

# CHAPTER 9 LESSON 3

## SECTION 1

**SPI 0707.7.1** Use a table of physical properties to classify minerals.

# What You Will Learn

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- The properties used to identify minerals
- Which properties are the most useful
- How do we use Mohs Hardness Scale to identify hardness?
- The different types of minerals

# What Mastery Looks Like

- 22** Students in a science class were observing properties of an unknown mineral. The mineral was soft enough to be scratched by a fingernail. The students compared the hardness of the mineral to the chart below.

**Mineral Hardness Chart**

1	Talc
2	Gypsum
2.5	Fingernail
3	Calcite
3.5	Penny
4	Fluorite
5	Apatite
5.5	Steel File
6	Feldspar

**Which mineral could the students have been observing?**

- F** Gypsum
- G** Calcite
- H** Apatite
- J** Feldspar

# Essential Questions

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- How are minerals identified?
- What types of properties are used to identify minerals?
- What are the different properties used?
- What are the common minerals?

# Foldable











- Get out your foldable from yesterday.
  - ▣ We had just started talking about hardness.
  - ▣ Today we will talk about hardness, specific gravity.
- Let's review what we know about minerals!
  - ▣ Study Jam Slideshow
  - ▣ Get out your white board. (Take quiz on study jam.)

# Hardness

This mineral can be scratched by all other minerals on the chart.

- This is resistance to being scratched.
- Mohs Hardness Scale
- How do you think this scale came to be?
- Why is this chart useful?
- Is this every mineral on Earth?
- Why were these minerals used?
  - ▣ These were ten minerals commonly and readily available.

This mineral can't be scratched by anything above it.

Mineral	Mohs Hardness	Image
Talc	1	
Gypsum	2	
Calcite	3	
Fluorite	4	
Apatite	5	
Feldspar	6	
Quartz	7	
Topaz	8	
Corundum	9	
Diamond	10	

# Hardness – How the Scale Came to Be

- In 1801 Mr. Mohs moved to the country of Austria. One of his jobs there was as the curator of a private mineral collection that was owned by a banker named J.F. van der Null.
- Mr. van der Null wanted his collection to be organized into categories. He also wanted Mohs to identify the many unknown minerals in his collection.
- Mr. Mohs started to study the different physical properties of minerals as a way to identify them. He noticed that some minerals are very soft, others are extremely hard. He also observed that harder minerals could scratch softer ones.
- With this in mind, Friedrich Mohs decided to develop a scratch test where he could determine the hardness of a mineral.



# Specific Gravity

- Compares the weight of a mineral to weight of equal volume of water
- EX: Pyrite is 5 times heavier than water
- Pure gold is more than 19 times heavier than water



# Common Minerals

## □ Rock-Forming Minerals

- Small number of 4,000 minerals make up most rocks.
- Most are silicates – made of silicon and oxygen
- Quartz = pure silica
- More than half of minerals in Earth's crust are a type of silica
- Other types can be carbonate
- Limestone = limestone

# Gems

## □ Gems

- Minerals that are rare.
- Can be cut, polished
- Used for jewelry
- To be gem-quality, it must be clear with few or no blemishes or cracks.
- Must have beautiful luster or color.



# Gems

- Gems are made...
  - Under special conditions
  - Example: Diamonds are a form of carbon. It forms deep within Earth's mantle under extremely high pressures.
  - Volcanic eruptions forces magma from mantle to surface bringing diamonds up.
  - This type of magma called kimberlite (TB 274)
  - [How Diamonds are Formed](#)

# Ores

- Must contain a useful substance that can be sold for profit.
- Example: Metals
  - ▣ Iron: used to make steel (hermatite)
  - ▣ Lead: used in batteries (galena)
  - ▣ Magnesium: used in vitamins (dolomite)
- Extracted by mining from Earth (p. 275)
- Since it take millions of years to form=nonrenwable resource

# Ore Processing

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- After being mined, it must be processed.
- Smelting process, melts ore and separates and removes most unwanted material.
- After smelting, minerals can be refined or purified.

# Exit Ticket

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