

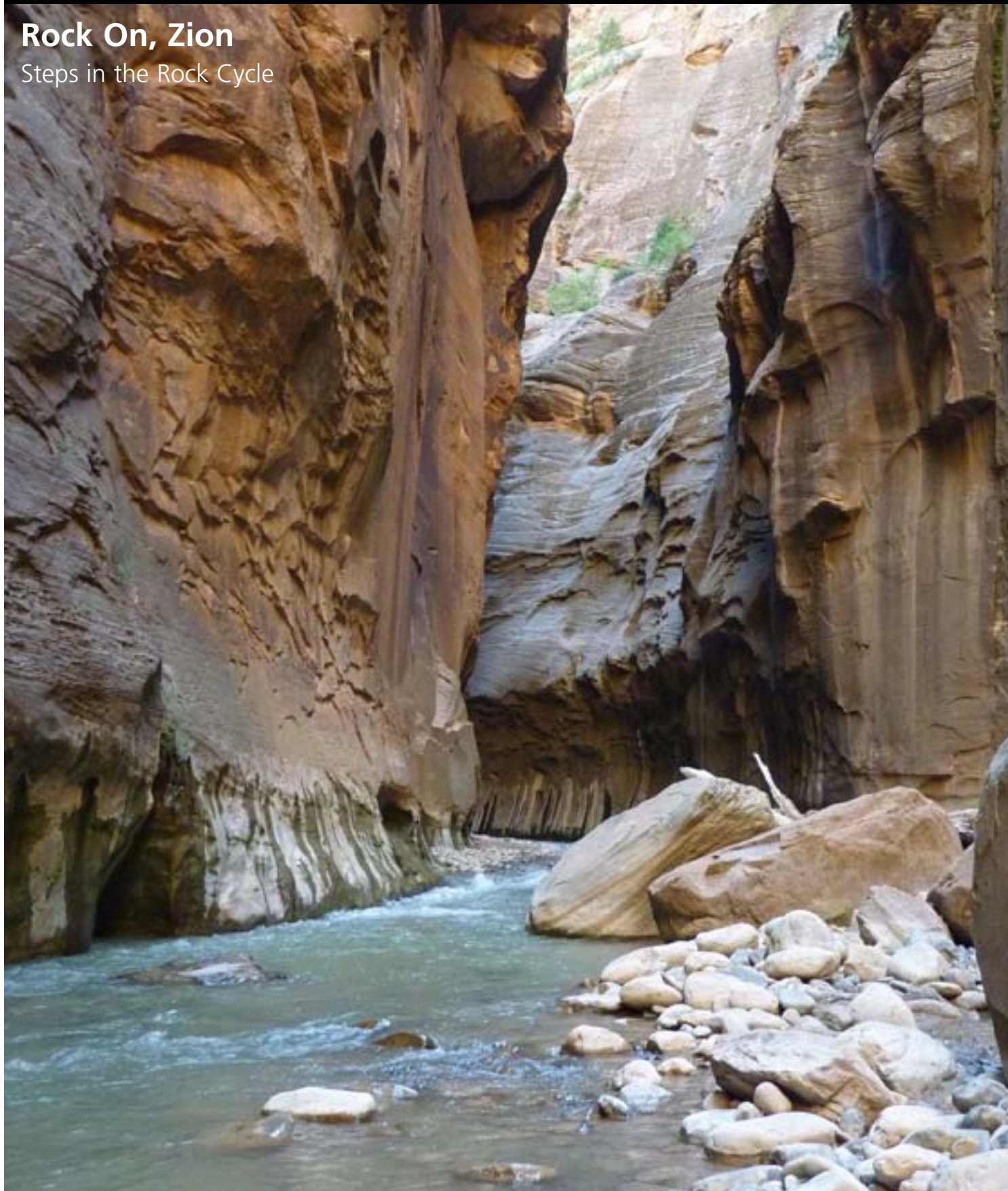
National Park Service
U.S. Department of the Interior

