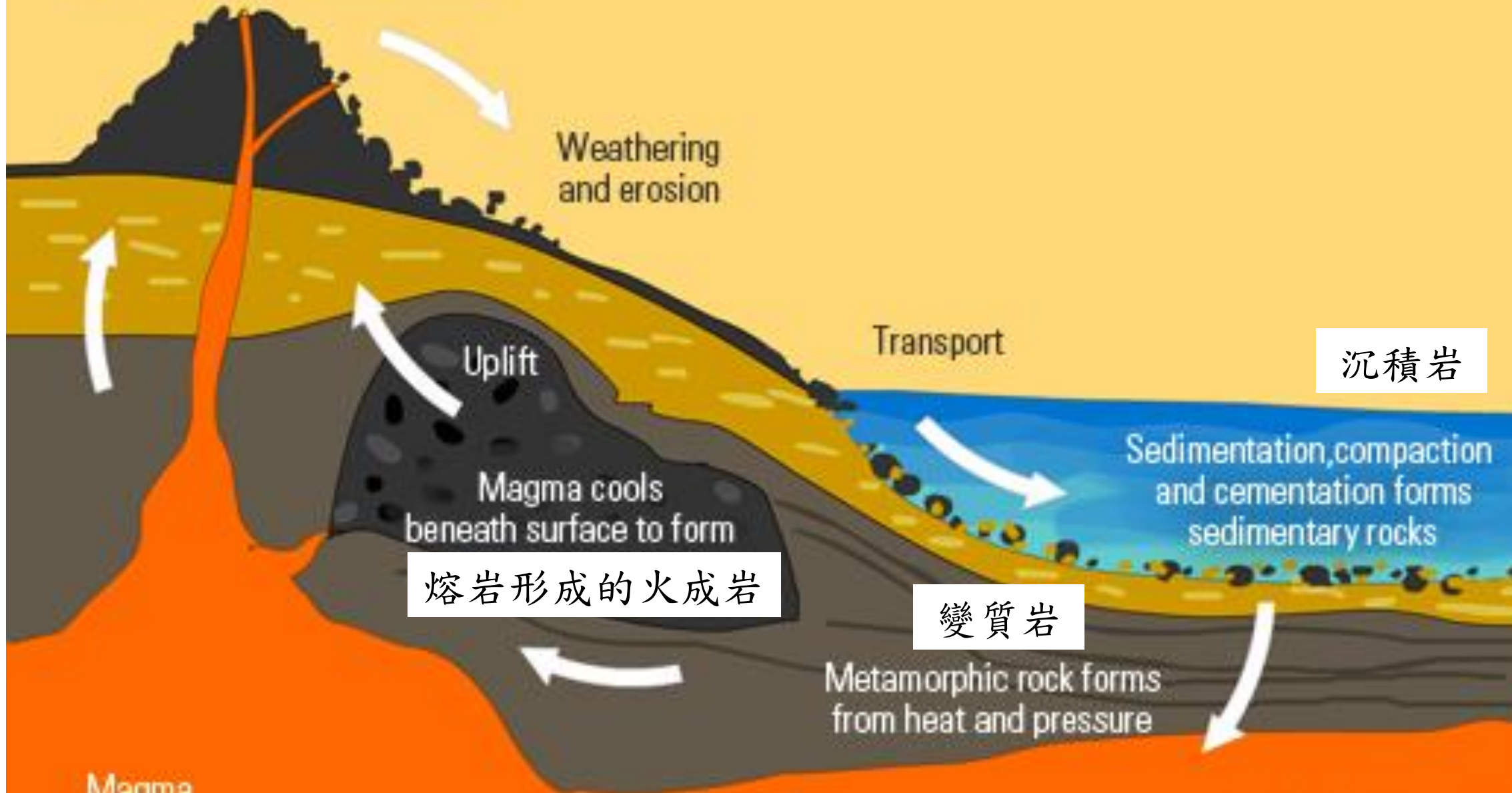
活動 2 岩石與礦物
Rocks and minerals

活動 3 風化與土壤



Magma flows to surface, cools to form extrusive igneous rocks

岩漿形成的火成岩



Uplift

Transport

沉積岩

Sedimentation, compaction and cementation forms sedimentary rocks

熔岩形成的火成岩

變質岩

Metamorphic rock forms from heat and pressure

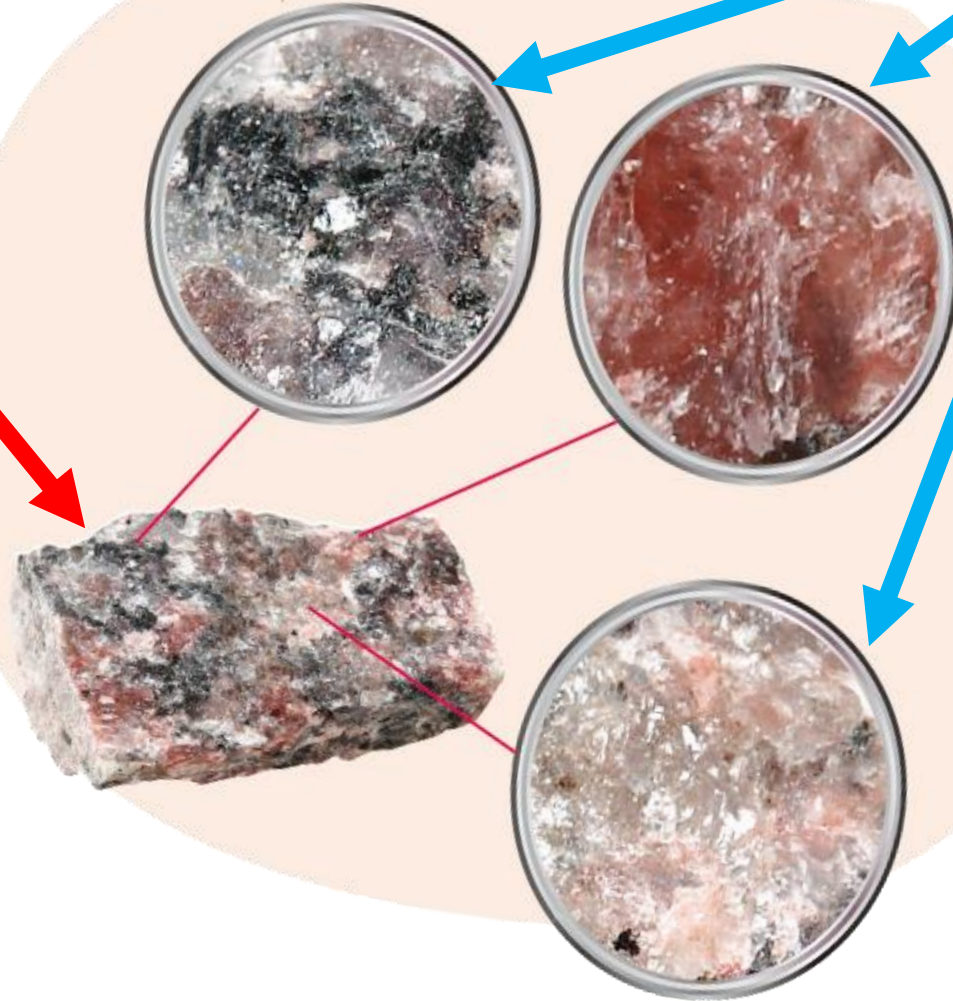
Magma

2-2

礦物 Minerals

Rocks are made of minerals.

Minerals are individual crystals (單個晶體) of all the same stuff.



Limestone

石灰岩



方解石
Calcite

方解石



▲石灰岩主要由方解石(Calcite)所組成。

花岡岩

Granite

長石
Feldspar



黑雲母
Black mica

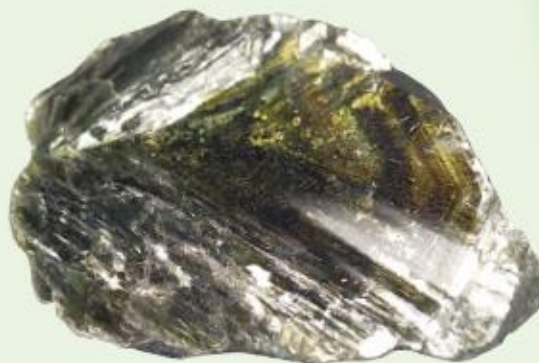
石英
Quartz

▲花岡岩主要由長石 (Feldspar)、石英 (Quartz)、黑雲母 (Black mica) 或白雲母 (White mica) 等礦物所組成。

長石



黑雲母



石英



How to distinguish Minerals?

- Structure 結構
- Color 顏色
- Crystallization 結晶
- Luster 光澤
- Touch the surface

What is the difference in appearance characteristics of talc and quartz?



▲ 滑石
talc



▲ 石英
quartz

How to distinguish Minerals?

Hardness

The hardness of minerals are different.

How to compare mineral hardness?



利用指甲 (fingernail)、硬幣 (coin) 或鐵尺 (iron ruler) 等工具來刻劃 (scratch) 礦物，可以作為礦物硬度的比較呵！

