Getting Creative - Geologic Map Day Learning Activities

"America the Beautiful" has inspired patriotism in Americans for generations. But few today realize that the song's lyrics were originally written in the late 1800s by Katharine Lee Bates as a poem — one that she first called "Pike's Peak."

Bates herself had been inspired by the grand landscapes she viewed as she crossed the country on a train trip to Colorado Springs, Colorado. Purple mountain majesties. The fruited plain. From sea to shining sea. The words, and later the soaring music, were inspired by the nation's natural wonders.

Chief among those wonders was Pike's Peak, the highest summit of the southern Front Range of the Rocky Mountains. What geologic forces produced this Colorado mountain? Why does it command the place it does among the surrounding geology? In short, where does all this inspiration come from?

Geologic maps can provide answers. Explore one or more of the suggested activities below to connect scientific understanding with your own sense of wonder and inspiration at the natural world around you.

Materials

• Computer with internet access
• 8-1/2" x 11" sheets of white paper
• Crayons, colored markers, or pencils

Inspirational Feature Near You

What's an awe-inspiring natural feature in your state? Maybe it's a mountain, canyon, waterfall, glacier, cave, volcano, geyser, natural arch, grand vista, or something else.

Identify an inspiring landscape near you, and learn about the geoscience behind it. Start with the geologic maps available from your state geological survey (http://www.stategeologists.org/), and consult other resources, such as rainfall maps, natural hazard maps, and maps of native species. Then tell the story of the natural feature you selected — in an essay, artwork, song, or other form of creative expression. Share with your classmates!

Online Resources:

To find a geologic map related to your chosen feature, conduct an internet search with the key words "geologic map" and the name of your feature.

Next Generation Science Standards Connections

Crosscutting Concepts
• Patterns
• Scale, proportion, and quantity
• Systems and system models

Science and Engineering Practices
• Developing and using models
• Obtaining, evaluating and communicating information

Disciplinary Core Ideas
• Earth's systems
• Earth and human activity

Fossils Tell a Bigger Story

What fossils — evidence of past plant or animal life — can be found in your region, state, city, or neighborhood? You can find out by visiting the websites of organizations like the National Park Service (http://paleoportal.org/nps/), your state geological survey (http://www.stategeologists.org/surveys.php), and the Paleobiology Database (https://paleobiodb.org/#/).

Since nearly all fossils are found in sedimentary rocks, you may also want to use geologic maps from the United States Geological Survey (https://ngmdb.usgs.gov/ngmdb/ngmdb_home.html) to discover the types of rocks where fossils are found. By understanding how different types of rocks form, you can gain further insight into the environments where these prehistoric organisms lived.

As a class, discuss how the fossils can be used as evidence to support conclusions about what the environment of your area was like when those organisms lived. In what ways has the area you are mapping changed? In what ways has it remained stable? How might the geologic maps of your area for those times look different than they do today?

Next Generation Science Standards Connections

Crosscutting Concepts
• Patterns
• Stability and change
Science and Engineering Practices
• Developing and using models
• Obtaining, evaluating and communicating information
Disciplinary Core Ideas
• Earth's systems

Create Your Own Map

How do you suppose people created geologic maps before the advent of photography, aviation, satellite imagery, and remote sensing? What data might have been gathered to determine the geology of an area?

Imagine you're a geoscientist in the early 1800s. You want to create a geologic map of your area. Get out your sketchpad, or a sheet of plain paper, and give it a try. Map your own back yard, school campus, or neighborhood.

In designing your map, consider the following questions. What type of information are you trying to communicate? Why are you creating a geologic map? How might you show various elevations? What could different lines, shapes, and colors represent? What symbols can you use to indicate significant features of the area you're mapping?

Tap into your own creativity to find ways of mapping what is— or what might be — beneath the surface of your area. Then compare your sketches with actual current geologic maps. What differences do you see?

Online Resources:

- USGS Why Make a Geologic Map (https://geomaps.wr.usgs.gov/sfgeo/geologic/stories/why_make.html)
- USGS National Geologic Map Database (https://ngmdb.usgs.gov/ngmdb/ngmdb_home.html)
- Association of American State Geologists (http://www.stategeologists.org/surveys.php)

Next Generation Science Standards Connections

Crosscutting Concepts
• Patterns
• Scale, proportion, and quantity

Science and Engineering Practices
• Developing and using models
• Planning and carrying out investigations
Disciplinary Core Ideas
• Earth's systems
• Earth and human activity

Metadata

Tags: activity, geologic map, fossils, nature, mapping, natural hazards, natural features
NGSS ESS Disciplinary Core Ideas (DCI's): Earth's Systems (ESS2), Earth and Human Activity (ESS3)
NGSS ESS Topics: Earth's Systems, Human Impacts
National Science Education Standards (1995): Science as Inquiry (G)
