VisibleGeology

EARTH SCIENCE WEEK

Inspire the next generation of geoscientists with Visible Geology, a free earth science education tool

Teach students fundamental geology concepts in a fun and interactive web application. Using Visible Geology, your students can explore geological models, build their own, and visualise real-world earth processes in 3D.

www.visiblegeology.com

"This really is the kind of tool that has been needed to light the passion in Earth Science."

- John Spring, Secondary School Teacher and Geologist

Explore Visible Geology resources for educators

Exploring critical minerals in pegmatite dikes, with Visible Geology!

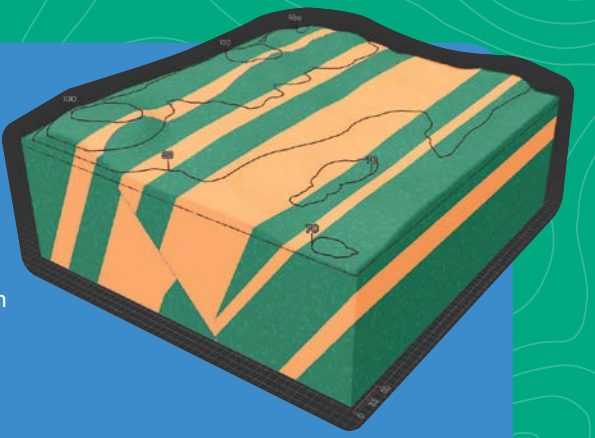
Lithium is used to create powerful rechargeable batteries that power everything from smartphones to electric vehicles. Lithium and other critical minerals are often found in special igneous rocks called pegmatites. The host rock is an ancient greenstone, a type of metamorphosed volcanic rock. Over time, molten magma squeezed into cracks in the greenstone, forming steep, sheet-like bodies called pegmatite dikes. This is where lithium ore is usually found: the actual formation of ore depends on the specific chemistry of the magma and the conditions during cooling, which means not all dikes contain valuable minerals.

Later, tectonic forces cause faulting, breaking and shifting the rocks underground. This fault offset the pegmatite dikes, so their positions no longer line up on either side of the fault. As a result, the ore zones are also offset, making it tricky to predict where to find lithium just by looking at a map.

An initiative by SEEQUENT

Learning Activity

Find the lithium ore!



This model is inspired by real-world lithium deposits in both Australia (where pegmatite dikes are common and often offset by faults) and North America (where pegmatite bodies can also be structurally complex).

Your challenge:

Open Visible Geology and use the core and xSection tools to explore the inside of this model and find the lithium ore.

1. Open the model in Visible Geology with this link: **https://www.visiblegeology.com/?sharecode=TwUBbinJnN6JZkEbHctHku** or by scanning the QR code below.
2. Use the core and xSection options located in the left-hand menu to find the ore (light pink). Click “New” in the right panel and use the handles to move your core or xSection.
3. Investigate:
   - Describe the shape and distribution of the ore body. Is it continuous, layered, or broken into separate sections? What geologic processes might explain its structure?
   - Make a claim about the best location for a drill hole to access the lithium ore. Support your claim with specific evidence from your cores and cross sections, and explain why this location is the most effective choice.

Open the model

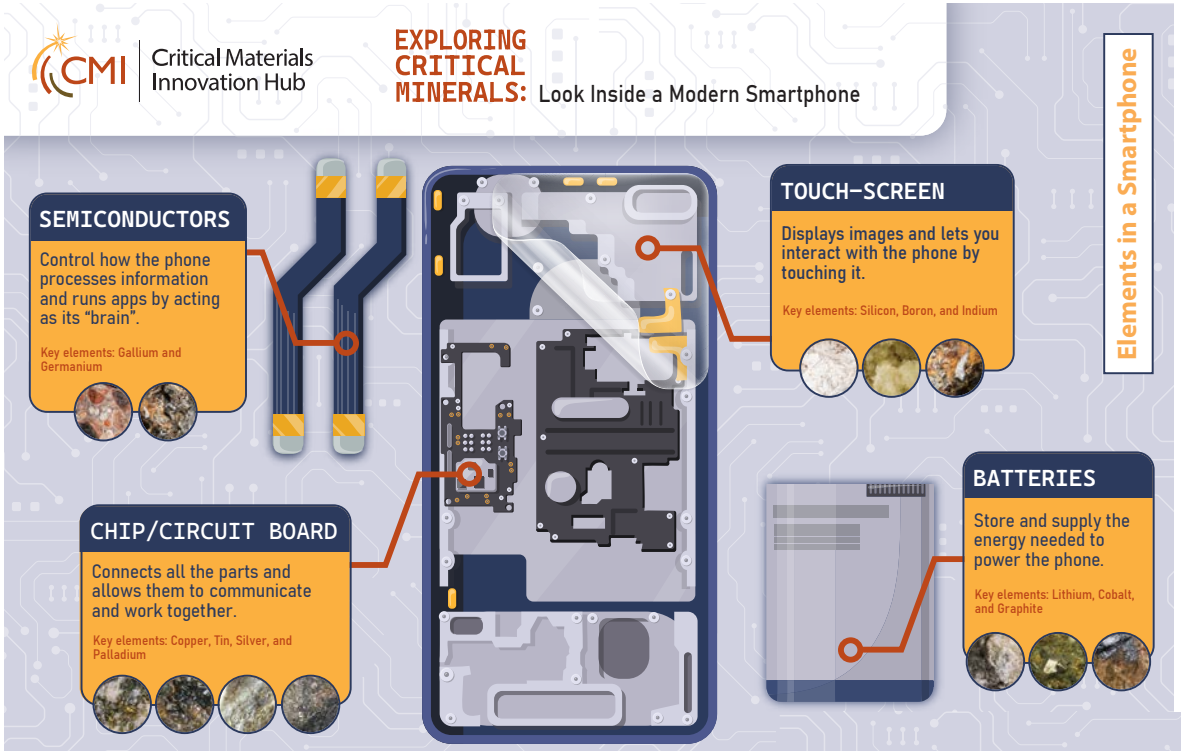
Teacher note:

