



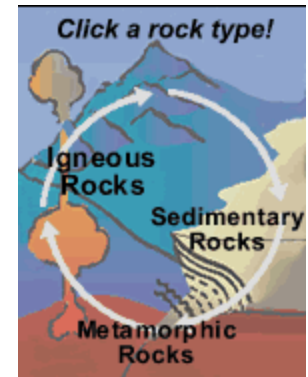
Ch 3.1: Rock Cycle

Be able to...

Define the term rock

Identify three major types of rocks

Describe the rock cycle



What is the difference between a rock and a mineral?



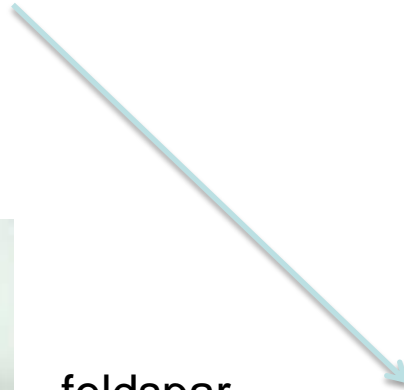
Rocks

- A rock is any solid mass of mineral or mineral-like matter that occurs naturally as part of our planet
- *Think of it like a solid mixture*
- The three major types of rocks are **igneous rocks**, **sedimentary rocks**, and **metamorphic rocks**.





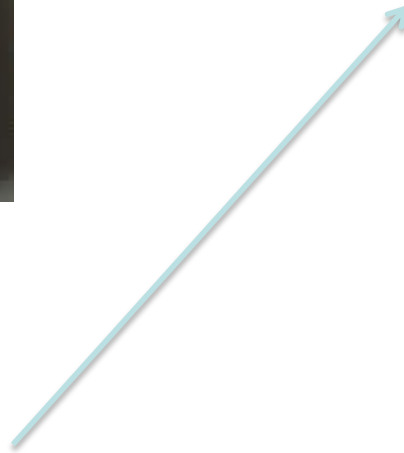
quartz



feldspar



Biotite



Granite

Rock Cycle

- Interactions among Earth's water, air, and land can cause rocks to change from one type to another.

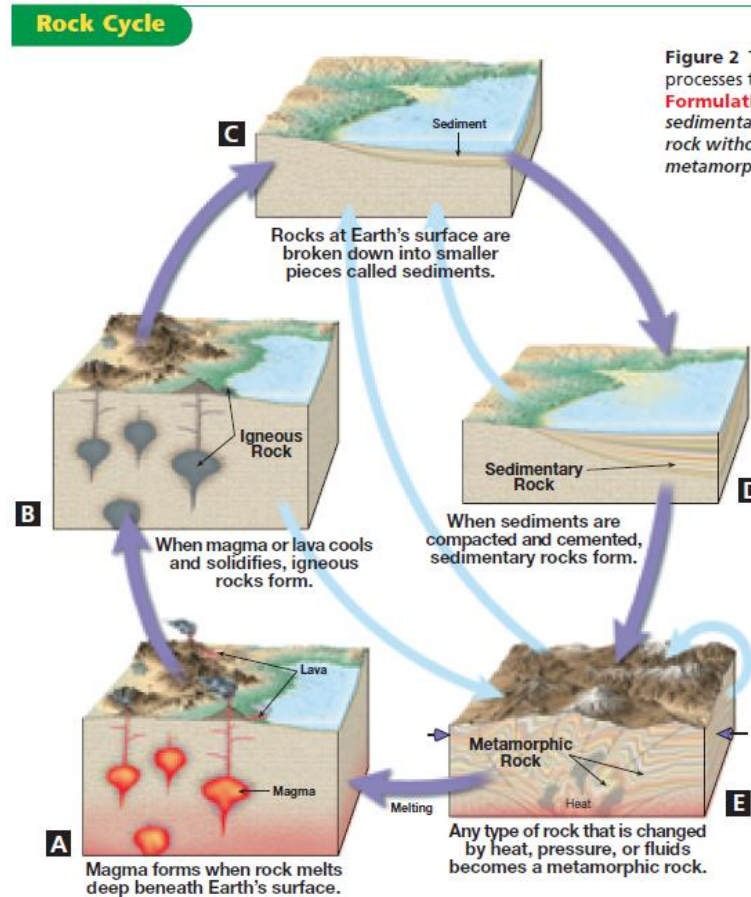
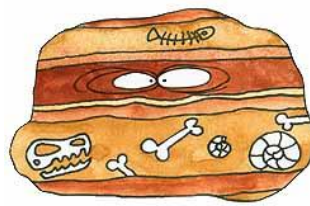


Figure 2 The rock cycle consists of many processes that change Earth's rocks. **Formulating Hypotheses** Can a sedimentary rock become an igneous rock without changing first to a metamorphic rock? Explain.