Zion National Park

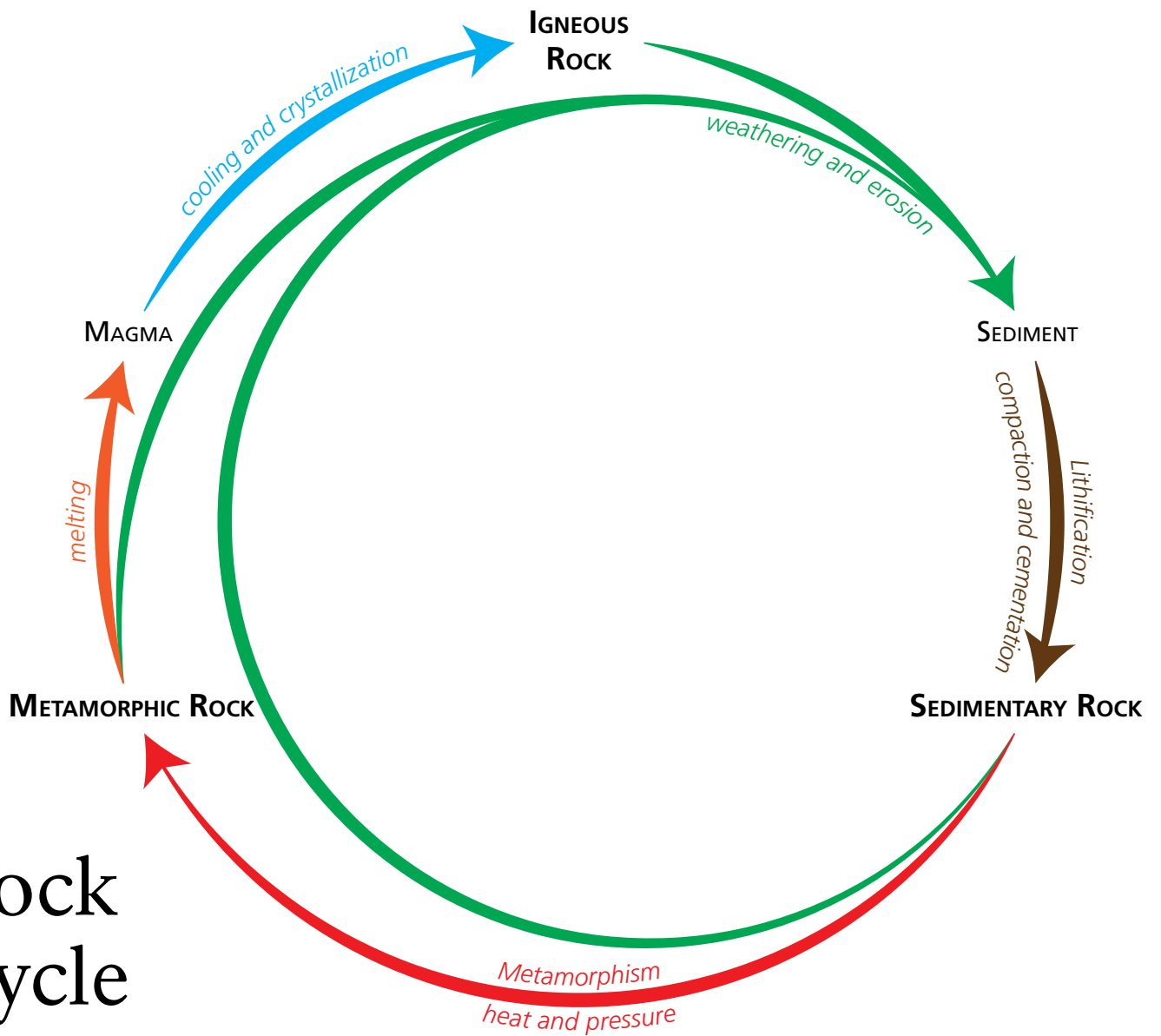


Rock On, Zion

Steps in the Rock Cycle



Rock Cycle



Zion National Park's Four Steps in the Rock Cycle

1. Sedimentation/Deposition
2. Lithification
3. Uplift
4. Weathering and Erosion



1. Sedimentation/Deposition

Sediments (broken down pieces of older rocks) are transported from their original source and deposited in various environments



