

Gorges and canyons

Gorges and canyons are the steepest kind of valleys, but only gorges have sheer sides.

Q1. In which direction is the river eroding in the gorge?



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Q2. What is the difference between a gorge and a canyon?




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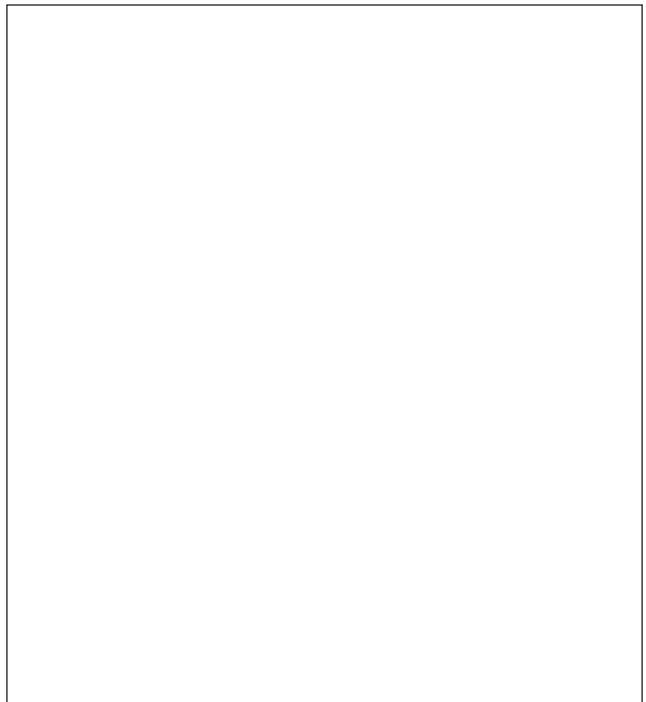
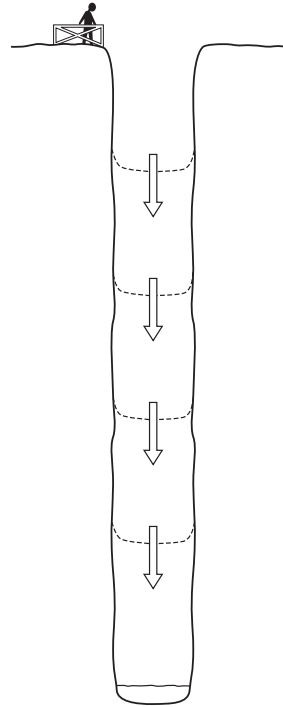
Q3. Name a famous canyon, then draw a side view of it in the space at right. Explain what has caused its shape.



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Answers

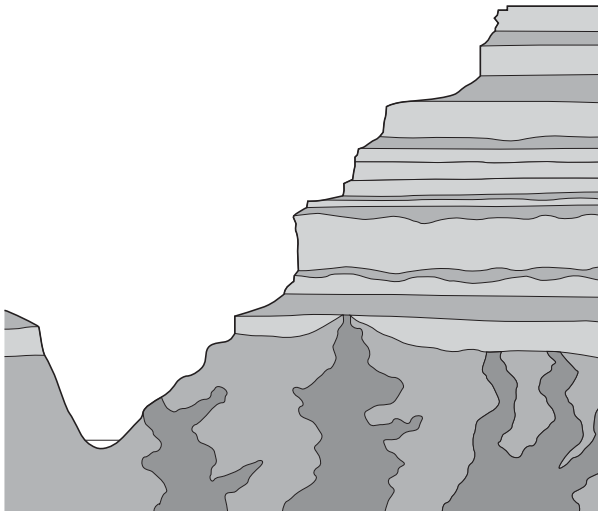
Q1. Downward

Q2. A canyon is a V-shaped valley with sides that are bare of soil or plants.

Q3. A floodplain

Q3. The Grand Canyon

(Its profile is caused by the way that erosion has picked out soft from hard rock bands, creating a steep staircase profile to the canyon.)



Resources

- Pictures of canyons from Arizona Rivers, Utah Rivers, and so on

Background support

The section on gorges and canyons emphasises the role that a river plays in the formation of a valley, and gives an excellent opportunity to show that, when rivers are the dominant erosive process, they simply cut a slot (gorge) in the landscape.

Gorges can occur in humid mountain areas but more often in deserts (such as the southwestern United States, where they are called 'canyons', or North Africa, where they are called 'wadis'). Many gorges are also found downriver from waterfalls.

The real usefulness of starting a topic on gorges is to provide a way of moving from a purely river process to a balance of river and slope processes that results in the valley shapes we can find.

Canyons are spectacular, and the Grand Canyon makes a good focus for a project. There is a profile of it in the student book.

A canyon demonstrates that valley slope processes are quite strong, so that the valley is able to produce shattered rock (in the case of the Grand Canyon mainly by winter frost shatter), and as the river carries this sediment away, some of its energy is used up in transport. This, in turn, gives more opportunity for valleys to widen out. Right at the bottom of the Grand Canyon, however, there is a gorge because here the river is cutting into very hard rock which has few fractures and so is not as subject to frost shatter as the limestones, sandstone, and shale rocks in the upper canyon.

Across the curriculum

Using this material you can link:

- The way that canyons have been exploited successfully by Native Americans, for example in Mesa Verde, Canyon de Chelly and elsewhere in North America. The reliable supply of water and deposited silt allowed successful farming to occur in otherwise desert terrain. Canyon de Chelly is still successfully farmed;
- Historical themes, such as the exploration of the Colorado by Powell;
- Transport themes, such as how canyons provide major transportation obstacles. This is shown dramatically by the Grand Canyon and the road distance of nearly 300 km needed to get around the canyon from the South Rim to the North Rim. The two rims are actually only 30 km apart directly across the canyon.