



CALIFORNIA 4-H PROJECT SHEET SERIES



4-H Geology Project



Geology is more than just the study of rocks. Geology is an Earth science focusing on Earth's physical structure and substance, the processes that change the Earth, and the history of the Earth and its life. Exploring geology helps us better understand the sources of the minerals we use each day, Earth's processes, and the impacts of climate and land-use change and conservation.

In this project, members will learn

- types of rocks, their composition, and how they were formed
- methods to collect rock and fossil specimens and identify the mineral
- the history of Earth, plate tectonics, and large-scale system interactions
- how scientists study water, energy, mineral, and other natural resources we rely on

STARTING OUT, BEGINNER

- Learn about the three main types of rock — igneous, sedimentary, and metamorphic — and how each is formed.
- Start a rock collection and label the composition of rocks.
- Display a rock collection at a fair or exhibition.
- Explore ways to make crystals.
- Learn about the difference between rocks and fossils.
- Learn what fossils can tell you about Earth's history.
- Discover the water cycle and impacts of erosion.

LEARNING MORE, INTERMEDIATE

- Learn about mineral properties and how to conduct tests for hardness and color.
- Make fossil molds.
- Explore, gather, and identify fossils.
- Discover the geologic history of your community, then learn about the geologic history of California.
- Find out what rock types are found in California.
- Learn more about earthquakes and other natural disasters.

EXPLORING DEPTH, ADVANCED

- Learn to measure specific gravity.
- Read and use a topographic map; locate sites on a plat map.
- Investigate the natural history and evidence of geologic eras in your county.
- Promote conservation of minerals and geological structures.
- Find the impacts of climate and land-use change.
- Explore geology careers.

The activities above are ideas to inspire further project development. This is not a complete list.

Light your spark | Flex your brain | Reach your goals



Expand Your Experiences!

Science, Technology, Engineering, and Mathematics (STEM)

- Gather various soils and conduct pH, nitrogen, phosphorus, and potassium tests to determine what helps plants thrive.
- Visit a structural engineer to learn how geology impacts their designs and buildings.
- Use an online 3D mapping program to explore geological features on Earth.

Healthy Living

- Learn about medical geology, a science that explores how Earth processes affect our health.
- Identify products in your household that contain minerals and explore how they impact your health (e.g., fluoride in toothpaste or calcium in milk).

Civic Engagement

- Learn about science communication and how geologists talk with the public.
- Visit with a geologist to learn how California's geological formations have changed due to humans.
- Plan a [service-learning project](#) to help reduce carbon emissions and ease climate change.

Leadership

- Serve as a junior or teen leader in your 4-H Geology Project.
- Deliver a presentation on geology at a 4-H meeting or community event.
- Organize a geology day at a community center.

College and Career Readiness

- Visit a college geology department to learn about higher education in Earth science.
- Visit with a geologist to learn more about their work and career path.
- Take additional high school courses on Earth science.

CONNECTIONS AND EVENTS

Presentation Days — Share what you've learned with others through a presentation.

Field Days — At these events, 4-H members may participate in a variety of contests related to their project area. Contact your county 4-H office to determine additional opportunities such as a county resource fair.

CURRICULUM

- 4-H Geology Levels 1–4
<https://shop4-h.org/products/4-h-geology-introduction-to-the-study-of-the-earth>
- 4-H Geology
<https://mdc.itap.purdue.edu/subcategory.asp?subCatID=362&CatID=16>

4-H RECORD BOOK

4-H Record Books give members an opportunity to record events and reflect on their experiences. For each project, members document their experiences, learning, and development.

4-H Record Books also teach members record management skills and encourage them to set goals and develop a plan to meet those goals.

RESOURCES

- U.S. Geological Survey, www.usgs.gov/
- Geology.com, <https://geology.com/>
- Education.com, www.education.com/resources/earth-science/
- Kansas 4-H Geology, www.kansas4-h.org/projects/agriculture-and-natural-resources/geology/index.html
- Oregon 4-H Geology, <https://extension.oregonstate.edu/4h/natural-science-projects#geology>

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4-H Thriving Model

4-H programs done well help youth thrive. No matter what project or activities are offered, the project leader should help ensure youth engagement with a focus on these three contexts:

FACILITATE YOUTH SPARKS

A spark is something youth are passionate about; it really fires them up and gives them joy and energy. Youth use their spark to make the world a better place.

Sparks create action, provide fuel for growth in knowledge and skills. Sparks grow a young person's networks.

Help youth find how this project may bring them joy, purpose, and direction.

To learn more: <https://tinyurl.com/y2lwct7u>

PROGRAM QUALITY MATTERS

Research shows that youth programs must be done well if they are to make a positive difference in the lives of youth.

Quality programs ensure:

- Physical and psychological safety.
- Appropriate structure.
- Supportive relationships.
- Opportunities to belong.
- Positive social norms.
- Support for mattering.
- Opportunities for skill building.
- Integration of family, school, and community.

To learn more: <https://tinyurl.com/yxg27m3j>

FOSTERING DEVELOPMENTAL RELATIONSHIPS

Caring, supportive adults are clearly connected to positive youth development.

Across the childhood years, youth need different things from adults as they learn, grow, and self-regulate. What should remain constant from all adult volunteers and staff:

- Expressing care through listening, warmth, and dependability.
- Challenging growth by expecting youth to do their best.
- Providing support.
- Sharing power.
- Expanding possibilities.

To learn more: <https://tinyurl.com/y6434ntw>



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For Further Information

For more UC ANR publications and products, visit our online catalog at <https://anrcatalog.ucanr.edu/>, call 1-800-994-8849, or write anrcatalog@ucanr.edu.

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