

## Mining Unit Overview: Where’s That Mine of Mine?

**Grade Level:** 6-12 (Complexity of the assignment may be adapted to the grade level)

**Time:** 2-3 class periods, plus outside work. Option for in-class presentations & further discussion.

### Objectives:

Through discussion and an assignment requiring research and analytical thinking, students will gain an understanding of modern mining, society’s reliance on the industry, and some of the challenges faced by modern mining professionals. Students will also be exposed to examples of the many professional disciplines on which the industry relies.

The assignment in this lesson challenges students to consider factors affecting where new mines might be developed, based on real-world locations. The mineral to be extracted will be a fictitious mineral (“amazite”). This can be completed as a class, in small groups or individually. It can be simplified or made more challenging as desired for the grade level of the students.

Augment this lesson plan by inviting one or more speakers from the mining industry to speak to your class.

### Related Next Generation Science Standards:

HIGH SCHOOL: HS-ESS3 – *Human Sustainability - Earth and Human Activity*<sup>1</sup>

MIDDLE SCHOOL: MS-ESS3 - *Earth and Human Activity*<sup>2</sup>

These are elaborated on in **Supporting Resources**.

Go to [MineralsEducationCoalition.org/standards](https://www.MineralsEducationCoalition.org/standards) to search for detailed correlations with the full array of Next Generation Science Standards and Common Core standards and all state standards.

### Key Concepts

Mining is the removal of useful materials from the Earth. These materials have value in making –or making possible–the products and services that people want and need for living in the developed world. From the first time a human scooped clay from the side of a river, to the development of mines that are visible from space or extend over 4 km deep into the ground, humans have depended on mining. While recycling and making more efficient use of materials that have already been mined are key to our responsible use of the world’s nonrenewable resources, those practices will not eliminate the need for mining.

“If it can’t be grown, it must be mined” is a way of expressing just how vitally important mining is to every person on this planet. And even growing things using modern agricultural techniques relies on mining—for farm machinery, transportation, fertilizers, irrigation equipment and more. But with our global dependence on mining also comes a need to make sure that our mining activities are sustainable. Mining is a temporary use or disturbance of the Earth’s surface—and only a small fraction of a percentage of it is ever touched by mining. But recognizing—and mitigating—the negative effects mining can have on the surrounding environment is critical to ensuring that humans and nature can continue to coexist for centuries to come.

---

<sup>1</sup> Source: <https://www.nextgenscience.org/dci-arrangement/hs-ess3-earth-and-human-activity>

<sup>2</sup> Source: <https://www.nextgenscience.org/pe/ms-ess3-1-earth-and-human-activity>

Key concepts to consider in this lesson include the following:

- Mining takes place where materials of value to humans are found and can be economically extracted. It can be above ground or below ground. These materials are only found in certain locations on Earth, which necessitates a global understanding of mining and its role in modern society.
- Local quarries are good examples of mining for industrial minerals and aggregates. Aggregates are bulk commodities of low unit value – such as the gravel and rock used in highway construction. Hence, they must be mined and processed near the location of use to prevent transportation costs from exceeding the value of the aggregate to the project.
- Mining is not an optional activity for society, nor one that is constrained to the past. Therefore, it needs to be done in a responsible, safe and sustainable manner, wherever it takes place.
- The mining industry is not just made up of people who dig, haul and process materials. It includes geologists, engineers, chemists, explorers, health and safety professionals, accountants, IT specialists and more.
- Every potential new mine site must be evaluated for its environmental, social and economic impact, as well as the ability to overcome engineering challenges. If the impacts and the challenges are insurmountable, the mine will not be developed. Also, before a modern mine can be opened, a reclamation plan must be in place for the restoration of the surrounding land once the mine is closed.
- While “green” energy is collected from resources naturally replenished on a human timescale, and reduces the destructive consumption of nonrenewable resources, it still depends on mined materials. For example, while wind, solar and geothermal energy are renewable, conversion of that energy into electricity relies on equipment built from non-renewable resources. The continued development and use of sustainable mining practices will remain a priority for years to come.

**Unit Components:**

**Overview**

**Introductory Activity**

**Primary Activity**

**Teacher Instruction**

**Student Instruction**

**Supporting Resources**