



**Pima County Natural Resources, Parks and Recreation  
Environmental Education Field Study**

**Geology of the Tucson Mountains  
Middle and High School Level**

**Description:** Geology of the Tucson Mountains

The geology of the Tucson Mountains is often described as chaotic due to the hodge-podge of geologic features seen today. Explore some of these dramatic features to understand how the Tucson Mountains and basin were formed. Use the geologic record to understand how the environment has made dramatic changes over the past 250 million years. This class trip involves relatively easy hiking over desert terrain.

**Linked to Arizona Academic Standards:** Science S6, C1, HSPO1-PO2; S6, C3, HSPO4.

**Duration:** 2 hours

**Objectives:**

- Learn how the Tucson Mountain and Tucson Basin were formed
- Trace the changes that have occurred in Tucson Mountains/Tucson area starting with the Paleozoic Era up to the present
- Explore geologic features (petroglyphs, anticlines, synclines, deposits made when the now-arid area was underwater) in Arrastre Wash that record the area's geologic past

**Conceptual Framework:**

- Change due to human and non-human forces is a fundamental characteristic of the physical environment that shapes the landscape, populations, species, communities and ecosystems
- The prehistory and history as revealed in cultural sites and artifacts, reflects the interaction of individuals and groups with the environment.

**Vocabulary:**

**Amole Arkose** – A sedimentary formation during the Cretaceous period when the area now called the Tucson Mountains was covered by a large freshwater lake.

**Arrastre** – Mill where silver ore is pulverized

**Anticline** – A fold in rocks caused by compression that folds up like an “A”.

**Basalt** – A volcanic rocks that is produced when molten rock is extruded from a volcano.

**Clay** - a fine-grained material consisting mainly of hydrated aluminum silicates that occur naturally in soil and sedimentary rock.

**Conglomerate** – A coarse-grained sedimentary rock consisting of rounded rock fragments (pebbles, cobbles, boulders) in a finer-grained matrix of sand and silt.

**Extrusive (igneous rock)** – Molten rock that solidifies quickly above ground (examples: basalt and rhyolite)

**Faults** – A fracture along which the rock on one side has moved relative to the rock on the other side.

**Folds** – A bend in rocks due to force.

**Forces** – Geologic forces include tension (pulling apart), compression (pushing together), and shear (sliding past).

**Gneiss** – A metamorphic rock with bands of alternating light- and dark-colored minerals

**Granite** – An igneous rock from a pluton that cooled slowly and contains feldspar and quartz. Granite contains crystals that are visible to the naked eye.

**Igneous** – Rocks that were produced from molten or partially molten magmas or lavas.

**Intrusive (igneous rock)** – Molten rock that solidifies slowly underground (example: granite).

**Lava** – Molten rock that has been erupted onto the surface of the planet.

**Limestone** – A sedimentary rock composed mainly of calcite, a calcium carbonate mineral.

**Magma** – Molten rock or partially molten rock material.

**Marble** – A metamorphic rock formed when limestone is subjected to heat and pressure.

**Megabreccia** – Broken rock fragments in which the angular blocks are huge, house size to hundreds of meters.

**Megafauna** – Large Ice Age (Pleistocene) mammals that are now extinct.

**Obsidian** – A dark volcanic glass that is produced when extruded lava cools quickly.

**Plate tectonics** – A conceptual model and theory that explains the movement of continental and oceanic plates making up the Earth's crust

**Pluton** – A subsurface volume of magma (molten or solidified) with a bulbous shape.

**Sandstone** – A sedimentary rock composed of sand that is cemented together.

**Seafloor spreading** – The mechanism driving the movement of oceanic (and continental) plates due to the upwelling of magma along a world-wide system of mid-ocean ridges.

**Sedimentary** – A layered rock that is composed of sediments like clay, silt, sand or pebbles.

**Shale** – A sedimentary rock composed mostly of fine particles like clay and silt.

**Sky Islands** – Cool moist communities on the higher elevations of mountains that are isolated by hot, arid desert habitat.

**Syncline** – A fold in rocks caused by compression that folds down like a “U”.

**Tuff** – A consolidated accumulation of pyroclastic material.

Revised 6/09

**Materials:**

Geology of Tucson Mountains student handouts  
Tucson Mountains geological timeline chart (2 pieces)  
Collection of local rocks  
Dry erase board, markers  
Clipboards (1/student)  
Pencils  
Aerial photograph of Arrastre Wash  
Topographic map of Tucson Mountain Park and compass

**Description of Activity:**

- Groups meet at the Juan Santa Cruz picnic area in the Tucson Mountain Park.
- Students receive a review of some basic geologic concepts necessary to understanding the information presented and geologic features observed during the field trip.
- Instructor leads students on a hike up the Arrastre Wash to observe geologic features such as anticlines, synclines, ripple formations, petroglyphs, and Cat Mountain rhyolite.
- Students trace the geologic changes that have occurred in the Tucson Mountains from the Paleozoic Era up to the present.