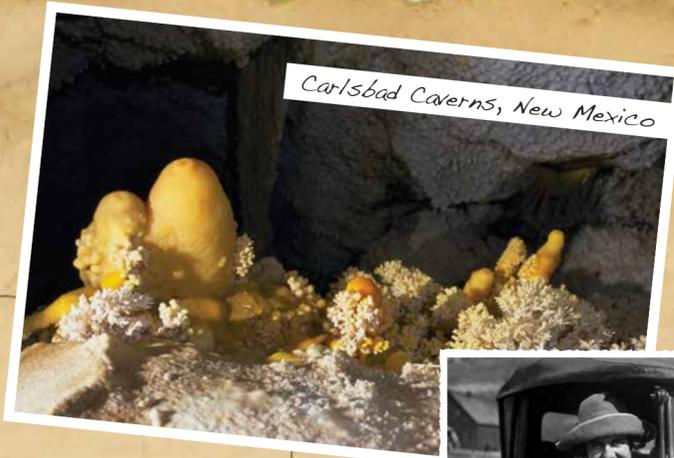


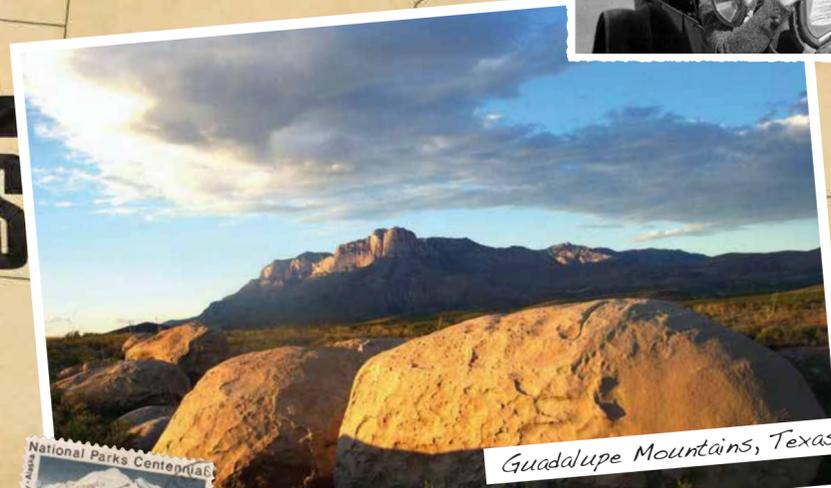
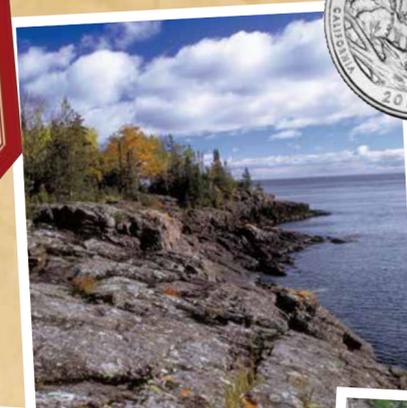
GEOLOGIC HERITAGE OF THE NATIONAL PARKS

SELECTED NATIONAL PARKS, PRESERVES, AND MONUMENTS WITH GEOLOGIC HERITAGE FEATURES

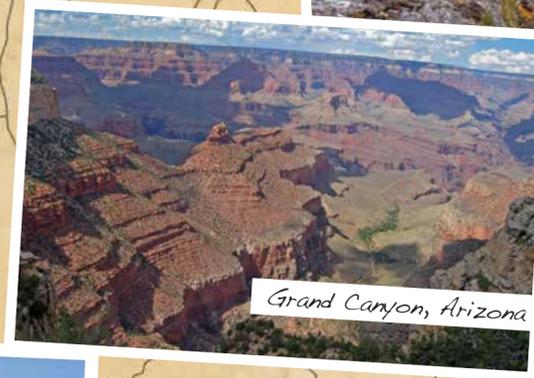
- CARLSBAD CAVERNS NATIONAL PARK, NEW MEXICO**
- EVERGLADES NATIONAL PARK, FLORIDA**
- GILA CLIFF DWELLINGS NATIONAL MONUMENT, NEW MEXICO**
- GLACIER BAY NATIONAL PARK AND PRESERVE, ALASKA**
- GRAND CANYON NATIONAL PARK, ARIZONA**
- GREAT SAND DUNES NATIONAL PARK AND PRESERVE, COLORADO**
- GREAT SMOKY MOUNTAINS NATIONAL PARK, NORTH CAROLINA & TENNESSEE**
- HAWAII VOLCANOES NATIONAL PARK, HAWAII**
- MAMMOTH CAVE NATIONAL PARK, KENTUCKY**
- MESA VERDE NATIONAL PARK, COLORADO**
- MOUNT RAINIER NATIONAL PARK, WASHINGTON**
- OLYMPIC NATIONAL PARK, WASHINGTON**
- REDWOOD NATIONAL PARK, CALIFORNIA**
- WRANGELL ST. ELIAS NATIONAL PARK AND PRESERVE, ALASKA**
- YELLOWSTONE NATIONAL PARK, WYOMING, IDAHO & MONTANA**
- YOSEMITE NATIONAL PARK, CALIFORNIA**