How to compare mineral hardness?

1. Use your fingernail/ a coin / an iron ruler to scratch the mineral.

penny



fingernail



How to compare mineral hardness?

2. Rub the **streak** off and check if there is a scratch on the mineral.



How to compare mineral hardness?

3. Tool leaves a **scratch** on the softer mineral.



Harder than
the tool.

Softer than
the tool.

It's your turn !

- Which mineral is softer than your fingernail?
- Which mineral is softer than a coin?
- Which mineral is softer than an iron ruler?

Or we can

將兩種不同的礦物互相刻劃。

The softer minerals are easily scratched by the harder minerals, and leaving a scratch.



▲將滑石和石英互相刻劃

1. Which mineral is the softest?

2. Which mineral is the hardest?

3. How to sort according to hardness?



莫氏硬度表

滑石
石膏粉
方解石
螢石
磷灰石
長石
石英
黃玉
剛玉
鑽石

MOHS HARDNESS SCALE



I
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↓

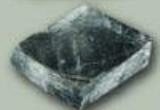


1 TALC



2 GYPSUM

← FINGERNAIL



3 CALCITE

← COPPER COIN



4 FLUORITE



5 APATITE

← KNIFE / GLASS



6 FELDSPAR

← STEEL



7 QUARTZ



8 TOPAZ



9 CORUNDUM



10 DIAMOND