



EARTHQUAKE

e-Newsletter about what's movin' and shakin' at the Earth Science Museum

Earth Science Museum, 3215 W. Bethany Home Rd., Phoenix, AZ 85017
www.earthsciencemuseum.org, scote@earthsciencemuseum.org, 602-973-4291

September 2014
Volume 3, Issue 9

ESM's Earth Science Day Event

By Shirley Coté, Harvey Jong and Ray Grant

Since 1998, the American Geosciences Institute (AGI) has organized Earth Science Week (ESW) in order to promote the understanding of Earth science and encourage stewardship of the Earth. This international event will be held from October 12-18 and features the theme "Earth's Connected Systems."

To help celebrate ESW in Arizona, the Earth Science Museum and Mesa Community College's Physical Science Department are co-sponsoring Earth Science Day on October 18, 2014 from 10 a.m. - 4 p.m.

Please join us and get connected with the Earth!

EARTH SCIENCE DAY 2014

ATMOSPHERE
LITHOSPHERE
HYDROSPHERE
BIOSPHERE

Earth's Connected Systems

OCT. 18, 2014 10AM TO 4PM
MESA COMMUNITY COLLEGE
PHYSICAL SCIENCE BUILDING
ON HOBSON ROAD, BETWEEN
SOUTHERN AVENUE & US 60

Free Planetarium Shows, Earth Science Talks, & Demos
Fun Activities Hosted by Local Lapidary & Mineral Clubs

SPONSORED BY
EARTH SCIENCE MUSEUM
www.EarthScienceMuseum.org

MESA COMMUNITY COLLEGE
www.mesacc.edu

Planetarium
South Parking Lot
Superstition Freeway (US 60)

TENTATIVE SCHEDULE

10:00 - Earth Science Day opens

10:15 - Planetarium Show - seating is limited and free tickets should be picked up at the information table.

11:00 - Lecture - *Lightning and Thunderstorms in Arizona*. This lecture provides a brief overview of our current knowledge of the lightning discharge and then presents the long-term patterns of cloud-to-ground lightning strikes across Arizona and more.

11:30 - Activity - *Geomodels*: This cut-and-paste activity involves building models to learn about the rock and water cycles, crystal forms, and prehistoric creatures.

12:30 - Planetarium Show - seating is limited and free tickets should be picked up at the information table.

1:00 - Lecture - *Geological Events in the News*
Volcanic eruptions in Iceland and Papua New Guinea; lava flows threaten homes in Hawaii; earthquakes rattle California... Learn what's behind these recent news headlines and if they are connected.

1:30 - Activity - Demonstrations of the different types of volcanoes and earthquakes

2:30 - Planetarium Show - seating is limited and free tickets should be picked up at the information table.

3:00 - Lecture/Demonstration - *Creepy Crawlers*. Halloween is coming up, and creepy crawlers, such as spiders, worms, and snakes, are part of the scary celebrations. See these creepy critters up close and learn about their life cycles and role in the biosphere.

From 10 to 4 - Various clubs from around the Phoenix area will host popular activities, such as the egg carton collections and spinning wheels. For one dollar, kids can build a collection of 12 rocks, mineral, or fossil samples in an egg carton, while there will be a small charge to spin to win assorted prizes. In addition, there will be a free dig for fossils activity along with free mineral samples for kids and teachers.