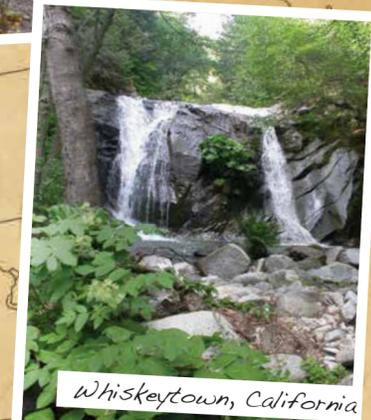
Carlsbad Caverns, New Mexico



Guadalupe Mountains, Texas



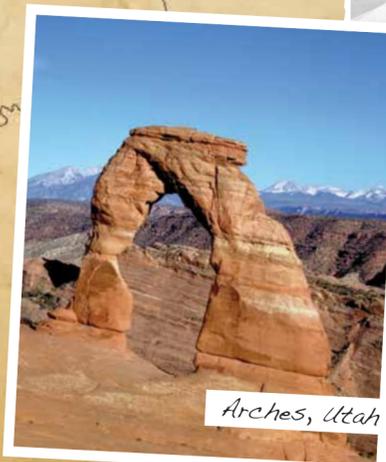
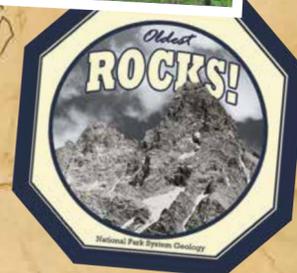
Grand Canyon, Arizona



Whiskeytown, California



Hawaii Volcanoes, Hawaii



Arches, Utah

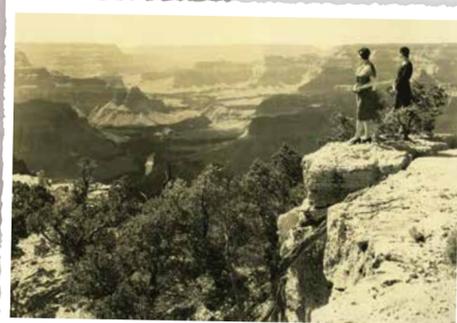


GEOLOGIC HERITAGE OF THE NATIONAL PARKS

The National Park Service serves as chief steward of our nation's natural heritage. Many of the country's most valuable and exciting geologic sites and features receive protection within the boundaries of the national park system. In its parks, preserves, and monuments, we find volcanoes, canyons, glaciers, dunes, caves, rivers, deltas, coastlines, limestone deposits, mountains, and more. We all are invited to explore the nation's rich geologic heritage.

WHAT IS GEOLOGIC HERITAGE?

Geologic heritage is the legacy of geologic wonders that we inherited from the past, enjoy today, and preserve and pass on to future generations. It encompasses a selection of features considered to be significant, such as treasured landscapes, collections of unusual rock and mineral types, important fossil sites, landforms connected to historical events, and places where geoscientists have made landmark advances.



GENERAL AUTHORITIES ACT OF 1970

"[U]nited through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage...these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one national park system preserved and managed for the benefit and inspiration of all the people of the United States."

HEALTHY PARKS HEALTHY PEOPLE

Exercising outdoors can have important health benefits. Hiking to geologic heritage sites and learning about earth science are great activities for your mind and your body. **CITIZEN SCIENTISTS, LET'S MOVE!**

For more information, see www.nps.gov/aboutus/letsmove.htm.

GEOLOGIC HERITAGE PRESERVATION

Geologic heritage is limited and irreplaceable. Many of the features that we treasure were formed in the distant past, over incredibly long periods of time. If this geologic heritage is not preserved, it may be lost to us forever.

