

1 In the upper course the rivers water volume and discharge are low. The river uses most of its energy overcoming friction with the channel. What energy is left over goes into hydraulic action, which deepens the channel by vertical erosion.

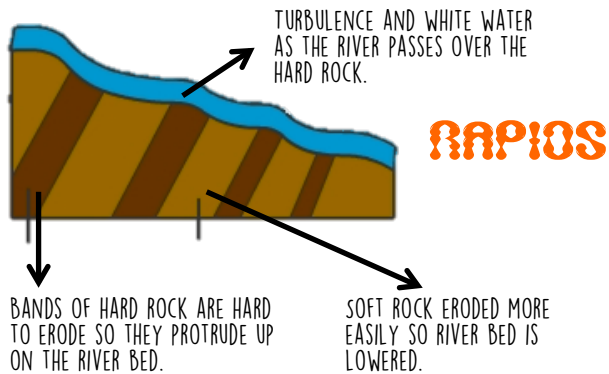
2 In upland areas the geology is made up of hard rock (granite or slate). However freeze thaw weathering gradually broadens it out. This gives the valley a steep V shaped cross profile. Repeated weathering weakens the rock so pieces break off and fall down the hillside as scree.

3 The winding path taken by the river is due to obstacles of harder rock in its path. The river takes the easiest route over the land. This results in projections of high land entering the valley from alternate sides. These projections are the interlocking spurs.

CHARACTERISTICS OF INTERLOCKING SPURS:

- A STEEP GRADIENT
- CONVEX SLOPES
- PROJECT FROM ALTERNATING SIDES OF THE VALLEY
- SEPARATED BY A NARROW VALLEY FLOOR TAKEN UP BY THE RIVER CHANNEL
- SOMETIMES WOODED
- MAY HAVE SCREE SLOPES.

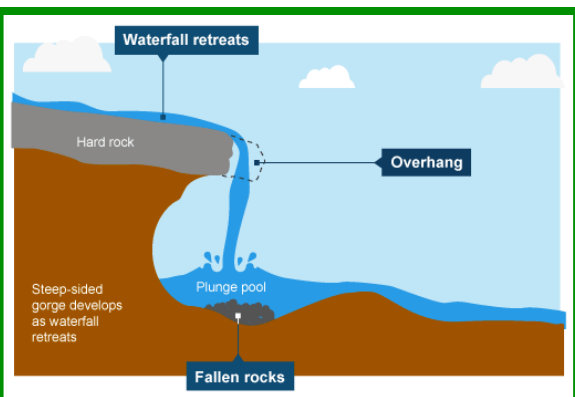
INTERLOCKING SPURS



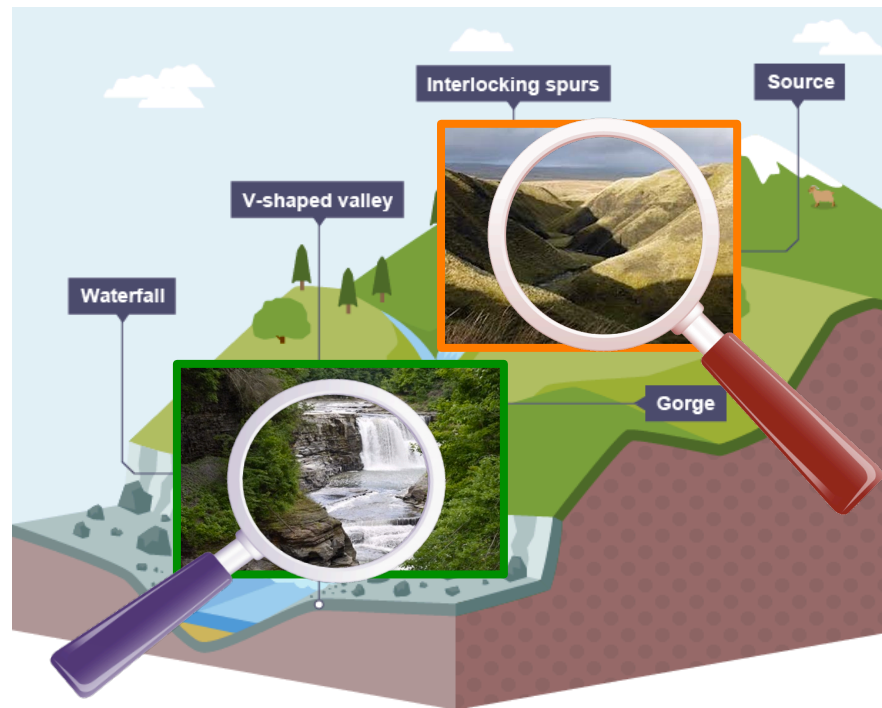
CHARACTERISTICS OF A WATERFALL:

- OVERHANG
- BARE ROCK
- WHITE WATER
- ALTERNATING LAYERS OF HARD AND SOFT ROCK
- PLUNGE POOL

WATERFALLS



UPPER COURSE LANDFORMS



CHARACTERISTICS OF A GORGE:

- VERY NARROW VALLEY
- VERY STEEP, HIGH VALLEY SIDES
- LOCATED IMMEDIATELY DOWNSTREAM FROM A WATERFALL
- TURBULENT FAST FLOWING WHITE WATER
- MANY AREAS OF BARE ROCK ON VALLEY SIDES
- BOULDERS LITTER THE RIVER BED

1 A river flows over layers of alternating hard and soft rock upstream. The river erodes the softer rock underneath and falls vertically from the hard rock to the soft rock below.

2 Splash back causes hydraulic action to weaken the rocks behind the fall of water. Pieces of soft rock break off and an indent is formed at the base. Continued undercutting leaves an overhang of hard rock.

3 The overhang of hard rock collapses. The fallen rock breaks up; some become trapped and drill into the bed creating a plunge pool. Undercutting continues, creating a new overhang.

4 As this process of headward erosion repeats the waterfall retreats upstream leaving a steep sided valley called a gorge downstream, which grows longer and longer as the waterfall retreats overtime.