

The Changing Face of

Snow Canyon



The Navajo Sandstone that surrounds you was deposited and lithified near sea level. Since then, the rock has been uplifted several thousand feet. Since the rock is brittle, uneven uplift will cause cracks (referred to as joints) to form in the rock. These joints provide

paths for water which increase the rate of weathering and erosion. The surface of the rock continues to change, sometimes giving rise to interesting features such as this small arch.



Lithification and Weathering – Sediment to Rock and Back Again

Loose sediment may build up over millions of years to form sequences several thousands of feet thick. Pressure from the overlying sediment causes grains of sediment to compact tightly together. Water also seeps through the sediment, leaving behind mineral deposits that cement the grains together. These mineral deposits are typically calcium carbonate (the material that causes spotting on glasses) and iron oxide (rust) which give the rocks a reddish color. Compaction and cementation together may take a material like loose sand and form a very hard rock. Weathering processes affect the rock at the surface, causing it to change from solid rock to loose sediment again.

Like pages of a book, the different layers of rock reveal clues of past climates and environments. This figure shows the rocks found in and around Snow Canyon State Park.

The majority of rocks in the park are Navajo Sandstone. They are easily identified by their vertical cliffs and rounded tops. But, if you go to the south end of the park and look towards St. George, you can begin to see the upper level of the Kayenta Formation. These rocks are recognized by the gentled slopes connecting up to sheer Navajo cliffs.

Period	Formation and Approximate Age	Rock Symbol
Tertiary-Quaternary	Sand, talus, river debris, soils, etc.	Uncemented Materials
	Unnamed Basalt Flows 3 million years to 2,000 years	
	Unconformity	
Jurassic Rocks in Snow Canyon	Wind-blown sands of the Navajo Sandstone 183 to 173 million years	
	Stream deposits of the Kayenta Formation 190 to 183 million years	Cliffs collan tongue
		Slopes

Two Types of Black Rocks



Black rocks form an interesting contrast to the red and white sandstone. The majority of the black rocks are due to volcanic activity several thousands of years ago. Cinder cone volcanoes formed as magma rose from near the base of the Earth's crust. Lava flows poured from these volcanoes and flowed down through Snow Canyon and adjacent areas. These lava

flows cooled to form basalt, a common type of black volcanic rock. The second type of black rocks seem to be imbedded in the sandstone. Upon close examination, you will see that these rocks are typically made of sand grains cemented together with a black material. These rocks were formed as water seeped through the loose sand, leaving behind high concentrations of iron oxide (sometimes referred to as Moki marbles). Where this material is highly concentrated, it is black instead of red.



Sand Dunes – Active and Petrified

As the wind (blue arrows) shifts sand across the desert floor, it is deposited in the "wind shadow" created on the backside of a sand dune. The sand is deposited in sloping layers called cross-bedding, as outlined in yellow. This process is active near the south entrance to the park. Sand dunes may eventually form sandstone, and the cross-bedding is preserved. Here, several dunes have built one atop another, leaving behind evidence of the ancient wind direction. The red and white Navajo Sandstone that you see here was deposited as sand dunes over 180 million years ago.



Snow Canyon State Park

St. George

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