Compacted &
Cemented

Sedimentary Rocks

Sediments (sand)

Heat &
Pressure



Metamorphic Rocks



Heat &
Melt Rock



MAGMA

Cools (liquid to solid)
Lava or Magma

Igneous Rocks



Weather &
Erosion



Rock Cycle

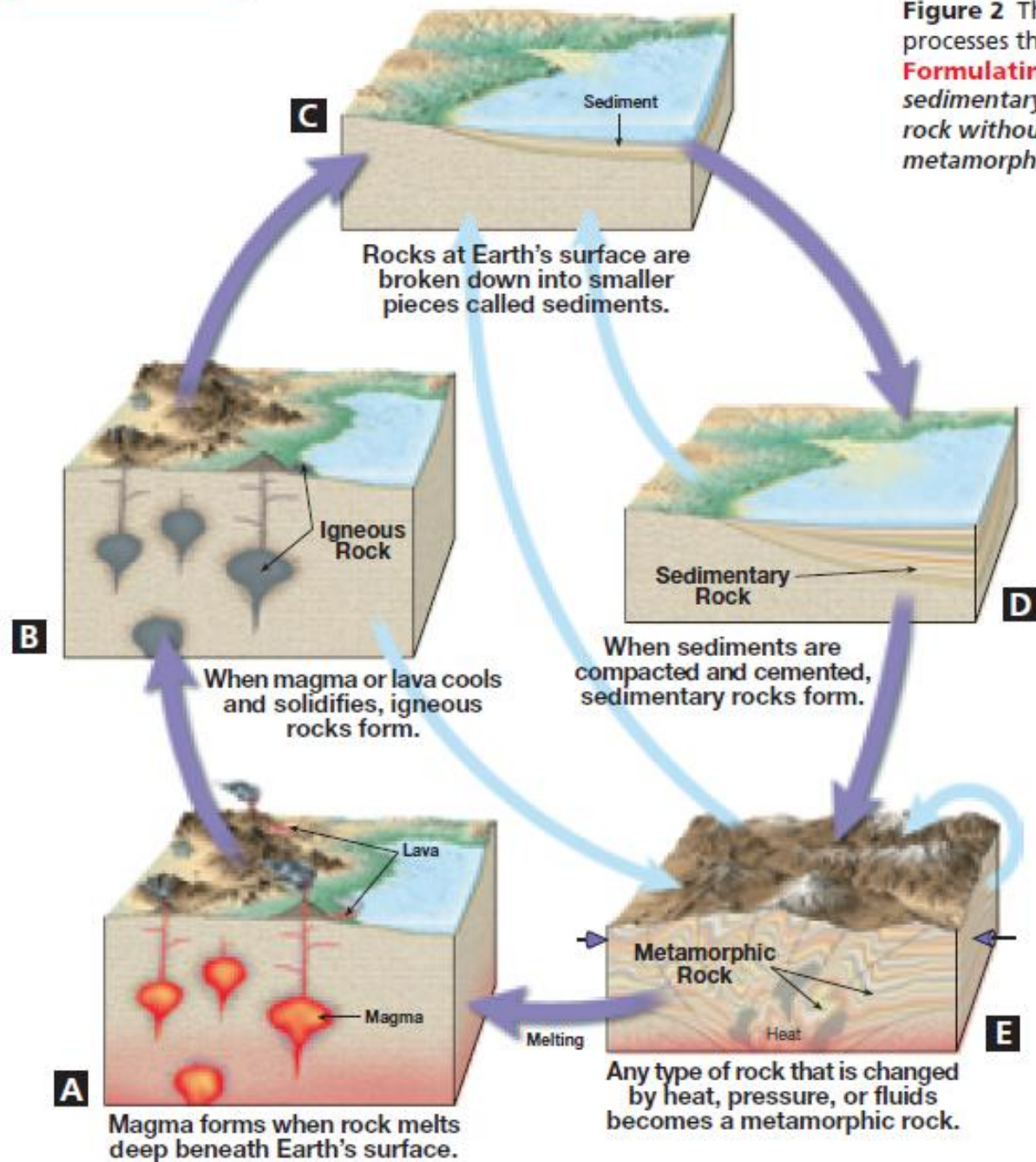