Geologic Formations	Rock Layer	Appearance	Where To See	Deposition	Rock Type
	Cinder cones and lava flows	black layers and cones	Kolob Terrace and west of Rockville	lava flows and cinder cones	basalt and cinders
	Carmel	cliffs	Mt. Carmel Junction	shallow sea and coastal desert	limestone, gypsum, sandstone
	Temple Cap	cliffs	top of West Temple	desert	sandstone
	Navajo Sandstone	steep cliffs 1,600 to 2,200 feet thick red lower layers are colored by iron oxides	tall cliffs of Zion Canyon: highest exposures are West Temple, Checkerboard Mesa believed to be the tallest sandstone cliffs in the world	desert sand dunes covered 150,000 square miles shifting winds during deposition created cross-bedding	cross-bedded sandstone
	Kayenta	rocky slopes	throughout canyon	streams	siltstone and sandstone
	Moenave	slopes and ledges	lower red cliffs seen from Zion Canyon Visitor Center	streams and ponds	siltstone and sandstone
	Chinle	purplish slopes	above Rockville	streams	shale, loose clay, conglomerate
	Moenkopi	chocolate cliffs with white bands	rocky slopes from Virgin to Rockville	shallow sea	shale, siltstone, mudstone, others
	Kaibab	cliffs	escarpment along I-15 near Kolob Canyons	shallow sea	limestone

