HANDS DOWN EDUCATION · 6-WEEK UNIT STUDY PLANNER

Rocks & Minerals unit study

A K-12 rocks and minerals homeschool curriculum: collecting, streak and hardness tests, the rock cycle, crystals, density and resources, in a six-week plan.

GRADE BANDS K-2 · 3-5 · 6-8 · 9-12
FULL GUIDE https://handsdowneducation.com/homeschool/rocks-and-minerals

How to use this planner

The six weeks below are the guide's authored scope and sequence: one focus, one key activity and one portfolio output per week. Run the activity at the level your child is at (the grade band notes tell you how), keep the output, and by week six you have a portfolio that shows the unit end to end.

Pace is yours. A week here is three to five working sessions; a topic that is going well can take two calendar weeks, and one that has run dry can be closed early. Tick the box when a week's output is in the portfolio.

Six-week scope and sequence

Wk	Focus	Key activity	Portfolio output	Done
1	**Collecting and describing**	Collection walk; washing, sorting and describing; the rock-versus-mineral distinction; start the egg-carton or labeled collection and the field guide.	A labeled collection of at least twelve rocks with descriptions.	☐
2	**Testing minerals**	Streak, hardness, luster, magnetism and vinegar tests; the Mohs scale; a mineral key; graph hardness results.	A completed mineral-identification data table.	☐
3	**Igneous rocks and crystals**	How magma and lava cool into rock; crystal size and cooling rate; pumice and obsidian; grow crystals and measure them.	A crystal-growth graph and an explanation of crystal size.	☐
4	**Sedimentary rocks, weathering and erosion**	Weathering hunt; sediment jars; layers and fossils; sandstone, shale and limestone; the vinegar test on limestone.	A photo essay of local weathering and a labeled sediment jar.	☐
5	**Metamorphic rocks and the rock cycle**	Heat and pressure; slate, marble and gneiss; the crayon rock cycle; density measurement for older students.	A rock-cycle diagram with energy sources, and density calculations.	☐
6	**Minerals as resources**	Minerals in everyday objects; mapping where they are mined; local geology; field report or final collection display.	A finished field guide or collection exhibit, or a field report.	☐

Running it at your child's level

Grades K-2: collecting, sorting and describing

Young children are natural collectors, and the first job of a geologist is to look closely and describe. A K-2 rocks unit is collecting, washing, sorting and comparing, with simple tests (does it scratch, is it magnetic, does it float) and plenty of new words. A labeled collection of a dozen rocks in an egg carton is a perfect final product.

- Rock hunt and sort: collect twelve rocks on a walk, wash them, then sort them three ways — by color, by smooth or rough, and by size — counting each group and drawing a simple bar chart of one sorting.
- Scratch test: try to scratch each rock with a fingernail and then a copper coin, and sort them into 'soft', 'medium' and 'hard' piles; compare with a piece of chalk and a quartz pebble.
- Magnet and water: test which rocks a magnet sticks to and which rocks float (a piece of pumice is a surprise), and talk about why.
- Rock detective: look at each rock under a magnifying glass and describe what you see — sparkly flakes,

layers, holes, little pieces stuck together, shells — then match a few to pictures of granite, sandstone, pumice and limestone.

Reading: Let's Go Rock Collecting by Roma Gans, a Let's-Read-and-Find-Out Science book that introduces the three rock types through a collecting trip, and Everybody Needs a Rock by Byrd Baylor, a gentle picture book about choosing one special rock.

Grades 3-5: mineral tests and the three rock types

Upper elementary students can identify common minerals with the same tests geologists use — streak, hardness, luster, magnetism and reaction with acid — and record results in a data table. This is the age to learn the three rock types and the clues that show how each formed, to see weathering and erosion at work locally, and to grow crystals and measure them.

- Mineral identification lab: for six samples (quartz, calcite, feldspar, magnetite, mica and gypsum make a good set), record color, streak, luster, hardness against a fingernail (2.5), a copper coin (3.5) and a steel nail (about 5.5), magnetism and fizz in vinegar, then use a simple key to name each.
- Three rock types: sort your collection into igneous, sedimentary and metamorphic using clues — crystals or holes, grains and layers, bands and sparkle — and write one sentence of evidence for each placement.
- Weathering hunt: find and photograph signs of weathering and erosion near home — cracked pavement, rounded stream pebbles, worn gravestones, tree roots splitting rock — and explain what caused each.
- Crystal garden: grow salt, sugar and alum crystals in three jars, measure the largest crystal in each every day for a week, and graph the growth.

