White Scar Britain's Longest Show Cave

Ingleton, North Yorkshire LA6 3AW Telephone: 015242 41244



Worksheet

National Curriculum Key Stage 1, 5–7 years

Finding your Way

Maps help us find our way and to remember places we have seen. White Scar Caves are very long, this is just a map of the parts you visited.



How does a Gorilla Walk?

Draw lines to complete the names of some of the places or things to be seen in the cave. One has been done for you.

Arum	Cavern
Bagshaw	Thorns
Battlefield	Lily
Crown of	Damocles
Gorilla	Rock
Long's	Gallery
Pulpit	Walk
Silver	Tunnel
Sword of	Fingers
Witch's	Torrent

Make a mark on the map (\mathbf{X}) where you

Stones that Grow

Dripping water in the cave leaves stone behind. Stalactites hang down from the ceiling and stalagmites grow up from the ground. They take many years to grow. Label the picture.



Straw Stalactites

This is a picture of a straw stalactite. It is hollow and water runs slowly through it. As the drips dry, they leave behind a ring of white stone called calcite and make the tube longer.



Measure this straw. How long is it?

Guess how long it was when you were born?



Christopher Francis Drake Long

Draw a picture to show what he was wearing when he discovered White Scar Caves in 1923.



Some Problems to Think About

Why are stalactites usually longer and thinner than stalagmites, most of which are short and thick?

What did you see living in the cave? Why did it live where you saw it? How did it get there?

Some of the passages you walked through were natural, others were man-made. How could you tell?

How do you think Christopher Long felt on the day he found the caves?

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Worksheet

National Curriculum Key Stage 2, 8–11 years

The Cave and its Formations

Making plans of cave systems is difficult. This one is based on a 100m grid.



Buddha

Sword of Damocles GR 2926

Battlefield Cavern

Foxhole	GR
Grotto (entrance)	GR
Tour End 1925–90	GR
Arum Lily	GR
Long's Gallery	GR
Second Front (start)	GR

How can grid references be made more accurate?

GR 2118

GR 5124



If your answers are right, the letters in the grey squares name a kind of rock.

Cave Life

Several kinds of living things inhabit the caves. Write the names of three of them.

For each, give reasons why you think they were living where you noticed them.

Try to explain how each kind of organism might have arrived in the caves.

With the help of reference books, make careful drawings of each type of organism.



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Worksheet

National Curriculum KeyStage 3, 12–14 years

Water and Limestone

White Scar Caves were created by the action of water on the Great Scar Limestone rock. The slow processes which began some 200,000 years ago continue to develop the caves and calcite formations within them. The sectional drawing below shows that the caves occupy various levels within the limestone. The cave system is very much larger than that to which the public has access and extends beyond the Battlefield Cavern towards Crina Bottom.

Section through White Scars to Crina Bottom	Scale: → 100 metres	
Chapel le Dale White Scars Lead Mines Mo	ss Crina Bottom Ingleborough Boggart's Roaring Hole	
Battlefield Cavern	Greenwood Pot	
Cave Entrance White Scar Caves		
Key: Slates & Grits Z Limestone Shales	Abandoned Cave Stream Cave Known Link	
What does the shape of the exposed slate and grit stratum in the Chapel le Dale area suggest?	The higher level caves do not have streams running through them, so how might they have been formed?	
Look at the profile of the upper surface of the lime- stone in Crina Bottom. What does that reveal?	of the lime- preveal? Do you think there may be undiscovered caves be neath Lead Mines Moss? Why, or why not?	
Man's Influence		
To improve access, Christopher Long's entrance crawl was enlarged and the Bagshaw Tunnel was driven through to the Battlefield Cavern. What evidence of mining did you see in the tunnels?	Some of the formations have suffered as a result of accidental damage and vandalism. What reasonable precautions can be taken to prevent this without ruining the atmosphere for visitors?	
How is it possible to tell which tunnel is the older?	How might a broken stalactite be repaired?	

