

Teacher Guide: Geologic Mapping to Understand Health Hazards

Incorporating the Sustainable Development Goals (SDGs) into secondary education is an important way to introduce learners to real-world issues and to help them understand the interconnectedness of the world. AGI has put together resources (e.g., student guides, lesson plans, media) to assist in introducing the SDGs and to encourage exploration of specific case studies that tell about projects that use Earth science knowledge to support one or more of the SDGs. Explore these resources [*here*](#).



Connections SDGs

3: Good health and well-being

- 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

4: Quality education

11: Sustainable cities and communities

NGSS

Earth's Place in the Universe

- HS-ESS1-5

Earth's Systems

- HS-ESS2-2

Lesson Summary

Students will be introduced to SDG 3: Good health and well-being, through visuals, a reading of a real-world case study, discussion questions, and hands-on activities that relate earth science concepts to work being done toward SDG 3.

It is recommended that the SDGs be introduced to students prior to this lesson. Explore AGI resources, UN Student Resources, UNESCO Resources for Educators, and The World's Largest Lesson resources for ideas.

Facilitator Background

- ◆ Read the case study in the [Geoscience in Action](#) Report (p. 27–28). The student reading “[Geologic Mapping of Health Hazards](#)” is adapted from this case study.
- ◆ Case study 4.3.2 focuses on SDG 3 but also ties to SDGs 4 and 11.
- ◆ Explore the summary pages from the UN about SDG 3: [Good Health and Well-Being: Why it Matters](#).
- ◆ Read about all 17 SDGs.
- ◆ Watch the brief video, [How are Geologic Maps Made?](#), which summarizes the Earth features that geologic maps depict.
- ◆ Read the factsheet, [Geologic Mapping and Public Health](#), which describes examples of how geologic maps are used to assess potential health hazards, such as arsenic, asbestos (the mineral erionite), and radon.

This lesson was created by funding from the American Association of Petroleum Geologists Foundation (AAPG-F). Header photo by NextVoyage via Pexels.

Student Activity

Show students one of these two-minute videos ([Understand Goal 3: Good Health and Well-Being; Take Action on Goal 3](#)), read a book from the [UN Good Health and Well-Being book list](#), or [page 3 in this comic](#), or interact with another visual summary of SDG 3 and discuss why work being done toward SDG 3 is important. Then, guide students in conducting a close reading of “[Geologic Mapping of Health Hazards](#)”, which is a secondary-level summary of the case study about work being done to achieve SDG 3. Depending on the level of the students, you may want to have them mark and discuss one or more terms, such as those that they think are important, confusing, or new to them.

Suggested Discussion Questions

1. Explain how mapping radon risk connects to keeping people healthy.
2. Research and describe how uranium breaks down into radon gas and ends up inside buildings. Why doesn't uranium end up in buildings?
3. Why do you think it is important for scientists to share geologic hazard maps with the public? Why is it important for us, here in our community, to understand and use these maps?
4. Why is it important to study potential exposure to harmful substances, such as radon, in the air we breathe?
5. How might a geologic map help scientists and community leaders make decisions about where to build homes, schools, or hospitals?
6. What further questions or investigations do you think could come from what people learned in this radon mapping case study?
7. How might technology, such as drones, sensors, and/or computer models, be used to improve geologic maps and hazard assessments?
8. How might achieving SDG 3: Good health and well-being, through projects like radon mapping, positively affect other SDGs?
9. What could each of us do in our daily lives to reduce risks from geologic hazards like radon, landslides, or earthquakes?

10. What challenges do you think scientists face when trying to make accurate geologic maps that cover large areas?

Case Study Activities

◆ [Reading Maps](#)

◆ [Applications of Geologic Maps](#)

Additional Resources and Activities

◆ [Geologic Map Day Activity Collection](#)
American Geosciences Institute

◆ [How Do Geologists Make Geologic Maps?](#)
Kentucky Geological Survey

◆ [Geological mapwork: using surface geology to make a geological map](#)
European Geological Union, Earth Science Teachers' Association

◆ [The Rise of Radon Comic Book](#)
Kentucky Geological Survey

◆ [Children's Book on Medical Geology](#)
Geological Survey of Brazil

Related Data

- ◆ **Geologically Based Indoor Radon Risk Interactive Map**
University of Kentucky and the Kentucky Geological Survey
- ◆ **The National Geologic Map Database**
U.S. Geological Survey