The model is simplified to help students focus on the key geological concepts, but remember that in real deposits, the ore is controlled by both the shape of the pegmatite and its unique chemical makeup. To make this model easier to build and explore in Visible Geology, we used a pluton-shaped intrusion to represent the ore body.

Additionally, an unconformity (Hidden basement) was added at the base of the model to hide the bottom, so students cannot see the full extent of the geology underground.

Critical Materials Innovation Hub

EXPLORING CRITICAL MINERALS: Look Inside a Modern Smartphone



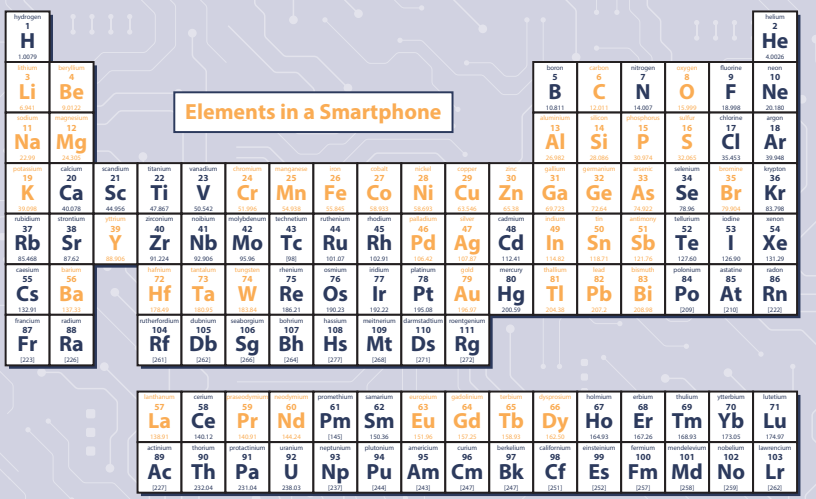
The Critical Materials Innovation Hub (CMI) is working to secure the future of these essential elements by enhancing and diversifying supply, developing substitutes, and unlocking secondary sources while also supporting the research community.

Did You Know?

The elements found inside smartphones, highlighted in yellow, make it possible to store energy, process information, capture memories, and connect instantly — all in a device small enough to fit in your hand. But many of these materials are difficult to source, limited in supply, and a challenge to recycle.

This is where research matters.

INNOVATION TODAY ENSURES THE TECHNOLOGY OF TOMORROW



Visit ameslab.gov/cmi to learn more

E-Waste Mining: Recovering Critical Materials from "Crushed Hard Drives" Activity

Electronics like hard drives, phones, and computers contain valuable metals (gold, copper, rare earths). Recycling e-waste helps recover these materials with less environmental and energy cost and supports technology supply chains while reducing the need for extracting new materials. In this activity, consider the benefits and challenges associated with e-waste material recovery.

Materials:

- Wild bird seed
- Various beads of assorted colors or shapes to represent various materials
  - Gold, copper, aluminum, and steel
  - Rare earth elements such as neodymium, praseodymium, and dysprosium (strong magnets)
- Shallow dishes — aluminum pie tins work great for this activity
- Tweezers and plastic spoon

Activity 1: Design a Separation Strategy

Before touching the mixture, brainstorm how the materials can be separated without using fingers, using only tools like tweezers, magnets, sieves or shaking.