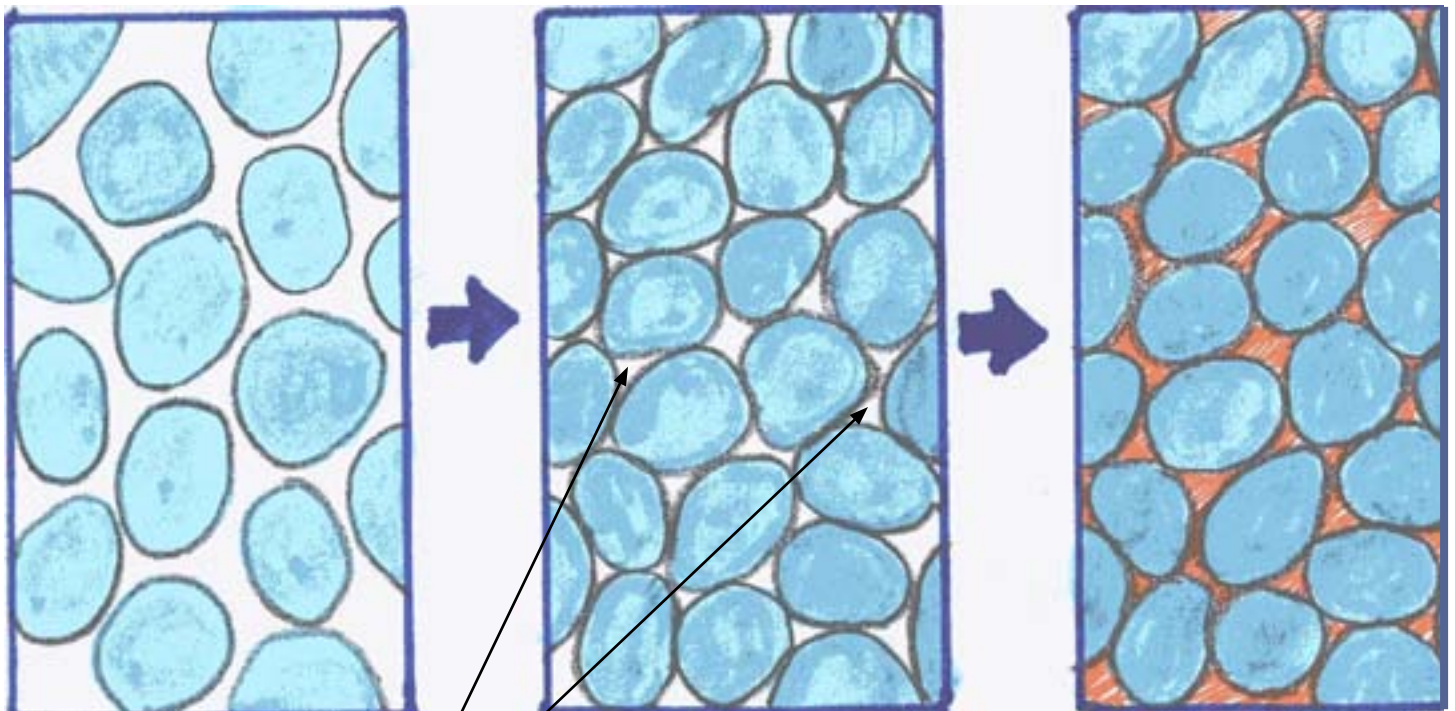
2. Lithification

Sediments become rock.

Original Sediments

Compaction

Cementation



Pore space

3. Uplift

Occurs through the movement of tectonic plates

The Colorado Plateau was uplifted several thousands of feet and was generally flat (little deformation).

In contrast, the Rocky Mountains and Basin and Range are highly faulted.



4. Weathering and Erosion

The breaking down and removal of sediment which is transported away by water, wind, ice, and/or gravity.

Water is the main agent of erosion at Zion



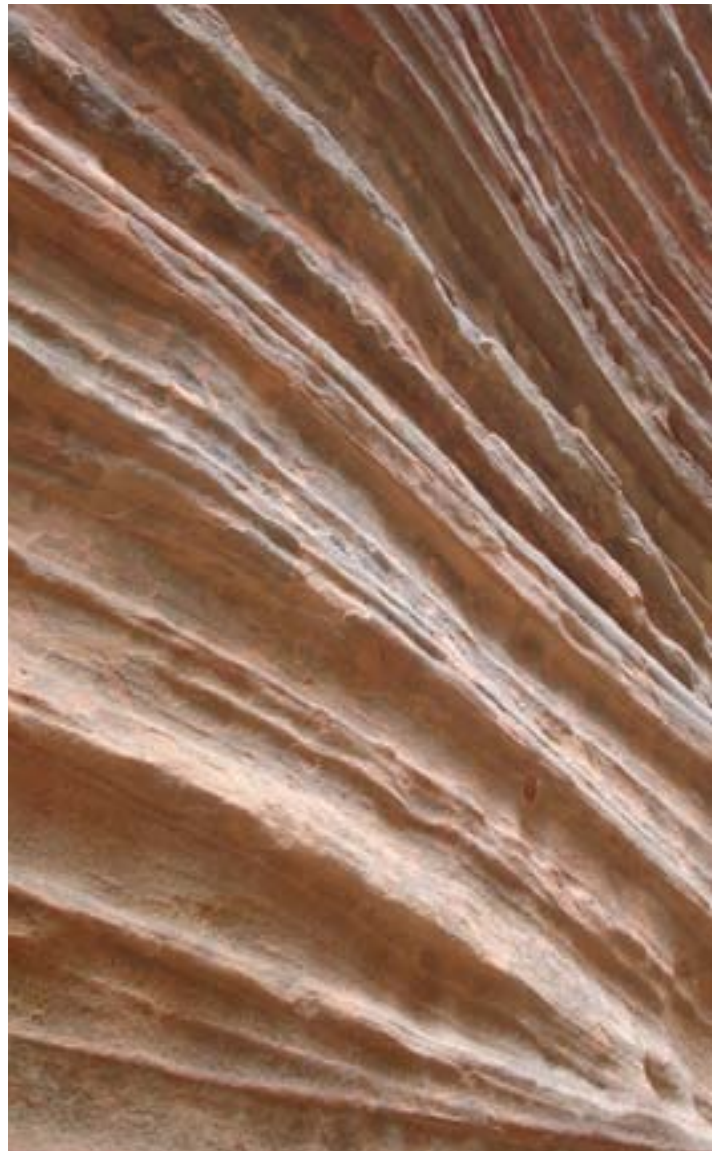
4. Weathering and Erosion

The breaking down and removal of sediment which is transported away by water, wind, ice, and/or gravity.

