



### Activity: Why Settle at Mesa Verde

Traditional geologic maps — sometimes crisscrossed with lines, blotted with colors, and marked with strike and dip symbols — have been used for at least 200 years to depict the geologic makeup of the Earth. Consider the map and other images of Mesa Verde National Park in Colorado shown here. Each provides a different perspective on the geologic makeup of the area. President Theodore Roosevelt created the 52,485-acre Mesa Verde National Park in 1906 to recognize and protect sites of natural and historical significance. The park represents the nation's largest archaeological preserve, including some 600 "cliff dwellings" — homes excavated, built, or otherwise fashioned in the niches and caves of cliffs — that were left behind by early Native Americans. Over many centuries, Mesa Verdeans fashioned various types of shelters. More than 900 years ago, they started building the massive cliff dwellings that we see today. They were hunters, gatherers, and subsistence farmers who grew food such as corn. The Mesa Verdeans were driven out by drought some 700 years ago. This profound disruption of their community at what we now call Mesa Verde is an example of climate change. This climate change was due to natural causes, unlike the man-made climate change that the world now faces.

#### Materials

- Notebook
- Pen
- Map of Mesa Verde for Activity

#### Procedure:

1. Discuss what you know about the geology of Mesa Verde National Park. What would you expect to find in the types of rocks, landforms, and plants common there? Record your thoughts in your notebook — and continue recording your answers to questions in the following steps.
2. Look at the top map of Mesa Verde here. Consider the shapes and patterns you see. Where do you think water erosion carved hollows in the cliffs? What advantages do you think this landscape offered people who settled here — in terms of dwellings? food? defense from attack?
3. Now consider the geological composition of the area. Caves and alcoves in the cliffs offered some shelter, but early inhabitants did not settle for that. What material might they have used to build adobe dwellings within the cliffs? What was readily available in the local geology? Research online to determine which types of Mesa Verde earth material would have been useful for building.
4. Water is a staple not only of life, but of construction. How do you suppose water was important to Mesa Verdeans?
5. In addition to hunting, Mesa Verdeans survived by gathering and cultivating certain plants, including beans and squash. Research online to determine which types of Mesa Verde earth material would have been useful for growing food. Do you think you would have enjoyed dining in Mesa Verde hundreds of years ago?
6. Discuss what living at Mesa Verde must have been like for early inhabitants. Learn more at the National Park Service's Mesa Verde website (<https://www.nps.gov/meve/index.htm>).
7. Now that you have explored Mesa Verde, consider what led people to first settle in your home town or state. Visit the website of your state geological survey or state geologist (<http://www.stategeologists.org/>) and the National Geologic Map Database (<http://ngmdb.usgs.gov/>). Find a geological map for your area. What shapes and patterns do you notice? Where is water? Where are potentially valuable natural resources? Where could farming, hunting, or ranching take place? Where have people thrived?
8. Mesa Verde National Park was established in part to provide federal protection for a geoheritage site where modern-day scavengers had begun stealing and damaging irreplaceable artifacts such



as pottery and carvings. Discuss what portions of your area's geoheritage are worth conserving. How can today's generation make informed decisions about this heritage to preserve it for the generation of tomorrow?

## Celebrate Geologic Map Day!

### Friday, October 14, 2016

Welcome to Geologic Map Day, a special event designed to promote awareness of geologic mapping and its vital importance to society. Geologic Map Day focuses the attention of students, teachers, and the general public on the creation, study, use, and significance of geologic maps for education, science, business, and a variety of public policy concerns.

Organizing partners of Geologic Map Day are the U.S. Geological Survey, the Association of American State Geologists, the National Park Service, the Geological Society of America, NASA, Esri, and the American Geosciences Institute. The event is celebrated on the Friday of AGI's Earth Science Week ([www.earthsciweek.org](http://www.earthsciweek.org)), a public awareness campaign that reaches over 50 million people each year with educational resources, information, and activities promoting awareness of Earth science. Please join us!