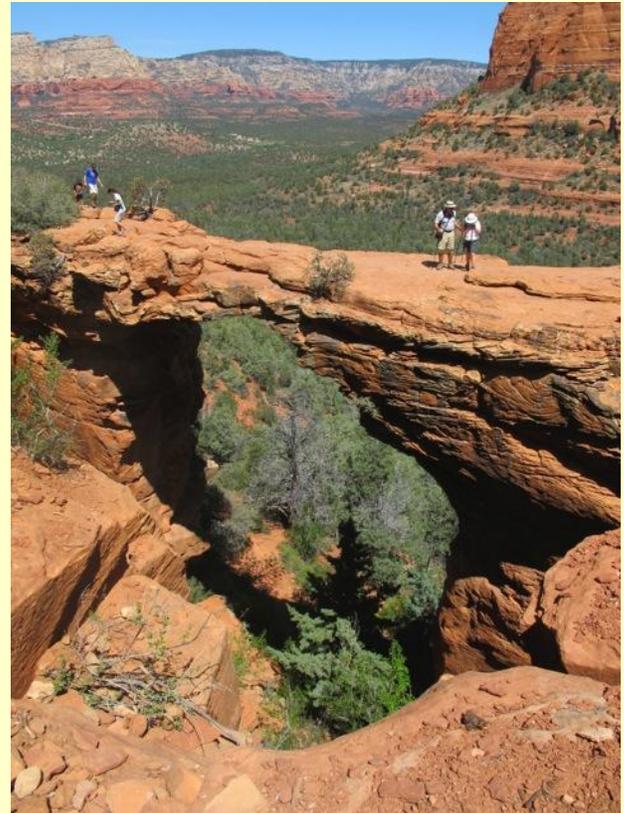
Arizona Rocks 16

Text and photos by Ray Grant

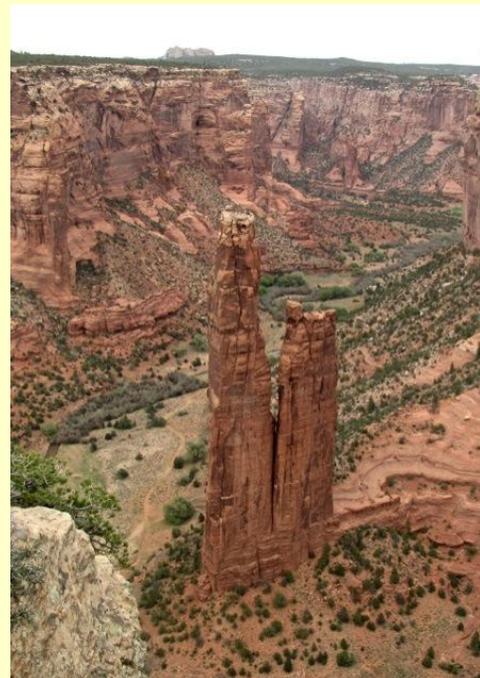
This month's rock is sandstone. It is a clastic sedimentary rock with particle sizes between 1/16 mm and 2 mm (1/12 of an inch). One sixteenth of a millimeter will not be visible without magnification but will feel slightly gritty like fine sandpaper. Sandstone of course will form from sand compressed and cemented together. Think of where we find sand, at the beach, in sand dunes, and in rivers, these are the types of places the sandstone formations we find in Arizona were formed. The common mineral in sandstone is quartz because the other minerals are soluble or weather to clay. (Note: there are names for sandstones where the sand grains are not quartz. If the sand is mainly feldspar the rock is arkose or arkosic sandstone and if the sand is rock fragments or minerals like mica the rock is called greywacke. Again these names are not commonly used unless a more detailed study has been made.)

The Coconino Sandstone, its eastern extension the DeChelly Sandstone, and the Navajo Sandstone are desert sand dune deposits. These dune fields covered large parts of Arizona, Utah, and New Mexico. The Tapeats Sandstone formed from beach sands. Some sandstone layers in the Supai group formed as river and delta deposits.

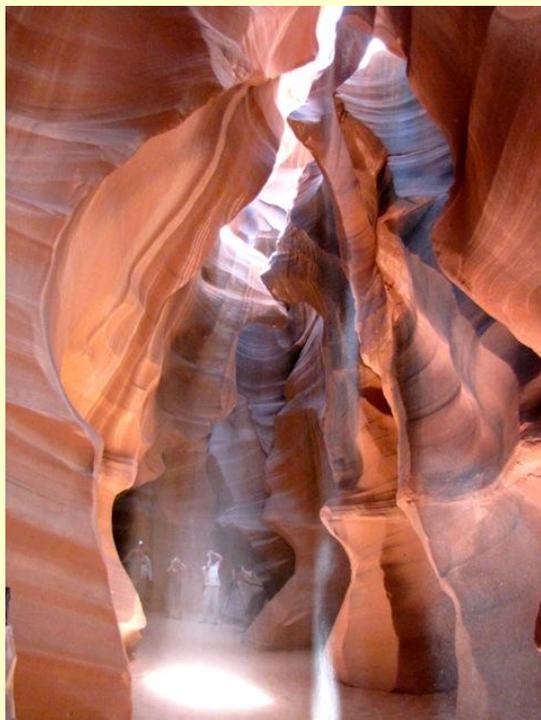
Because sandstone is resistant to weathering, it forms cliffs, canyons, arches, and natural bridges. Sandstone is responsible for a lot of the spectacular scenery in the Colorado Plateau that people travel here to see.



Devil's Bridge near Sedona, the rock is the Schnebly Hill Formation a mixed wind and marine deposited sandstone. The white layer in the background is the Coconino Sandstone.



Spider Rock in Canyon de Chelly, the rock is the De Chelly Sandstone a desert sand dune deposit.



Antelope Canyon near Page, this is the Navajo Sandstone and also a desert sand dune deposit.



Entrance to Lower Antelope Canyon
(Photo by Matthias Kabel via Creative Commons)



Cross beds from sand dunes in the Navajo Sandstone near Page.



The Wave in the Coyote Buttes,
Vermilion Cliffs National Monument
(Photo by Lobineau at it.wikipedia)

EXPLORE YOUR WORLD!