Reading: Everything Rocks and Minerals by Steve Tomecek (National Geographic Kids) for photographs and clear explanations, and The Magic School Bus Inside the Earth by Joanna Cole for a fun tour of the rock types and the planet's layers.

Grades 6-8: the rock cycle, density and resources

Middle schoolers can model the rock cycle as a system driven by Earth's internal heat and by sunlight-powered weathering, calculate density as a real identification tool, read a geologic map of their own area, and study why mineral resources are found where they are and what extracting them costs. The NGSS middle-school earth-science standards map directly onto this band.

- Crayon rock cycle: shave crayons into 'sediment', press the shavings into a 'sedimentary' layer by hand, heat and press them in foil into a 'metamorphic' rock, then melt and cool them into an 'igneous' one; diagram each step and label the energy source driving it.
- Density as identification: measure the mass and volume (by water displacement) of five specimens, calculate density, compare with published values, and explain why a gold nugget sinks in a pan while sand washes away.
- Read your local geologic map: find your home on the USGS National Geologic Map Database or a state survey map, identify the rock units beneath you, and visit one exposure to compare with the map.
- Resource map: choose five minerals in everyday objects (copper wiring, lithium batteries, gypsum drywall, halite salt, quartz glass), map where they are mined, and write a page on why they are found there and one environmental cost of extracting each.

Reading: The Smithsonian Handbook of Rocks and Minerals by Chris Pellant as the identification reference, and A Rock Is Lively by Dianna Hutts Aston, a picture book that younger siblings can share, for the beauty of the subject.

Grades 9-12: crystal structure, mineral chemistry and field geology

High schoolers can explain a mineral's properties from its atomic structure and bonding — why diamond and graphite are both carbon yet one is the hardest natural mineral and the other marks paper, why mica splits into sheets and halite into cubes — and can do field geology: describe an outcrop, measure layers and write a report. Done with lab write-ups and a field report, this unit is a substantial part of an earth science or chemistry credit.

- Structure and properties: compare diamond and graphite, then quartz, mica and halite, using diagrams of their crystal structures; write an explanation of hardness, cleavage and electrical conductivity in terms of bonding.
- Field report: visit a road cut or outcrop, sketch it to scale, measure the thickness of each layer, identify the rock types and write a two-page report proposing the sequence of events that formed it.

- Ore to metal: research how copper is extracted from chalcopyrite or iron from hematite, write the chemical equations, and estimate how much rock must be mined to produce the copper in one household's wiring.
- Read John McPhee: choose a chapter of Annals of the Former World and write an essay on how McPhee and the geologists he follows read a road cut as a historical document.

  Reading: Annals of the Former World by John McPhee, the Pulitzer-winning account of geologists reading North America's rocks, paired with the free open textbook Physical Geology by Steven Earle for the mineralogy and rock-cycle chapters a credit needs.

A sample week, subject by subject

Reading & Writing

Write a field-guide page for five rocks from your own collection: a sketch, where each was found, its color, texture and test results, and a guess at how it formed, revised after the week's reading.

Math

Find the density of three rocks by weighing each on a kitchen scale and measuring its volume by water displacement in a measuring cup, then compare with published densities of quartz, granite and pumice.

Science

Test six minerals with the classic kit: streak on an unglazed tile, scratch with a fingernail, a copper coin and a steel nail to place each on the Mohs hardness scale, a magnet, and a drop of vinegar to find the calcite.

Social Studies

List the minerals inside a smartphone or a pencil (graphite, clay, copper, lithium, gold), find the country each mostly comes from on a world map, and discuss why mineral resources are unevenly spread.

Art

Grow salt or alum crystals on a string over several days, sketch them under a magnifying glass every morning, and compare their shapes with photographs of natural crystals.

Books, sites and kits

- Let's Go Rock Collecting by Roma Gans (Book (K-2)) — A Let's-Read-and-Find-Out Science book on the three rock types told through a collecting trip; the K-2 opener.
- Everybody Needs a Rock by Byrd Baylor (Book (K-3)) — A quiet picture book of 'rules' for finding your own special rock; a good first-day read-aloud.
- Everything Rocks and Minerals by Steve Tomecek (Book (3-5)) — National Geographic Kids photographs and explanations of minerals, rock types and the rock cycle.
- The Magic School Bus Inside the Earth by Joanna Cole (Book (2-5)) — Ms. Frizzle's class digs through the crust collecting rocks of every type.
- Smithsonian Handbook: Rocks and Minerals by Chris Pellant (Book (6-12)) — A photographic identification guide to hundreds of specimens; the reference for the middle and high school bands.
- Annals of the Former World by John McPhee (Book (9-12)) — Pulitzer Prize-winning narrative of geologists reading the rocks along Interstate 80; a chapter or two for the high school essay.
- Mindat (Website) — The largest free mineral database, with photographs, properties and localities for every named mineral.
- USGS National Geologic Map Database (Website) — Free geologic maps of the United States to find the rock units under your own home.