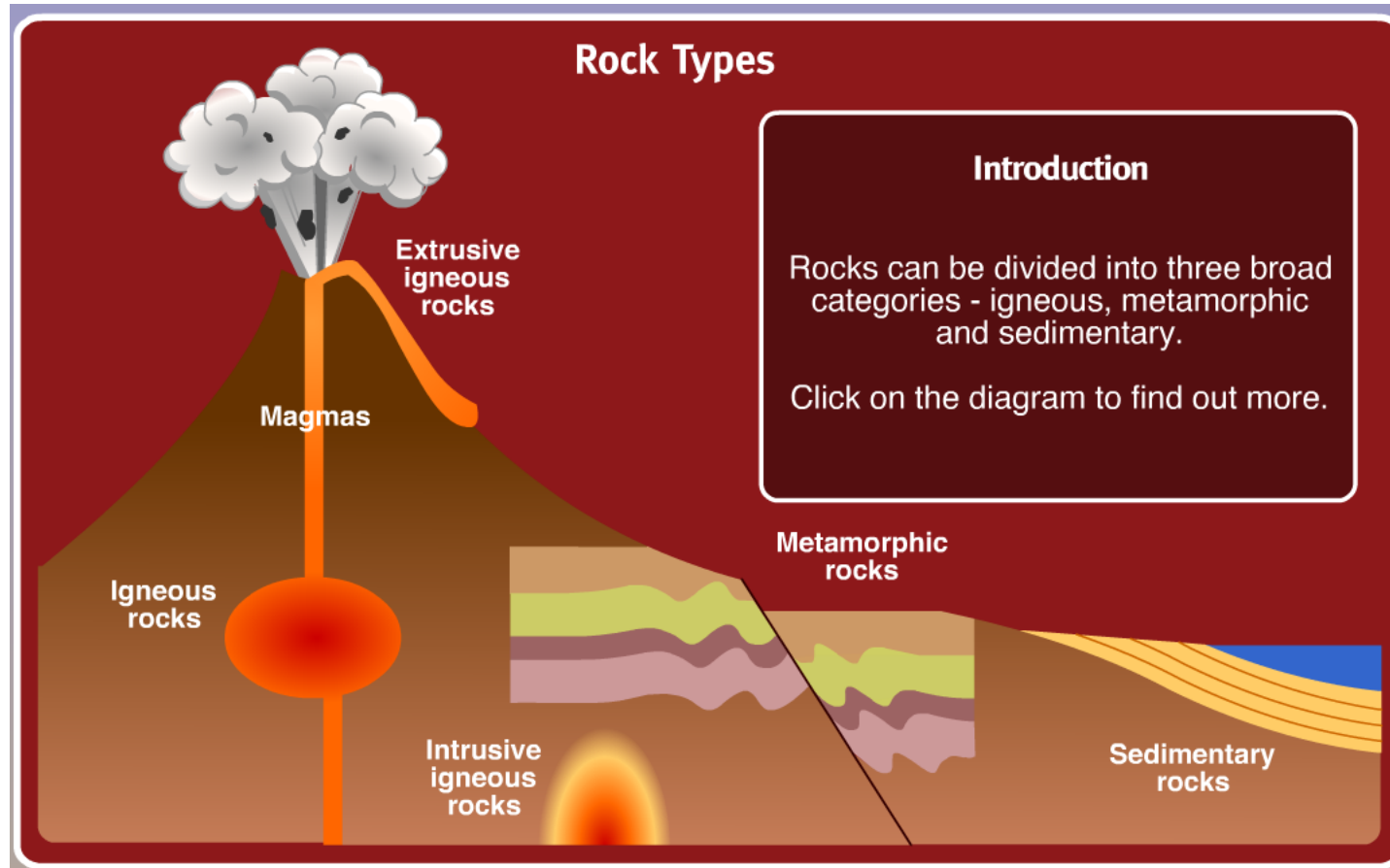


Figure 2 The rock cycle consists of many processes that change Earth's rocks. **Formulating Hypotheses** Can a sedimentary rock become an igneous rock without changing first to a metamorphic rock? Explain.