Visitation to national parks has been increasing over the last 50 years. This enthusiasm for national parks is in many ways wonderful. But our geologic heritage is being affected by the unfortunate side-effects of human activities. Vandalism, pollution, erosion, and crime threaten the geologic heritage of our national parks.

How can you help protect our geologic heritage? Learn as much as you can about geology and geologic heritage, not just in the national parks but in your home town as well. Tell others about human activities that could impact geologic heritage resources. Report vandalism, pollution, and theft to

park rangers or local police. And always remember to be respectful when you are visiting a geologic heritage site. Stay on the trail, don't collect rocks in protected areas, and never vandalize or destroy the environment.

FOR MORE INFORMATION

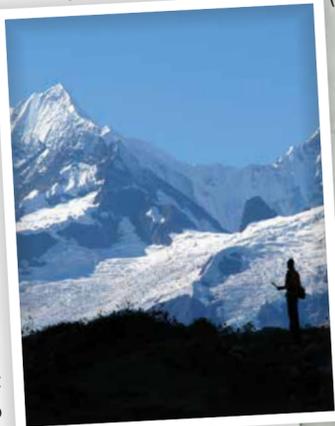
To learn more about geologic heritage in the national parks, go to www.nature.nps.gov/geology/geoheritage/index.cfm.



HOW WE VALUE IT

Geology is closely tied to our nation's human history as well as to the plants and animals living around us. Our geologic heritage tells the story of our nation's past, provides opportunities for us in the present, and holds clues that may help us thrive in the future. People from all walks of life value this shared geologic heritage in many ways:

SCIENTIFIC VALUE is evident in the outstanding examples of geologic processes, fossils, minerals, rock types, as well as geologic features representing the rarest or best examples of their kind. Visitors to Fossil Butte National Monument



find some of the world's best-preserved fossils. The park's fossilized fish, insects, plants, reptiles, birds, and mammals are exceptional for their abundance, variety, and detail of preservation.

Hawaii Volcanoes National Park features two of the world's most active volcanoes and offers insights on the birth

of the Hawaiian Islands. Access to the ongoing eruptions of Kilauea Volcano and the periodic eruptions of Mauna Loa provides an opportunity for people to witness the formation of geologic features.

CULTURAL IMPORTANCE is linked to locations where significant activities or events of a particular culture have occurred because of a geologic feature or landscape. For example, in Guadalupe Mountains National Park of Texas, El Capitan was used as a signal peak for travelers in the area for hundreds of years.

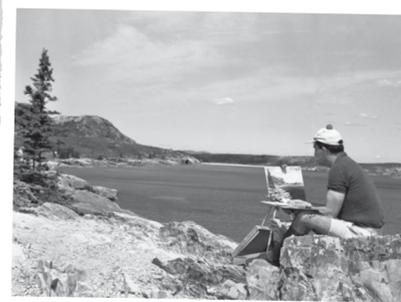
WHERE CAN YOU FIND IT?

(For answers, see bottom of poster.)

1. Tallest mountain in North America?
2. Tallest sand dunes in North America?
3. Longest undeveloped barrier island in the world?
4. Largest piedmont glacier in North America?
5. Deepest limestone cave in the world?
6. Largest collection of glaciers on a peak in the contiguous U.S.?
7. Lowest elevation in North America?
8. Fossil of largest winged animal that ever lived?
9. Highest concentration of arches in the world?
10. Highest natural bridge in the world?
11. Highest point within 25 miles of the U.S. east coast?
12. Longest known cave system in the world?

On the site of Colorado's Mesa Verde National Park, the Ancestral Puebloans recognized the land's diversity and used its geology to create a sustainable and advanced lifestyle. These people thrived in the Southwest from A.D. 600 to A.D. 1300. Today the park protects over 4,000 known archeological sites, including 600 cliff dwellings.

ECOLOGICAL SIGNIFICANCE is seen in places that provide habitats sustaining biodiversity. Great Smoky Mountains National Park in Tennessee and North Carolina, for example, encompasses over 800 square miles of the Southern Appalachian Mountains. No other area of this size in a temperate climate matches the park's astounding diversity of plants, animals, and invertebrates. Over 17,000 species have been documented in the park, and scientists believe that up to 80,000 additional species may live here. Why? The park's combination of mountains, glacial history, and weather patterns are the reasons most often cited.