Straw Stalactites

These delicate features, also known as cave straws, are so called because they are hollow. Water flows through the centre of each straw and, as drips evaporate from the end, deposits calcite around the rim gradually lengthening the tube. The local growth rate is quite fast, roughly 40cm per 1000 years.

These strange formations are often far from being simple, vertical tubes. The diagram opposite shows just three of the variations which can occur. The processes involved are not very clear.

How do you think each of these variants might have been formed?



Why are stalactites often found along straight lines?

Why are some calcite formations coloured?

Water, water everywhere...

The mean rate of flow of water through the system is 0.09 m³ sec⁻¹, some of which supplies local needs. In an average day, how many litre bottles could be sold?

What have you assumed in reaching your answer?

Features of White Scar

Hidden below are the names of seventeen of the features of the caves. They are all in straight lines but may be written in any direction. Good hunting!



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Worksheet

National Curriculum KeyStage 4, 15–16 years



Answer the following questions, based on your observations of the White Scar Cave system and the information given below.

field Cavern was phreatic?

The Battlefield Cavern $(\mathbf{\nabla})$ and other parts of the system began to form as phreatic caves in the limestone between two depressions on the north-western flanks of Ingleborough.

Earlier glaciations shaped the landscape to some extent, but the real significance of this third major glaciation was the excavation of the valley of Chapel le Dale (\bullet) .

Calcite began to be deposited in the early parts of the cave system. Radioactive decay of uranium traces from Battlefield Cavern stalagmites show them to be this old.

Before the ice returned, the lower or Stream Cave (*) had begun to form. The ice deepened the valleys and scoured away the shales to expose the limestone pavements.

The Water Exit, by which the stream now leaves the cave from the foot of the First Waterfall, has formed since the ice last retreated. White Scar Caves continue to develop.

Definitions

What evidence did you find that the Battle-

Why was the valley excavation so important in the cave's history?

How does the stalagmite evidence help date the Battlefield Cavern?

What effect do you think removal of the shales had on the caves?

How has the presence of the slate beds affected cave development?

Phreatic caves are formed by water flowing under pressure. Roof and floor are both eroded and water may be forced upwards creating vertical caves or avens. Vadose caves are formed as canyons, with water from bedding planes eroding faults in the floor and producing a typical T-shaped crosssection, just as can be seen in the active Stream Cave at White Scar.

Cave Chemistry

Complete the paragraph opposite to explain how the White Scar formations were created. The words needed are given below:

acidic, bicarbonate, capacity, calcium, carbon, carbonate, calcite, crystalline, dioxide, fissures, green, grey, insoluble, iron, vegetation

Limestone is almost	in pure water, but the rain water
entering the cave through	is This
water contains	_ dioxide gathered from the atmosphere
and especially from decaying	in the soil. It dissolves
limestone as calcium	. When this solution meets the air
in the cave, some of the carbon	diffuses out reducing the
of the water	to carry bicarbonate.
The excess is precipitated as	,aform

Calcite is white. What are the causes of each of the black, green, grey, red and yellow tints found in the caves?

The Deposition of the Limestone

The 200m thick band of Great Scar Limestone in which the caves have been formed was created during the Carboniferous Period. The skeletal remains of marine animals accumulated as mud on the floor of a shallow tropical sea. Under the pressure of later sediments including the Coal Measures, the ooze recrystallised as limestone. The rate of deposition in today's shallow tropical seas, e.g. the Bahamas Banks in the Western Atlantic, is around 1cm in 400 years. How long did it take for the Great Scar Limestone to accumulate?

What have you assumed in making the above calculations?

Running a Show Cave

White Scar offers a particularly interesting opportunity for the general public to visit a cave and gain some understanding of the ways in which caves are formed. In any such undertaking, the safety of the public must be assured. From time to time, specific concerns may be raised. Writing from the viewpoint of the Cave Safety Officer prepare three statements to allay any worries about each of the following. Use the space below for making notes.

Flooding	Power Failure	Rockfalls
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