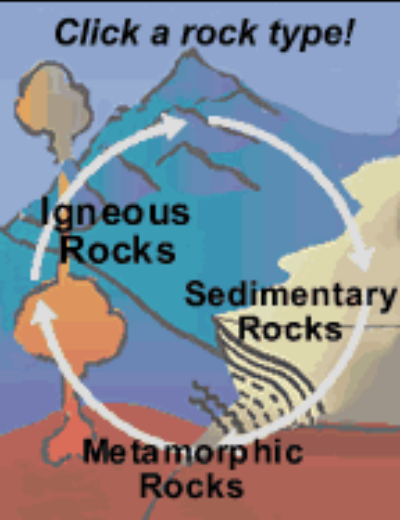
Rock Types



Introduction

Rocks can be divided into three broad categories - igneous, metamorphic and sedimentary.

Click on the diagram to find out more.



Ch 3.2: Igneous Rocks

Be able to...

Compare Contrast intrusive and extrusive rocks.

Igneous Rocks

- Forms when magma or lava cools.
 - *ignis* is Latin for *fire*

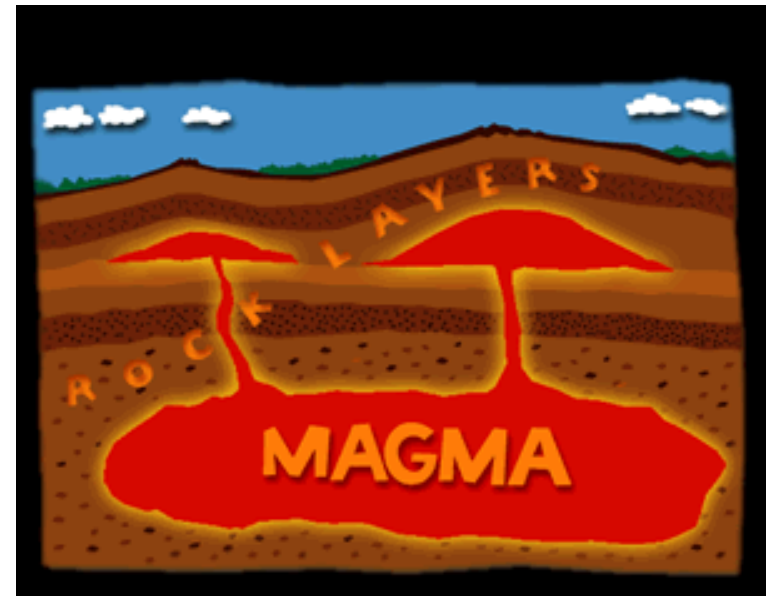


Figure 5 Basaltic Lava

Lava from this Hawaiian volcano flows easily over Earth's surface. When this lava cools and hardens, the igneous rock called basalt will form.



Two Types of Igneous Rocks

- **Extrusive igneous**

- Form from lava, which has been erupted on the surface.
- Cool quickly
- Have little crystals (Fine-Grained) or no Crystals (glassy)



Two Types of Igneous Rocks



- **Intrusive igneous**
 - When magma cools and solidifies below earth's surface.
 - Cool more slowly
 - Have larger crystals (Coarse-Grained)