EDUCATIONAL RELEVANCE abounds in our national parks. Mammoth Cave National Park in Kentucky enables visitors a unique chance to learn about caves. And Mount Rainier National Park in Washington allows visitors to study glaciers. Mount Rainier has the largest collection of glaciers on any single peak anywhere in the contiguous United States. There are 25 major glaciers on Mount Rainier as well as numerous unnamed snow and ice fields.

AESTHETIC WORTH is self-evident in the sensory, and specifically visual, appeal of particular geologic settings. Outstanding examples include Arizona's Grand Canyon National Park, a natural wonder of the world, and California's Yosemite National Park, widely admired for its breathtaking half-dome of granite. Every national park might be said to appeal to our artistic sensibilities.

Learning Activity:

MAKING YOUR OWN GEOLOGIC HERITAGE TOUR

Grade Level: 6-8

BACKGROUND

Many national parks were designated because of their amazing geology. Just think of the geologic features of Yellowstone, Grand Canyon, and Hawaii Volcanoes National Park! In this activity, you will use two web sites—the National Park Service's site and the American Geological Institute's Image Bank site—to create a slide presentation demonstrating the variety of geologic features and history of the national parks.

MATERIALS

Either with a partner or by yourself:

- A computer with Internet access and presentation software
- Paper and pencil to sketch out a presentation



PROCEDURE

1. Travel to the National Park Service's site for geologic features at www.nature.nps.gov/geology/tour/. Click on a geologic theme to go to the list of parks that contain that feature.
2. On the theme page, select a park that is nearby or that you would like to visit. Take a virtual tour of that park's geology, noting important points that you would like to share with other citizen scientists like you.
3. Either alone or with a partner, make a diagram of images and words that you could use to teach someone about the history and geology of the park. Use the Image Bank site at www.earthscienceworld.org/images/ to browse for images or search by category. Click on images you want for your presentation and save them in a computer file.
4. Now, create a template for your slide presentation by starting from scratch with the software or by using a Wizard. Write a story, slide by slide, that tells about the park's geology. Keep words to a minimum, and let pictures tell the story. You might also include a map, so viewers see where your park is.
5. Once you create your presentation, arrange with your teacher to show it to your class. Beforehand, however, be sure to conduct enough research on the park's geology so you can answer your audience's questions. For example, what major rock types occur in the park? How did they get there? Discuss examples of how the site is threatened by human activities and explain on how visitors can help preserve it. Direct listeners to the National Park Service's site so that they, too, can tour the parks!

CREDITS: Project: Geoff Camphire, Filla Baliwag (AGI), Rebecca Port, Jim F Wood (NPS); Design: Angela Terry Design.

Front images (left to right, down) Photos courtesy of NPS except as noted: Carlsbad Caverns NP; NPS Historic Photo Collection, c1922 Yellowstone NP; NPS graphic, volcanoes; Isle Royale NP; National Park Quarters, US Mint; Guadalupe Mountains NP; Michael Quinn, Grand Canyon NP; Whiskeytown NRA; Historic stamps, US Postal Service; Kenai Fjords NP; A. Poole, Hawaii Volcanoes NP; NPS graphic, oldest rocks; NPS graphic, mountains; NPS graphic, See America First; NPS Historic Photo Collection, c1936 White Sands NM; c1903 Ricksecker survey, Mount Rainier NP; Arches NP; NPS graphic, sand dunes; Fossil Butte NM; Historic stamps from US Postal Service.

Back images (left to right, down): Grand Canyon NP; Devils Tower NM; Badlands NP; Glacier Bay NP&P; NPS Historic Photo Collection, c1930 Grand Canyon NP; NPS Historic Photo Collection, c1961 Acadia NP.

ANSWERS

1. Mount McKinley, Denali National Park & Preserve, AK
2. Great Sand Dunes National Park & Preserve, CO
3. Padre Island National Seashore, TX
4. Malaspina Glacier, Wrangell St. Elias National Park & Preserve, AK
5. Lechuguilla Cave, Carlsbad Caverns National Park, NM
6. Mount Rainier National Park, WA
7. Badwater Basin, Death Valley National Park, CA
8. Quetzalcoatlus in Big Bend National Park, TX
9. Arches National Park, UT
10. Rainbow Bridge, Glen Canyon National Recreation Area, UT
11. Cadillac Mountain, Acadia National Park, ME
12. Mammoth-Flint Ridge Cave System, Mammoth Cave National Park, KY