



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

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ESM Outreach Events

By Shirley Cote, Ray Grant and Harvey Jong

Outreach Report - September, 2014 By Mardy Zimmermann

The new school year is off to a busy start. During the month of September, the Outreach Program served 685 students in 6 schools. During the same period last year, we served 385 students in 5 schools. The big increase is a result of our new Properties of Minerals program, which provides Middle School students with a hands-on experience identifying 10 minerals. Middle schools tend to be larger and have larger class sizes. The six schools we served in September were Zuni Elementary, Chaparral Elementary, Congress Elementary Geology Club, Sossaman Middle School, Eduprize of Gilbert, and Madison Park Middle School. In addition, we served 93 children and adults, at Community Outreach events. We anticipate October to be slower as many schools have a fall break.

Earth Science Day - October 18th

We would like to thank Kelli Wakefield and the other members of the Physical Science Department of Mesa Community College for cosponsoring Earth Science Day this year.

We also would like to thank Earl Fosdick, guest speaker, the members of the MCC Geology Club, Arizona Leaverite Rock & Gem Society, Maricopa Lapidary Society, and the Mineralogical Society of Arizona for their continued support of the Earth Science Museum's Earth Science Day.

Participants in the festivities enjoyed planetarium shows, plus lectures on lightning and geology. They also enjoyed participating in the hands-on activities such as making geomodels and trying their hand at constructing a model of an earthquake resistant building.



These were some of the beautiful items that were for sale at the Earth Science Museum's booth on Earth Science Day. (S. Cote photo)



Terry Dyer is standing ready to answer any questions about rocks by participants at Earth Science Day. (Lynne Dyer photo)



Great prizes to be won at the Mineralogical Society of Arizona's spinning wheel. (S. Cote photo)



Arizona Rocks 17

Text and photos by Ray Grant

The last clastic sedimentary rock we will discuss is usually called shale, but mudstone, claystone, and siltstone are also used. There are two size designations 1/16 mm to 1/256 mm (silt forming siltstone) or less than 1/256 mm (clay forming mud or clay stone). Since these sizes are too small to be seen without fancy equipment; geologists commonly use shale as the name for these rocks. Shale is the most common sedimentary rock as it forms from clay that resulted from the weathering of feldspar, and since the feldspar minerals are the most common in the earth's crust, lots of clay is formed. But shale also weathers and breaks down quickly so we don't usually see the spectacular outcrops like those of sandstone.

The environments where shale is formed will be places where mud is deposited, places like river flood plains, ocean bays, lakes, anywhere the transporting water is moving slowly or has stopped moving. The most famous shale formation in Arizona is the Chinle Formation, it makes up the Painted Desert and the rocks in the Petrified Forest. It formed from river and swamp deposits in the Triassic and the trees were buried in the mud. Other shale formations in the Grand Canyon include the Bright Angle Shale that was deposited off shore in the ocean, the Hermit Shale and the Watahomigi Formation that are mainly river flood plain deposits. Because shale weathers readily it forms slopes or low rounded hills.

Mitten Butte in Monument Valley, the top cliff forming unit is the DeChelly Sandstone and the lower slope forming unit is the Organ Rock shale. There are a couple of sandstone layers in the lower unit that form steps.



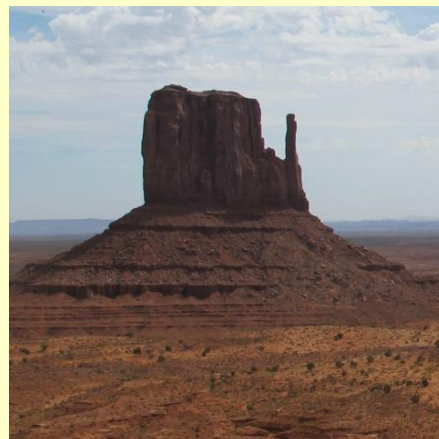
Chinle Formation in the Petrified Forest/Painted Desert, typical rounded hills formed from shale.



Chinle Formation in the Petrified Forest with resistant petrified wood weathering out of the shale.



Shale layers exposed in the Grand Canyon; the shale layers form slopes.



EXPLORE YOUR WORLD!

Chinle Fm. and other Shale Occurrences in Utah

The Chinle Formation and other notable shales can be viewed in many of the National Parks, Monuments and Recreation areas in southern Utah like Glen Canyon National Recreation Area, Grand Staircase-Escalante National Monument, Capitol Reef National Park, and Canyonlands National Park.



Purplish Chinle Formation in Glen Canyon National Recreation Area, Utah
(Photo by Qf1247 via en.wikipedia)



Chinle Badlands, Grand Staircase-Escalante National Monument, Utah
(Photo by Duk via en.wikipedia)



The Chinle Formation generally forms colorful talus slopes below Wingate Sandstone Cliffs. Canyonlands NP, UT
NPS Photo by Neal Herbert



Chinle Formation (mostly shale) rises above brown cliffs of Moenkopi Formation in Capitol Reef National Park. (USGS)



Remnants of Organ Rock shale form many spires in the Maze District's Land of Standing Rocks in Canyonlands NP
Photo by Mike Hill



Mancos Shale Badlands in Capitol Reef NP, (USGS)



Mancos Shale slopes along the east side of Strike Valley Capitol Reef NP, (USGS)

ESM's Upcoming Meeting

The Earth Science Museum's next scheduled Board meeting on November 12th, 2014, at the Burton Barr Library, located near Central Ave. and McDowel in Phoenix at 6:30 p.m. in Rm. A. Everyone is welcome to attend.

BECOME A MEMBER!

Join the Earth Science Museum's



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**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!

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 3215 W. Bethany Home Rd.
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Phone:
 602-973-4291

Editor E-Mail:
 scote@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, November 12, 2014, at the Burton Barr Library in Phoenix at 6:30 p.m. Rm. A.

We're on the Web!

Visit us on  and at:
www.earthsciencemuseum.org

THANK YOU FOR YOUR CONTINUING INTEREST & SUPPORT!!!

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