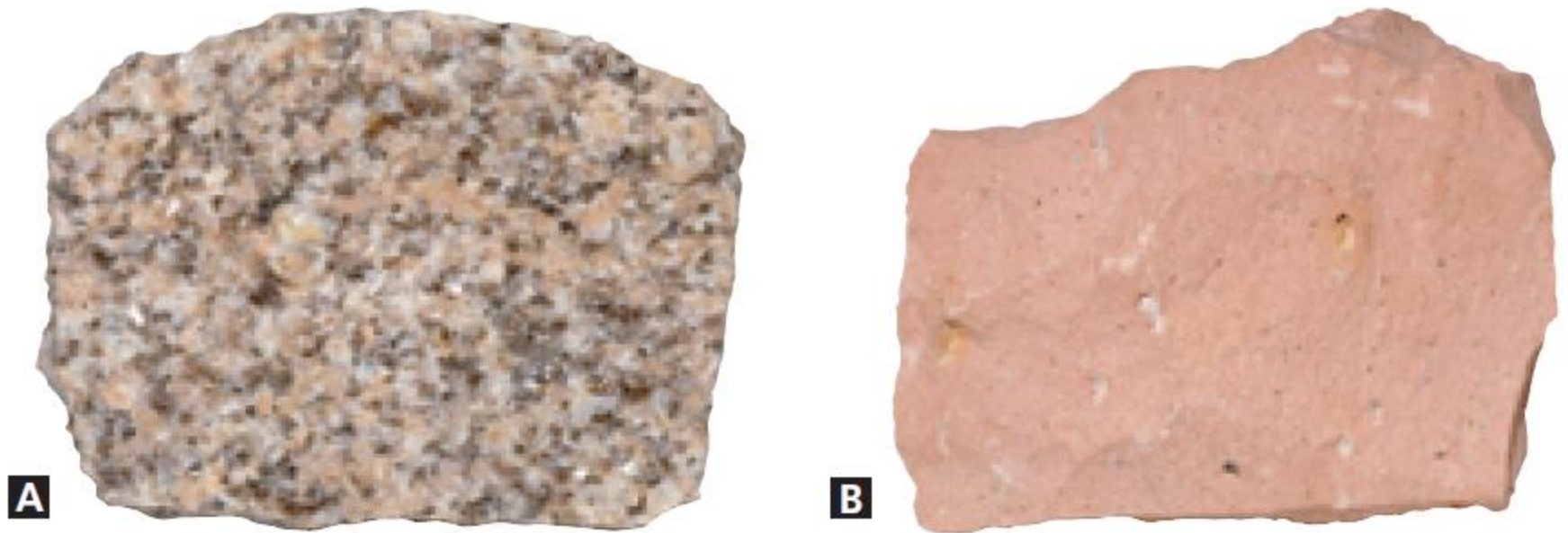








Figure 6 **A** Granite is an intrusive igneous rock that forms when magma cools slowly beneath Earth's surface. **B** Rhyolite is an extrusive igneous rock that forms when lava cools quickly at Earth's surface.

Igneous Rocks

Crystallization	Iron-magnesium silicate minerals	Feldspar minerals	Rock names
<p>First to crystallize</p>  <p>Decreasing temperature</p> <p>Last to crystallize</p>	<p>Olivine</p>  <p>Pyroxene</p>	<p>Plagioclase (calcium feldspar)</p> 	<p>Gabbro, basalt</p>
	<p>Amphibole</p>  <p>Biotite</p>	<p>Plagioclase (sodium feldspar)</p> 	<p>Diorite, andesite</p>
	<p>Orthoclase (potassium feldspar)</p>  <p>Quartz</p>		<p>Granite, rhyolite</p>

1. Which minerals are the first to crystallize from cooling magma? _____

Olivine & Plagioclase (calcium feldspar)

