

# CHAPTER 9 SECTION 3

## DAY 1

**SPI 0707.7.2** Label a diagram that depicts the three different rock types.

**SPI 0707.7.3** Identify the major processes that drive the rock cycle.

# Agenda

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- We will review for your science quiz that is coming up tomorrow.
- We will preview and start discussing metamorphic rock.
- Remember, you get five points for having the flow chart correctly completed and stapled to your quiz.
- We will complete the flow chart after we review for our quiz.

# Review

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- Complete p.276 1-5.
- Complete p. 283 1-4.
- Be ready to discuss.
- Use your book and notes to help you.

# Review Answers p. 276

1. Explain the difference between a mineral and a rock. Name five common rock-forming minerals.

**Minerals:** Naturally occurring, inorganic solid with a definite composition and orderly internal atomic arrangement. **Rock:** usually comprised of two or more minerals. Rock-forming minerals include quartz, feldspar, calcite, gypsum, and halite, among others.

2. List five properties that are used most commonly to identify minerals.

**Color, luster, streak, hardness, cleavage, magnetism**

# Review Answers p. 276

3. Describe an event that must occur in order for diamond to reach Earth's surface. Where in Earth is diamond formed?

Diamonds form in Earth's mantle under conditions of high pressure. Diamonds erupt to the surface via volcanic eruptions.

4. Describe the steps of mining, smelting, and refining that are used to extract minerals or elements from ores. When is a mineral considered to be an ore?

Minerals first are extracted from Earth by mining. Mined material can be melted and desired substances separated from unwanted material during smelting. Refining purifies the desired mineral even more. Earth materials are considered ores when they can undergo expensive mining and refinement processes and still yield a profit.

3. Would you want to live close to a working gold mine? Explain.

# Review p. 283

1. Compare/Contrast the ways in which extrusive and intrusive igneous rocks are formed.

Extrusive igneous rocks cool quickly from lava, producing no or small crystals. Intrusive igneous rocks cool slowly from magma, producing large crystals.

2. Diagram how each of the three kinds of sedimentary rock forms. List one example of each kind of rock: detrital/clastic, chemical, and organic

Detrital rocks – pieces of other rocks, sandstone

Chemical rocks – precipitation of minerals from solution, rock salt

Organic rocks – from the remains of once-living things, coal

# Review p. 283

3. List in order from smallest to largest the grain sizes used to describe detrital rocks.

clay, silt, sand, gravel

4. Why do igneous rocks that solidify underground cool so slowly?

The surrounding rock insulates the cooling magma.

# Quiz

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- Your quiz is tomorrow.
- Don't forget to study!
- Study Guide



# Metamorphic Rock

- <https://www.youtube.com/watch?v=1oQ1J0w3x0o>
- Flow Chart
- You must have this in your hands tomorrow to get the bonus points.

# What You Will Learn

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- What metamorphic rock is
- How metamorphic rock is formed

# Essential Questions

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- What is metamorphic rock?
- How is it formed?

# What Mastery Looks Like

## Some Processes in the Rock Cycle

1	New rock forms from rock that is melted and then cools.
2	New rock forms after rock experiences high temperatures and pressure.
3	New rock forms after pieces of rock weather and then erode and are deposited in layers.

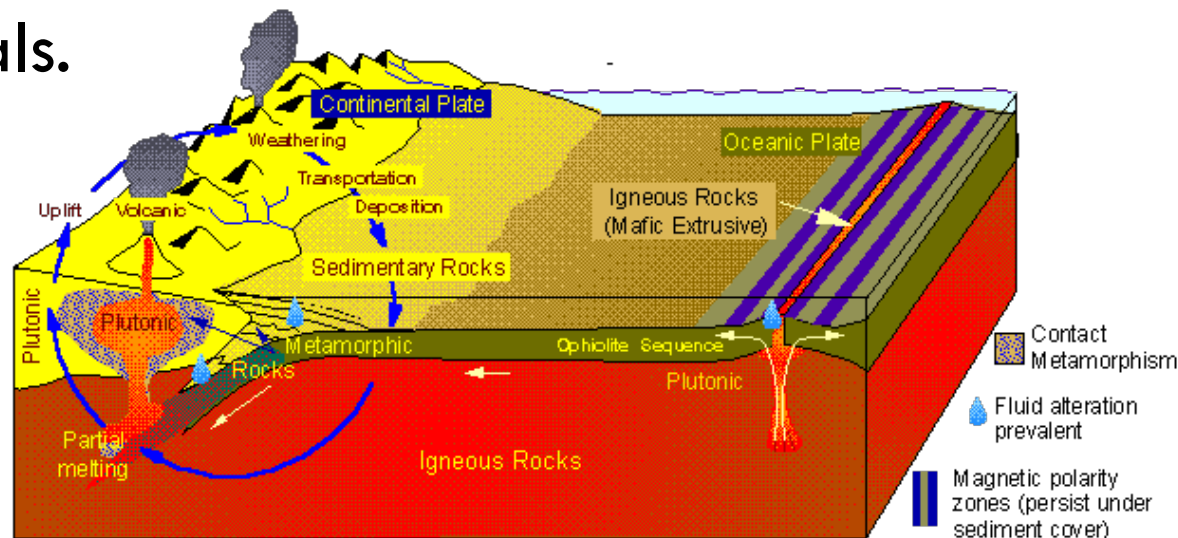
Which number represents metamorphic rock?