#### Frequently Asked Questions

##### What is a geologic map?

Like all maps, a geologic map shows where things are. But while other maps highlight where you can find things like rivers and streams, a geologic map shows the distribution, nature, and age relationships of rocks, faults, veins, and other geologic features.

A geologic map is usually superimposed over a regular map, or base map, to help you find familiar locations on the map. The base map is printed in light colors, while geologic features are represented in bolder, more readily visible colors, lines, and symbols. Each color on a geologic map stands for a different geologic unit, that is, a rock or rock of a particular type and age.

##### How do you read a geologic map?

Each geologic map has a map key, which is a table explaining the meanings of all colors and symbols used to represent geologic features on the map. For example, geologic units are shown in color, topographic features are shown in brown (and usually formed on top of the oldest [formed earliest in time]). The key often will give a brief description of that unit's rock.

#### Geologic Map Resources Online

**Geologic Map Day:**  
[www.earthsciweek.org/geologicmap](http://www.earthsciweek.org/geologicmap)

**Look for Geologic Map Day on Facebook and Twitter!**

Top map credit: Carter, N.E., 2012. National geologic map of Mesa Verde National Park, Montezuma County, Colorado and U.S. Geological Survey, Scientific Investigations Map, 588-I-01, scale 1:50,000.  
Center map: US Mesa Verde district website. Griffin, Mary G., 1990. Mesa Verde National Park Geologic National Park Service, unpublished report, scale 1:50,000. Digital data by Steve Pardo (National Park Service) and Stephanie Williams (Colorado State University) that is public in the public domain (Colorado State University).  
Bottom photo credit: National Park Service Family Classrooms. © 2016. Geographical American Geosciences Institute, 2016. Photo: Deborah and Design: Kathleen Morris, Barbara Taylor, Geoff Campbell, Kathleen Cannon, and Thomas Sisson.

In addition to units, the key usually explains the map's use of lines and symbols. Lines might show where two units meet and perhaps bend, fold, and overlap against one another. Symbols might indicate where you can find things like faults, previous faults, or active faults.

A strike-and-dip symbol, for instance, is a T-shaped symbol that shows where layers of rock stack up in tilted beds. The number accompanying a strike-and-dip symbol indicates the angle, or dip, of the rock bed.

**How do you use a geologic map?**  
Like people all over the world, your life is shaped by the geology of your area. Is the ground good for building or farming? Are you likely to find groundwater? What natural resources exist underground? What is the likelihood of a natural disaster such as an active volcano or earthquake?

As we can see on the maps on both sides of this poster, geologic maps are used to identify and locate many features and phenomena. Geologic maps are necessary to help us navigate among the many challenges and opportunities offered by the Earth system that surround us.



#### Top map key

<b>Stratigraphic Deposits</b>	<b>Alluvial deposits</b>
Ga	Alluvium deposited by small ephemeral streams (Pleistocene and late Pleistocene)
Qvnl	Colluvial deposits that form from the basal part of a formation (Pleistocene and late Pleistocene)
Qgr	Gravelly deposits
Qk	Clayey deposits
Qs	Sandey deposits
Qsh	Shaly deposits
Qst	Stony deposits
Qtr	Thinly bedded deposits
Qm	Medium bedded deposits
Ql	Large bedded deposits
Qn	Nonconsolidated deposits
Qp	Partly consolidated deposits
Qc	Consolidated deposits
Qd	Dip-sloping deposits
Qe	Escarpment deposits
Qf	Folded deposits
Qg	Gully deposits
Qh	Hill deposits
Qi	Interfluve deposits
Qj	Junction deposits
Qk	Kinship deposits
Ql	Lake deposits
Qm	Mesa deposits
Qn	Narrow valley deposits
Qo	Overlook deposits
Qp	Panoramic deposits
Qq	Quadrant deposits
Qr	Range deposits
Qs	Saddle deposits
Qt	Terrace deposits
Qu	Upland deposits
Qv	Valley deposits
Qw	Wash deposits
Qx	Xerophytic deposits
Qy	Yard deposits
Qz	Zonal deposits



#### Learning Activity

##### Why Settle at Mesa Verde?

Traditional geologic maps — sometimes accompanied with lines, internal with colors, and marked with strike and dip symbols — have been used for over 200 years to depict the geologic makeup of the Earth. Consider the map and other images of Mesa Verde National Park to identify what the map can tell you about the geologic makeup of the area.

