

Ores to Minerals

Lesson 3

Ore and Mineral Vocabulary

LESSON PLAN

Standards Alignment, Learning Objectives, Materials List, Step-by-Step Instructions, Vocabulary Bank, Differentiation Suggestions

In this lesson, the students and teachers will co-construct a graphic organizer that includes the vocabulary terms, their parts of speech, definitions, examples, and other pertinent information. The students will retain their own copy of the graphic organizer, which they may use in later lessons. They may also add additional terms to the graphic organizer throughout the module's lessons.

Teaching science vocabulary helps students to explain observations and phenomena and engage in critical thinking to develop language skills. An understanding of key vocabulary allows students to understand complex texts and communicate their ideas using supporting evidence. This lesson will use the technique where students explore-before-explain, often called "discovery learning." This means that the lesson will focus on the conceptual meanings of the vocabulary terms, because a student's inability to describe something using academic science vocabulary isn't necessarily related to their understanding of science content, and students are better able to understand a term's definition in context.



Standards

AP® Environmental Science Standard: 5.9 Impacts of Mining - LEARNING OBJECTIVE-EIN-2.K: Describe natural resource extraction through mining.

Next Generation Science Standard: HS-ESS3-1 - Construct an explanation based on evidence for how the availability of natural resources [and/or the] occurrence of natural hazards...have influenced human activity.

Learning Objective

Identify and apply language to highlight vocabulary related to magnetism.



Materials

1

Student Worksheet - Vocabulary Graphic Organizer

2

Student Slides

Step-by-Step Instructions

1. Provide students with the vocabulary word bank. Tell students that together, you will co-construct definitions and examples to fill out the Student Worksheet - Vocabulary Graphic Organizer.
2. Project or display the Student Worksheet - Vocabulary Graphic Organizer for the class.
3. Begin with the first word.
4. Discuss the part of speech for the term. You may project the Student Slides to support this.
5. Ask students to describe their current understanding of the phenomenon. Write their best definition in the Student Worksheet - Vocabulary Graphic Organizer.
6. Probe and guide students to create a model (diagram, simulation, replica, equation, or physical model) or form an example and fill in the appropriate column in the Student Worksheet - Vocabulary Graphic Organizer. Show the Student Slides as needed to support the students' understanding of the context of the vocabulary term.
7. If appropriate and necessary, provide an additional activity, video, or demonstration to explore the phenomenon.
8. Add other pertinent information to the Student Worksheet - Vocabulary Graphic Organizer that arises during the co-creation activity, such as rejected definitions, synonyms, applicable sentences, and related words.
9. Guide students to refine the definitions and examples on the Student Worksheet - Vocabulary Graphic Organizer.
10. Ask students to complete a row for the vocabulary term on their own Student Worksheet - Vocabulary Graphic Organizer.
11. Repeat for all vocabulary terms in the vocabulary word bank.
12. Tell students that they may add vocabulary from earlier lessons to the Student Worksheet - Vocabulary Graphic Organizer for future reference.
13. Tell students that they may add to the Student Worksheet - Vocabulary Graphic Organizer in upcoming lessons in this module.

Vocabulary Bank

- **Brittle** - Hard but easily shattered with an applied force
- **Cleavage** - The splitting of rocks or crystals in a specific plane
- **Crystal** - A solid with symmetrically arranged planes due to its regular and repeating atomic structure
- **Density** - A physical property related to mass per unit volume
- **Hardness** - A measure of a mineral's relative resistance to scratching
- **Luster** - How light interacts with the surface of a crystal, rock, or mineral so that the surface is shiny
- **Malleable** - A physical property where a metal is capable of being flattened under the blows of a hammer into thin sheets without breaking or crumbling into fragments
- **Ore** - A source from which valuable minerals or resources are extracted
- **Refine** - The process of separating and purifying raw minerals

Differentiation Suggestions

- **Adjust Amount:** Reduce the amount of vocabulary terms.
- **Use a Cooperative Learning Strategy:** Add a Think-Pair-Share or similar activity when co-constructing the examples.
- **Scaffold Support:**
 - Provide or allow aids, like additional text or images.
 - Provide sentence frames in the example column in the Student Worksheet - Vocabulary Graphic Organizer.
 - Provide a list of examples before asking students to provide a definition.
 - Refer students to the parts of speech when their definition uses action (a verb) instead of describing a person, place, or thing (a noun).
- **Reduce Cognitive Load:** Limit the amount of text you include in each slide and simplify the definitions.
- **Ongoing Check-Ins:** Regularly check in with groups to provide feedback and support, ensuring all students participate and understand the task.
- Use translation technology or a bilingual dictionary.
- Read the text aloud.