Standards this unit covers

- 2-PS1-1 (NGSS) — Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties — sorting and testing the collection.
- 4-ESS1-1 (NGSS) — Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time — the sediment jar and the outcrop.

- 4-ESS2-1 (NGSS) — Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind or vegetation — the weathering hunt.
- 5-PS1-3 (NGSS) — Make observations and measurements to identify materials based on their properties — the mineral-identification lab.
- MS-ESS2-1 (NGSS) — Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process — the crayon rock cycle.
- MS-ESS3-1 (NGSS) — Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy and groundwater resources are the result of past and current geoscience processes — the resource map.
- HS-PS1-3 (NGSS) — Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles — structure and properties of diamond, graphite, mica and halite.
- CCSS.MATH.CONTENT.6.RP.A.3 (CCSS Math) — Use ratio and rate reasoning to solve real-world and mathematical problems — density as mass per unit volume.

Common questions

What should a rocks and minerals unit study include?

Five strands: collecting and describing rocks, identifying minerals by their properties (hardness, streak, luster, cleavage, magnetism, reaction with acid), the three rock types and how each forms, the rock cycle and the weathering and erosion that drive it, and minerals as resources — where they come from and what we make from them. The six-week scope and sequence above runs one strand a week and ends with a labeled collection or field guide.

What is the difference between a rock and a mineral?

A mineral is a naturally occurring solid with a definite chemical composition and an orderly crystal structure — quartz, feldspar, calcite, halite. A rock is a natural mixture of one or more minerals, or of grains and fragments. Granite, for example, is a rock made mostly of the minerals quartz, feldspar and mica, which you can often see as separate colored grains. That distinction is the first idea of the unit at every grade.

Where can we collect rocks legally?

Your own yard, road cuts and stream beds on public land where collecting is allowed, beaches where it is permitted and the many fee-dig sites that welcome families. In the United States collecting is generally not allowed in national parks and monuments, while Bureau of Land Management land usually permits reasonable amounts for personal use; state parks vary. Always ask before collecting on private land, and record where each specimen came from.

Can I run a rocks and minerals unit with several ages at once?

Yes, and the collection is the shared spine. Everyone hunts for rocks on the same walk; a five-year-old sorts them by color and texture, a nine-year-old runs the streak and hardness tests and uses a key, a twelve-year-old classifies them by how they formed and models the rock cycle, and a fifteen-year-old calculates densities and explains properties from crystal structure. The grade-band sections above give one row per child for the same week.

Does this unit work for secular and faith-based homeschools alike?

Yes. The core of the unit is observation and testing: streak, hardness, luster, density, crystals and how rocks change by weathering, melting and pressure, which are identical in any setting. Where the reading touches the age of rocks and the timescale of the rock cycle, in the 6-8 and 9-12 bands, it is noted so families can present it in the framework that fits their convictions.

How much does a rocks and minerals unit study cost?

Under twenty dollars. The rocks are free; an unglazed tile (the back of a bathroom tile works), a steel nail, a copper coin, a magnet, white vinegar, a magnifying glass and a kitchen scale cover the testing; salt or alum grows crystals. A small labeled mineral kit for comparison is a worthwhile extra. Mindat, the USGS and the

Smithsonian publish free reference images and data.

How do I start a rocks and minerals unit study?

Start with a walk and an egg carton. Collect twelve rocks from the yard, a park or a stream bed, wash them, and let your child sort them in any way they choose and explain the sorting. The next day, rub each on the back of a tile to see its streak color and try scratching it with a fingernail and a coin. That is the beginning of real mineral identification, and it costs nothing. Pick the row from the grade-band section above that fits your child; the six-week scope and sequence carries the rest.

Is rocks and minerals a good homeschool subject?

It is one of the best first earth-science units, because the materials are everywhere and every test gives a real result. Inside the unit the content maps onto the earth-science and physical-science standards at every grade — classifying materials by their properties, weathering and erosion, the rock cycle, the uneven distribution of mineral resources and, for older students, how atomic structure determines properties — with sorting and graphing in the early grades and density as a ratio later. The skills list above names each with its strand.

Turn this into a full, standards-aligned curriculum

Generate a complete plan around rocks & minerals for your child's grade and pace — free to try, no account required.

https://handsdowneducation.com/curriculum/generate