Zion National Park - Utah

Text & photos from NPS.gov

Zion National Park is located along the edge of a region known as the Colorado Plateau. The rock layers have been uplifted, tilted, and eroded, forming a feature called the Grand Staircase, a series of colorful cliffs stretching between Bryce Canyon and the Grand Canyon. The bottom layer of rock at Bryce Canyon is the top layer at Zion, and the bottom layer at Zion is the top layer at the Grand Canyon.

Located in the counties of Washington, Iron, and Kane in southwestern Utah, Zion National Park encompasses some of the most scenic canyon country in the United States. Within its 229 square miles are high plateaus, a maze of deep, narrow, sandstone canyons, and the Virgin River and its tributaries. Zion also has 2,000-foot Navajo Sandstone cliffs.

Hidden in Zion's geologic grandeur are dozens, perhaps hundreds, of freestanding arches of all shapes and sizes. The Navajo Sandstone formation provides a fertile setting for the creation of these ribbons of rock.

A natural arch is formed when deep cracks penetrate into a sandstone layer. Erosion wears away the exposed rock layers and the surface cracks expand, isolating narrow sandstone walls, or fins. Water, frost, and the release of tensions in the rock cause crumbling and flaking of the porous sandstone and eventually cut through some of the fins. The resulting holes become enlarged to arch proportions by rock falls and weathering. Architecturally, arches are the most stable load bearing structure, but through weathering, eventually all arches

collapse, leaving only buttresses that will inevitably give way to the unyielding forces of erosion.



Navajo Sandstone Cross-bedding, Checkerboard Mesa
Photo by Jon Sullivan via Wikimedia Commons



Double Pine Arch, Zion NP



Kolob Arch

ESM's Upcoming Meeting

The Earth Science Museum's next scheduled Board meeting on October 8th, 2014, at the Burton Barr Library, located near Central Ave. and McDowel in Phoenix at 6:30 p.m. in Rm. B. Everyone is welcome to attend.

BECOME A MEMBER!
Join the Earth Science Museum's



----- cut here -----

**ESM Earth Science Investigation
Team Membership Form**

_____ New Member _____ Renewal

Membership levels:

_____ ESI Family \$20

_____ ESI Individual \$10

_____ ESI Student (16 & under) \$5

Membership benefits:

- ◆ Monthly e-newsletter *Earthquake*
- ◆ Official team membership card
- ◆ Knowledge that your contribution is making a difference in earth science education.

MANY THANKS TO OUR MAJOR DONORS!

AZ Leaverite Rock & Gem Society
www.azleaverite.org

Flagg Mineral Foundation
www.flaggmineralfoundation.org

Friends of the AZ Mining & Mineral Museum

Maricopa Lapidary Society

Mineralogical Society of AZ
www.mineralogicalsocietyarizona.org

White Mountain Gem & Mineral Club
www.whitemountain-azrockclub.org

Wickenburg Gem & Mineral Society
<http://www.wickenburggms.org>
www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438

Staples Foundation
www.staplesfoundation.org

Anita Aiston
Stan & Susan Celestian
Russ Hart
Will & Carol McDonald
Debbie Michalowski
Dennis & Georgia Zeutenhorst

----- cut here -----

Name: _____

Address: _____

City, State, Zip: _____

Email: _____

Phone Number: _____

Mail form & payment to: Earth Science Museum
3215 W. Bethany Home Rd., Phoenix, AZ 85017
For Office Use Only

Card given/mailed: _____

Database updated: Distribution Lists updated:

Card ID # _____ Expires: _____

Earth Science Museum
3215 W. Bethany Home Rd.
Phoenix, AZ 85017

Phone:
602-973-4291

Editor E-Mail:
scote@earthsciencemuseum.org

We're on the Web!

Visit us on  and at:
www.earthsciencemuseum.org

Mission

Establish an innovative, world-class destination museum in the Phoenix area dedicated to inspiring all generations about earth sciences.

Vision

We envision a community where students and the general public have curiosity about, passion for, and understanding of the underlying principles of earth sciences.

For more information about the ESM, how to become a member or how to arrange for a school visit or Community function, go to:
www.earthsciencemuseum.org.

Please join us at the next ESM Board meeting Wednesday, October 8, 2014, at the Burton Barr Library in Phoenix at 6:30 p.m. Rm. B.

THANK YOU FOR YOUR CONTINUING INTEREST & SUPPORT!!!

**EARTH SCIENCE MUSEUM
NON-PROFIT BOARD OF DIRECTORS**

Harvey Jong	President
Mardy Zimmermann	VP Outreach
Robin Evans	Treasurer
Shirley Coté	Secretary/Asst. Treasurer
Doug Duffy	Ray Grant
Bob Holmes	Alice La Bonte
Tony Occhiuzzi	Tom Parks
Chris Whitney-Smith	Jayne Wright

Earth Science Museum
3215 W. Bethany Home Rd.
Phoenix, AZ 85017