Crystallization	Iron-magnesium silicate minerals	Feldspar minerals	Rock names
<p>First to crystallize</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Decreasing temperature</p> <p style="text-align: center;">↓</p> <p>Last to crystallize</p>	<p>Olivine</p> <p style="text-align: center;">↓</p> <p>Pyroxene</p>	<p>Plagioclase (calcium feldspar)</p> <p style="text-align: center;">↓</p>	<p>Gabbro, basalt</p>
	<p style="text-align: center;">Amphibole</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Biotite</p>	<p>Plagioclase (sodium feldspar)</p> <p style="text-align: center;">↓</p>	<p>Diorite, andesite</p>
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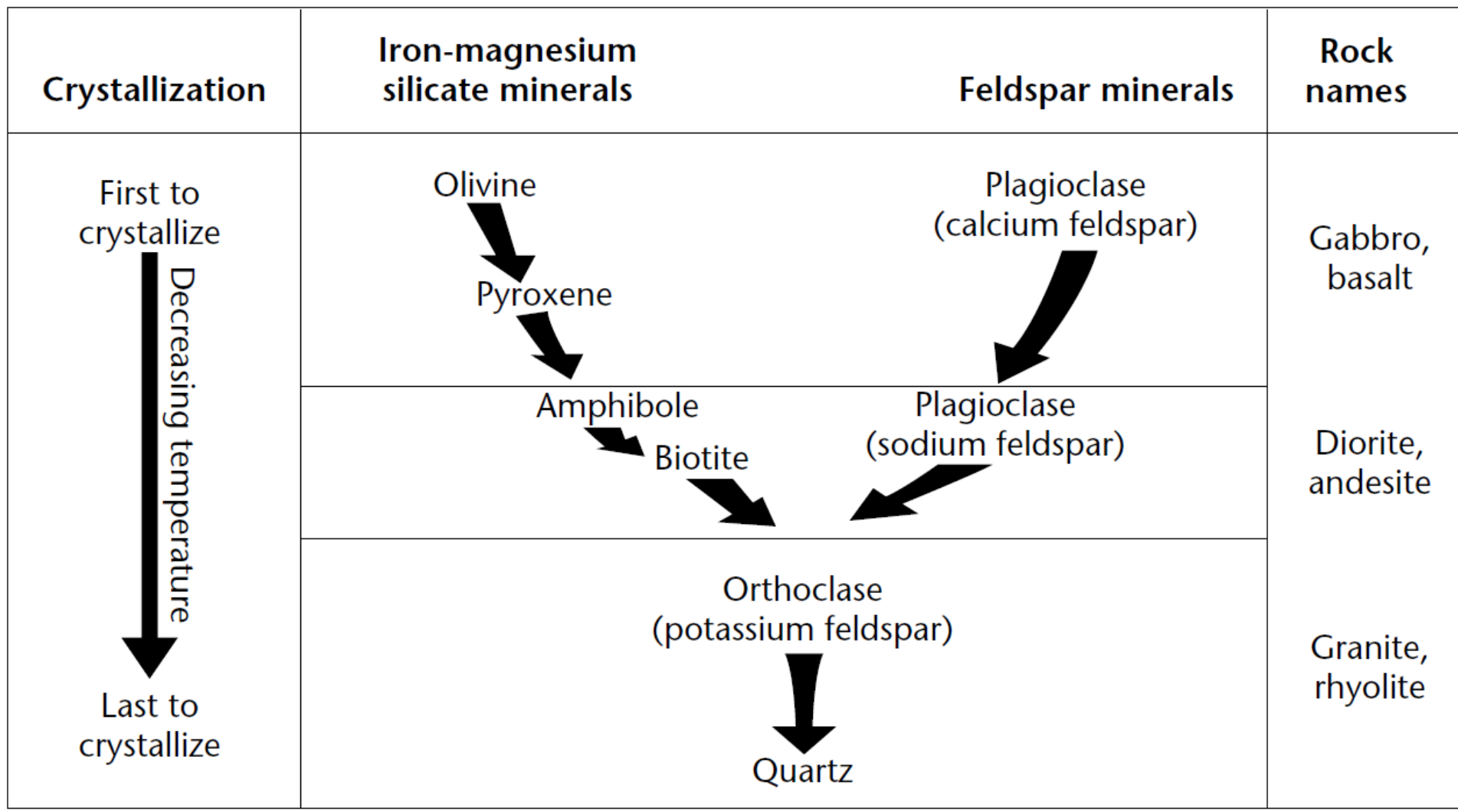
2. What kind of rocks are formed by these minerals? **Grabbro & Basalt**