Ice (especially the freeze-thaw cycle) is important erosional force



Wind and sandblasts play a small role in rock erosion

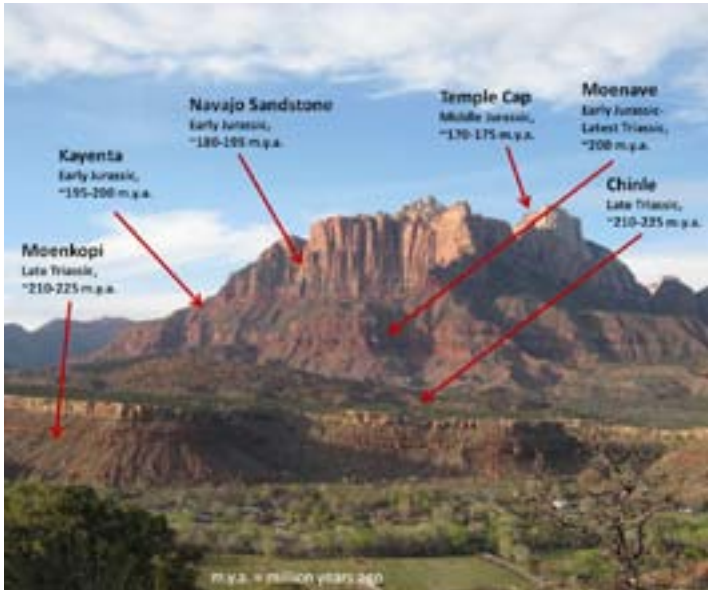


Teacher's Key to the Subsequent Images

1. Rock layers (uplift, erosion)
2. Rock layers labeled
3. Southwest desert (sedimentation, uplift, erosion)
4. Meandering river (sedimentation, erosion)
5. Canyon overlook rock layers (uplift, erosion)
6. West Temple rock layers (uplift, erosion)
7. Virgin River flash flood (erosion, weathering)
8. Subway (erosion)
9. Aerial view of canyon & river (sedimentation, erosion)
10. The Narrows (erosion)
11. Water (erosion)
12. Echo Canyon (erosion)
13. Aerial view (uplift, deposition)
14. Aerial view (erosion)
15. Observation Point (uplift, erosion)
16. Virgin River (erosion, sedimentation)
17. Virgin River (sedimentation)
18. Virgin River (sedimentation)



1.



2.



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5.



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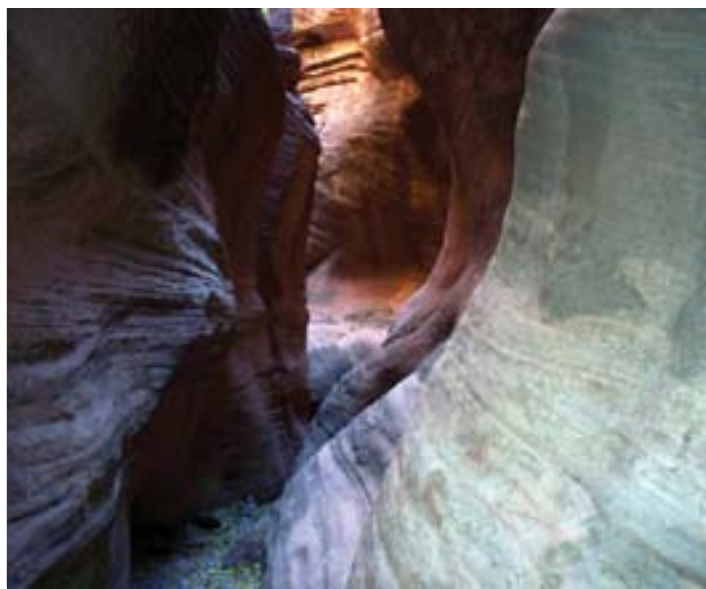
9.



10.



11.



12.



13.



14.



15.



16.



17.



18.