Guiding Questions:

- What physical properties could help separate materials (size, magnetism, density)?
- What challenges do you predict?

Activity 2: Two-Minute E-Waste Mining Challenge

How many valuable beads can you extract from the mixture in two minutes using the approved tools? After extraction, calculate the total "value" of the beads recovered using the cost chart.

Guiding Questions:

- How might recyclers decide which materials are "worth" recovering?
- How does this reflect real recycling challenges?

Find a list of items to make your own Critical Materials Toolkit and find corresponding activities at ameslab.gov/cmi/cmi-lesson-plans.

Explore activities surrounding critical materials including

- Exploring Separation and Recovery Techniques
- Finding Critical Materials and Rare Earth Elements
- From Trash to Treasure: Exploring the Circular Economy of Lithium
- Making Sense of Critical Materials
- Critical Materials in Action: Exploration of Phosphors
- And more!

Simply visit ameslab.gov/cmi/cmi-lesson-plans

CMI Critical Materials Innovation Hub

EXPLORING CRITICAL MINERALS:

- Enhancing and Diversifying Supply
- Developing Substitutes
- Unlocking Secondary Sources
- Crosscutting Research

Society of Exploration Geophysicists Field Camps

The SEG Field Camp Program is intended to advance geophysics today and inspire geoscientists for tomorrow by providing opportunities for SEG Student Chapter's undergrad and graduate students to build professional skills in geoscience fields. This program provides critical funding for projects that further professional development, student support, and youth outreach goals.

Students Teaching Students. Making K-12 Connections

SEG Field Camps allow students to translate their work into meaningful experiences for K-12 students, taking learning beyond the classroom into workshops for the students and community. SEG Student Chapters can expand the interaction through the **SEG Outreach Program** to expand the interaction to virtual field trips, science fairs, and talks and/or hands on activities for K-12 students. These activities can bring real world geoscience topics, from hazards to natural resources, into classrooms and communities.

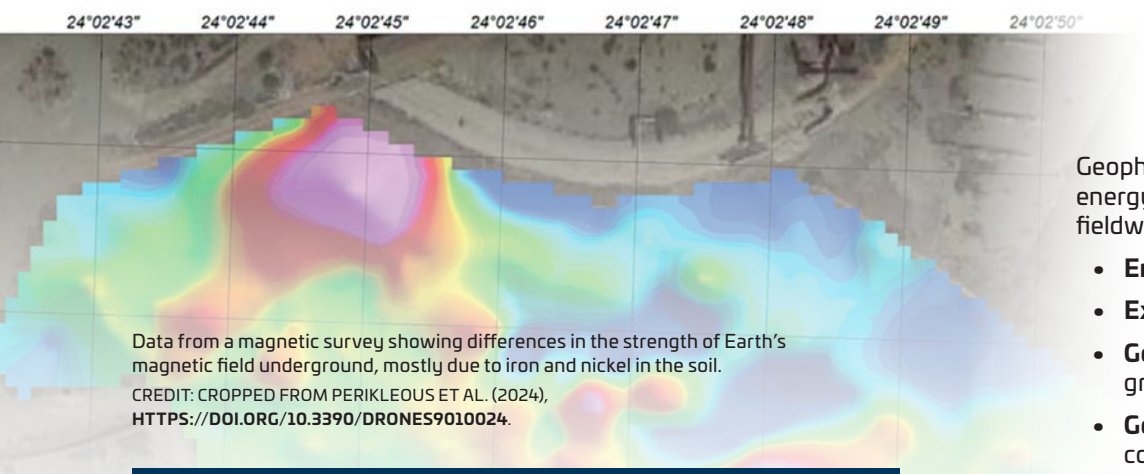
> *"Participating in this field camp has allowed me to develop crucial skills in teamwork, management, and social interaction, which are essential for my future professional endeavors."*
>
> – Mahotsav Basnet Tribhuvan University SEG Student Chapter, Field Camp 2024 – Training on Delineation of Water Contamination Zone of Bagmati River Using Environmental Geophysics.

The Field Camp program is an SEG Foundation supported program for SEG Student Chapters to support students in developing project and organizational skills and gaining industry experience while collaborating with peers, faculty, and geoscience professionals.

SEG Student Chapters can apply for funding to run K-12 outreach events. K-12 educators are encouraged to reach out to local chapters that could bring geophysics workshops and other events to their students at little or no cost to their school.

Electrical Resistivity Tomography (ERT) geophysical data acquisition at Bagmati river to identify pollution levels affecting water resistivity, Nepal.
CREDIT: TRIBHUVAN UNIVERSITY SEG STUDENT CHAPTER

BACKGROUND PHOTO: ADOBE STOCK



Data from a magnetic survey showing differences in the strength of Earth's magnetic field underground, mostly due to iron and nickel in the soil.