Crystallization	Iron-magnesium silicate minerals	Feldspar minerals	Rock names
<p>First to crystallize</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Decreasing temperature</p> <p style="text-align: center;">↓</p> <p>Last to crystallize</p>	<p>Olivine</p> <p style="text-align: center;">↓</p> <p>Pyroxene</p>	<p>Plagioclase (calcium feldspar)</p> <p style="text-align: center;">↓</p>	<p>Gabbro, basalt</p>
	<p style="text-align: center;">Amphibole</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Biotite</p>	<p>Plagioclase (sodium feldspar)</p> <p style="text-align: center;">↓</p>	<p>Diorite, andesite</p>
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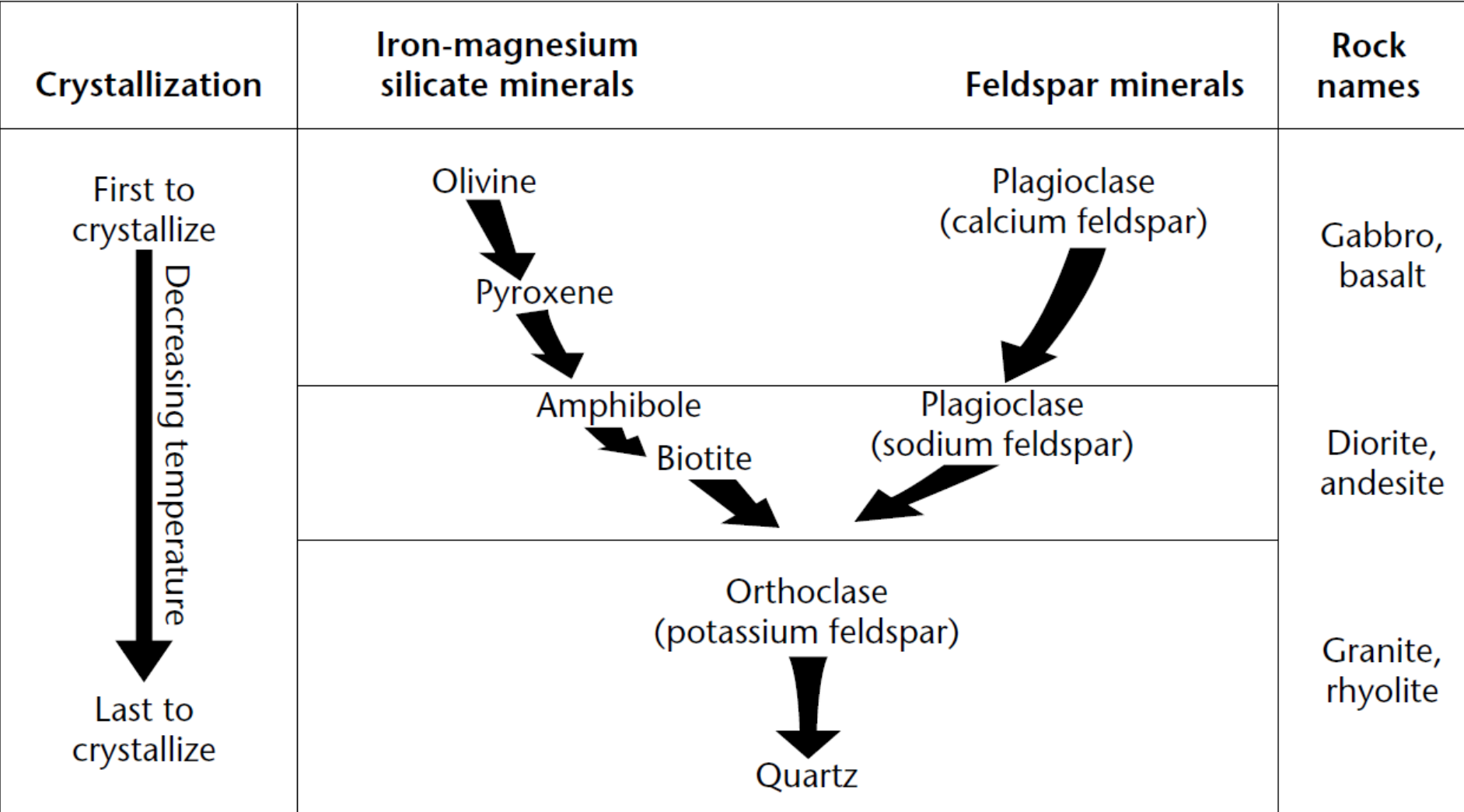
3. Which mineral crystallizes at the lowest temperature? quartz

Crystallization	Iron-magnesium silicate minerals	Feldspar minerals	Rock names
<p>First to crystallize</p> <p style="text-align: center;">↓</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Decreasing temperature</p> <p style="text-align: center;">↓</p> <p>Last to crystallize</p>	<p>Olivine</p> <p>↓</p> <p>Pyroxene</p> <p>↓</p>	<p>Plagioclase (calcium feldspar)</p> <p>↓</p>	<p>Gabbro, basalt</p>
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4. Which mineral, pyroxene or orthoclase, crystallizes from magma first? pyroxene