**Problem:** The United States Geological Survey created the USGS National Geologic Map of Mesa Verde National Park in 1988 to represent and present data of natural and historical significance. The park represents the nation's largest archaeological resource, including some of the best-preserved cliff dwellings, ancient rock art, and other cultural resources in the region and west of the U.S. — that were left behind by early Native Americans.

Over many centuries, Mesa Verdeans fashioned unique types of dwellings that have survived to this day. They were farmers, gardeners, and craftsmen who grew food such as corn. The Mesa Verdeans created early drought-tolerant crop plants. The geologic map shows the distribution of these plants and other resources that were available to the Mesa Verdeans. Research on the geologic map can help us understand the geologic conditions that were available to the Mesa Verdeans. The geologic map can also help us understand the geologic conditions that were available to the Mesa Verdeans. The geologic map can also help us understand the geologic conditions that were available to the Mesa Verdeans.

##### Materials

- Computer with internet access
- Notebook and pen

##### Procedure

1. Discuss what you know about the geology of Mesa Verde National Park. What would you expect to find in terms of rocks, fossils, and structures? How have these things changed over time? ... and continue recording your answers to questions in the following steps.
2. Look at the top map of Mesa Verde National Park. Consider the map and picture you see. What do you think some ancient natural features in the U.S. that were left behind by early Native Americans? How do you think these features affect people who visit today? ... in terms of dwelling? (How do you think they affect people who visit today?)
3. Now consider the geological composition of the area. What do you think is the most important geological feature that has shaped the area? ... and continue recording your answers to questions in the following steps.
4. What is a major geological feature that has shaped the area? ... and continue recording your answers to questions in the following steps.

##### 5. In addition to hunting, Mesa Verdeans carved by quartz, using and polishing various stones, including bone and quartz. Research online to determine which types of Mesa Verdean artifacts would have been useful for growing food. Do you think you would have any good ideas for growing food in your area?

##### 6. Discuss what type of Mesa Verdean artifacts would have been useful for early inhabitants. What types of Mesa Verdean artifacts would have been useful for growing food in your area?

##### 7. How do you think you would have grown food in your area? ... and continue recording your answers to questions in the following steps.

##### 8. Discuss what type of Mesa Verdean artifacts would have been useful for early inhabitants. What types of Mesa Verdean artifacts would have been useful for growing food in your area?

##### 9. How do you think you would have grown food in your area? ... and continue recording your answers to questions in the following steps.

##### 10. Discuss what type of Mesa Verdean artifacts would have been useful for early inhabitants. What types of Mesa Verdean artifacts would have been useful for growing food in your area?

##### 11. How do you think you would have grown food in your area? ... and continue recording your answers to questions in the following steps.

##### 12. Discuss what type of Mesa Verdean artifacts would have been useful for early inhabitants. What types of Mesa Verdean artifacts would have been useful for growing food in your area?

##### 13. How do you think you would have grown food in your area? ... and continue recording your answers to questions in the following steps.

##### 14. Discuss what type of Mesa Verdean artifacts would have been useful for early inhabitants. What types of Mesa Verdean artifacts would have been useful for growing food in your area?

##### 15. How do you think you would have grown food in your area? ... and continue recording your answers to questions in the following steps.

##### 16. Discuss what type of Mesa Verdean artifacts would have been useful for early inhabitants. What types of Mesa Verdean artifacts would have been useful for growing food in your area?



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