CREDIT: CROPPED FROM PERIKLEOUS ET AL. (2024), **HTTPS://DOI.ORG/10.3390/DRONES9010024**.

> *"This experience has been truly inspiring, motivating me to pursue further excellence in geophysics and reinforcing my commitment to using science to make a positive impact on society. I want to become a geophysicist because I believe geophysics has the power to better understand natural hazards, protect communities, and contribute to solving real-world challenges through innovation, research, and international collaboration. Participating in the Field Camp strengthened my passion for applying geophysical methods in projects that support both science and humanity."*
>
> — Ana Elena Suditu, University of Bucharest SEG Student Chapter, Field Camp 2024 – Geophysics for Civil Protection and Sustaining Humanitarian Aid Operations.

Drone based and ground level magnetometric measurements for detection of unexploded ordnance (UXO) and explosive remnants of war (ERW) near the village of Vadu, Constanta County, Romania.

CREDIT: UNIVERSITY OF BUCHAREST SEG STUDENT SECTION

Geophysicists have diverse career opportunities in various sectors, including energy, environmental consulting, and academia, with roles ranging from fieldwork to research and data analysis.

- **Environmental Geophysicist –** Assess and mitigate environmental risks.
- **Exploration Geophysicist –** Natural resources: oil, gas, and minerals.
- **Geophysical Data Analyst –** Interpret seismic, magnetic, or gravitational data.
- **Geotechnical & Engineering Geophysics –** Site investigations for construction, stability assessment, subsurface imaging.
- **Government and Research Institutions –** National geological surveys, environmental monitoring, and policy development.
- **Planetary science & space missions –** Remote sensing, geophysical studies, and mission instrumentation.
- **Research & Academia –** teaching and conducting research at universities.

Learn What It's Like to Be a Geophysicist

For Earth Science Week 2026, SEG has developed an activity for students to conduct surveys like those used by geophysicists who investigate what lies beneath Earth's surface. Students can:

- construct a simplified seismometer or use a free smartphone app to measure and record ground vibrations, and/or
- measure electrical resistivity to detect variations in subsurface materials (e.g., water or mineral content of soil).

SEG and their humanitarian program, Geoscientists *Without* Borders® (GWB), have a long history of supporting Earth Science Week. Discover past activities from SEG and GWB designed to introduce students to:

- geophysical methods and data,
- geoscience careers,
- natural hazards,
- and the role of earth science in understanding our planet.

Visit the ESW Online Toolkit, and search for "SEG" or "GWB".

bit.ly/ESW-online-toolkit

What really lies **DOWN UNDER?**

Australia's rich geology, abundant resources and world-class mining operations make it a global mining powerhouse. Download **Australian Mining: Mapped** to learn more.

Considering a **CAREER IN MINING?**

From engineering and technology to environment, finance and community, find the mining career that's right for you! Download the MCA's **Periodic Table of Mining Careers**.

Explore Australia's rich geology, mineral resources and career opportunities

AUSTRALIAN MINING

Brought to you by
Minerals Council of Australia

minerals.org.au/careers

How minerals power
MODERN LIFE

Discover everyday things made possible by mining – from phones to wind turbines to your favourite sport and even emerging technologies. Download the **30 Things** series.

Australia's rich list of
CRITICAL MINERALS

Australia's enviable catalogue of critical minerals are helping to power global clean energy and advanced technologies. Download the MCA's **Good Guide to Critical Minerals**.

Where geology meets opportunity
EXPLORE DOWN UNDER

The Minerals Council of Australia is the national body representing Australia's mining and mineral processing sectors.

Minerals Council of Australia

X marks the science

For Educators

Interactive resources and hands-on investigations to keep your students engaged

By Educators

Created by former teachers to fit any teaching environment

Open to All

Available at no cost, aligned with Next Generation Science Standards, and backed by research from UL Research Institutes

Teacher & Student Resource Library

Classroom-Ready Printouts

Educator Fellowships & Community Partnerships

Photo Credit: ULRI Xplorlabs

Explore some of the world's most pressing safety challenges in your classroom

Spark curiosity and critical thinking with real-world, hands-on safety science learning — all at no cost.

Photo Credit: ULRI Xplorlabs

Xplorlabs materials are based on trusted safety science research from UL Research Institutes and tied to key concepts students need to know. Our award-winning platform helps students better understand the science behind everyday safety risks — empowering them to make safer decisions, take action in their communities, and explore future careers in safety science.

XPLORLABS®

By UL Research Institutes