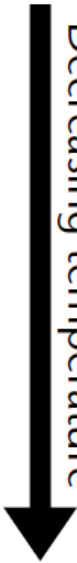







5. Which feldspar mineral is found in granite? orthoclase



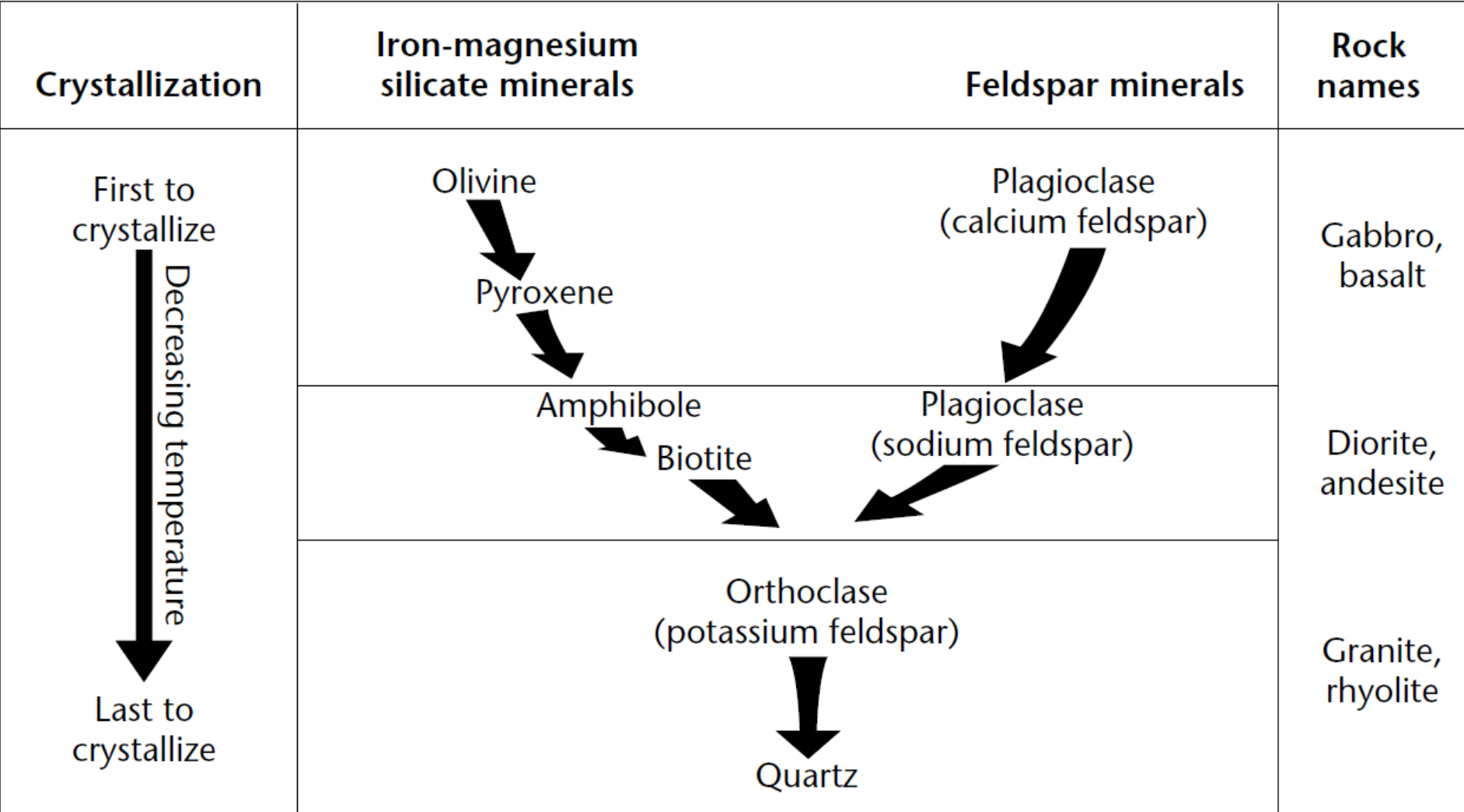
6. What minerals form the rocks diorite and andesite? Amphibole, Biotite, Plagioclase

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7. Which kind of magma, basaltic or granite, is hotter? basaltic

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8. Minerals higher in silica content crystallize from magma at lower temperatures. Which magma, basaltic or granitic, is higher in silica content? granitic



9. Magma low in silica content flows more easily. Which kind of lava, basaltic lava or granitic, flows faster? Basaltic lava

