

Materials and Metallurgy

Materials Science and Metallurgical Engineering

Objective

Students will learn about raw materials and where they come from.

Standards and Objectives

- 7th Grade Standard 1, Objective 3
- Chemistry Standard 4, Objective 1

Learning Outcomes

Students will learn:

- Where raw materials come from
- How to extract pure Copper metal
- Physical properties of Sodium

Essential Questions

- What are raw materials
- How do they get the materials to make products like cell phones, paint, etc.

Time Required

- Introduction (15 minutes)
- Activity 1 (30 minutes)
- Activity 2 (30 minutes)

Assessments

- Students follow directions outlined in the procedures

Materials

- Steel nails
- Copper sulfate
- Litmus paper
- Beakers
- pH color code
- Thermometer
- Pure sodium metal
- Scale

Lesson Description

Please see “Rocks and Materials Science” Presentation. Review uses of rocks. Explain that engineers extract compounds from raw materials to create materials for products like conductors for cell phones, paint for bridges, rubber for tires, semiconductors for cell phones.

Companies like Kennecott Copper use Mining Engineers to efficiently and safely extract ore, Metallurgical Engineers to refine the copper, and Materials Scientists to create materials that will be used by industry.

The “Copper Metal Experiment” outlines a process used by real engineers at Kennecott to extract pure copper. The “Sodium Metal Experiment” is an investigation of chemical properties of sodium. To purchase chemicals for these experiments, you may call the University of Utah Chemistry Stockroom at 801-581-6626.