# New Rock from Old Rock

- Physical changes on & within Earth constantly change rocks.
- Examples:
  - ▣ Weathering and Erosion = Sedimentary Rock
  - ▣ High Temperature with Molten Rock = Igneous
- Pressure and temperature increase as rocks are compressed or buried deeply.
- This leads to change in chemistry and grain sizes of rock. (without melting it)

# New Rock from Old Rock

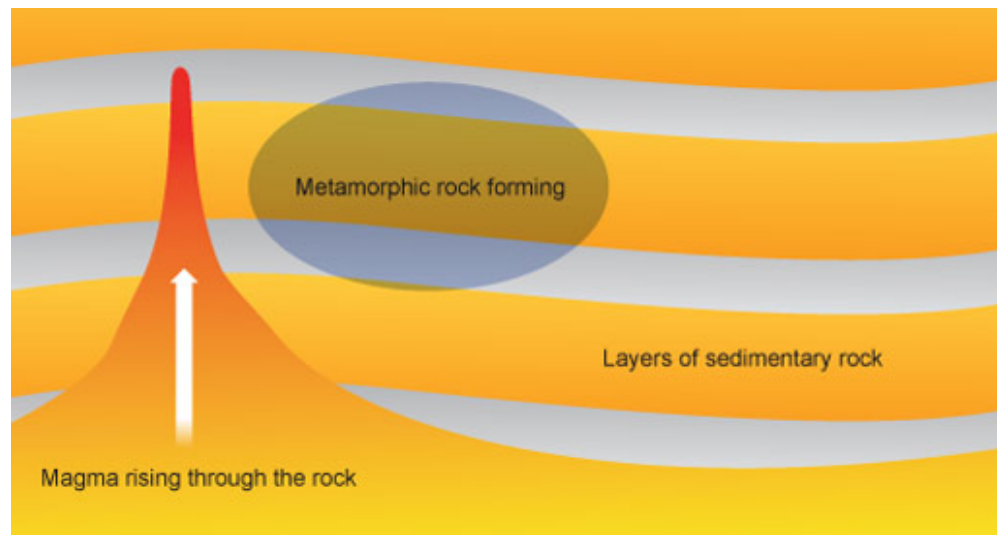
- These changes happen where Earth's tectonic plates collide to form mountains.
- This change in rocks takes **MILLIONS** of years.
- Existing rocks are cooked when magma is forced upward in Earth's crust – changing the mineral crystals.



Redrawn by W. Milner, as modified from Montgomery (1990) and Monroe and Wicander (1994).

# Metamorphic Rock

- The term “metamorphic” means “to change form.”
- Process
  - New rocks form thousands of meters below Earth’s surface where temperatures and pressures are...
    - HIGH!
  - New rocks are formed when existing rock is heated and squeezed, but not melted.
- Rocks look different, have recrystallized and have been chemically changed.



# Examples of Changed Rocks



Granite



Gneiss



Sandstone



Quartzite



# Examples of Changed Rock



Limestone



Marble

# Metamorphic Rock

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- Can any rock become metamorphic rock?
  - ▣ Think about it. Come with your answer tomorrow.

# Exit Ticket

## Some Processes in the Rock Cycle

1	New rock forms from rock that is melted and then cools.
2	New rock forms after rock experiences high temperatures and pressure.
3	New rock forms after pieces of rock weather and then erode and are deposited in layers.

Identify the process that shows metamorphic rock.