



Activity One

Activity Name	1. Mining in pre-history
Learning Aims	<ul style="list-style-type: none"> ○ Understand that iron ore has been mined on the Brendons for thousands of years. ○ Learn something about the historic, social and natural heritage of the WSMR area.
Links to National Curriculum	<p>History</p> <ul style="list-style-type: none"> ● Historical enquiry ● Local history study ● British history ● Romans in Britain ● Chronological understanding
Resources required	1a The Brendon Hills through time illustration; 1b The Brendon Hills through time worksheet; 1c The Brendon Hills through time answers; 1d Reconstruction drawing of Timberscombe Iron Age hill fort; 1e Sherracombe Ford.
Activities	<p>The Brendon Hills through time</p> <ol style="list-style-type: none"> a. Display the Brendon Hills through time illustration (1a). This is intended to show typical activities which would have happened throughout both the Iron Age and Roman period. Please note in order to show the variety of agricultural tasks the farming year is not chronologically accurate. b. Discuss the similarities and differences between the Iron Age, Roman and Medieval periods of history on the Brendon Hills. What was life like during these times? Why was iron important? What was it used for? c. Pupils complete worksheet (1c). d. Draw a picture of an artefact made from iron from one of the periods discussed.

Teacher information

1. LIFE ON THE BRENDON HILLS DURING PERIODS OF IRON MINING

Iron Age Britain c.700 BC – 43AD

In the Iron Age the climate became colder and wetter. People began to live in more heavily protected settlements called 'hillslope enclosures'. It is believed that there was a great reliance on livestock, especially cattle at this time. Iron Age Britons lived in tribal groups some of which were ruled by kings or chieftains.

Whilst people continued to farm the land and keep animals, they also started to smelt iron, as iron working techniques from Europe reached Britain. Waste from smelting at this time has been discovered at Twitchen on the southern edge of Exmoor, and shows us that people were extracting iron thousands of years ago.

Resource 1d shows a reconstruction drawing of Timberscombe Iron Age hill fort.

Places to visit: Timberscombe hillslope enclosure (SS 9572 4139); Bat's Castle (SS 9881 4213); Cow Castle (SS 7945 3735);

Romans 43AD – 410AD

The Romans introduced new developments in industry, agriculture and architecture. They invaded Britain aiming to exploit its resources such as gold, silver lead and iron. The forces which occupied Britain needed continuous supplies of iron for military and naval purposes.

The Roman invasion probably had little direct impact on people living around Exmoor. Two small fortlets were built on the coast at Old Burrow and Martinhoe, whilst Exmoor is ringed by

Roman forts on its southern side. However, recent work is showing that the Romans exploited Exmoor's iron deposits on a large scale. Evidence of iron smelting has been identified at several locations in West Somerset and North Devon including Clatworthy Reservoir and Sherracombe Ford (resource 1e).

Places to visit: Old Burrow Roman fortlet (SS 7880 4934); Martinhoe Roman fortlet (SS 6630 4933); Clatworthy Reservoir (ST03:30, resource 1f).

Medieval 1066-1485AD

After the Romans left Britain, there was probably little disruption to life on Exmoor. We know very little about how and where people lived and the Anglo-

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Saxon invasions had a limited impact on the south-west of England, although several places on Exmoor have Anglo-Saxon names. (using 'ton', 'cot', 'ham' and 'worthy'). The Vikings made several raids on the Exmoor coast – at Porlock and Watchet. The Royal Forest probably came into being at this time.

After the Norman Conquest of 1066 three castles were built on Exmoor. They were made of earth and timber, but one of them, Dunster, was rebuilt in stone. The Domesday Book of 1086

recorded 55 manors on Exmoor. Two priories were founded at Dunster and Barlynch. The settlement pattern of farms, hamlets and small villages was largely established by the end of the 13th century and closely resembles that of today. Dunster became a borough town and the layout of the settlement reflects its burghage plots of long, narrow properties.

A few settlements were abandoned in the medieval period and these provide a valuable insight into life on Exmoor in medieval times - the best preserved is at Badgworthy, where the remains of old fields, terraces for arable farming and the traces of buildings survive. The Royal Forest (which probably came into being much earlier) was of major importance in the economy and life of Exmoor. It belonged to the Crown and provided an

area for hunting, but more importantly formed a source of income for the king, because farmers paid to graze their animals on the Forest.

During the medieval period parts of Exmoor were mined for iron and to a lesser extent, copper. At Combe Martin, silver and lead mines were highly productive, and were initially controlled by the crown. There is evidence of medieval iron working at Shircombe Slade and New Invention Wood

Places to visit: Culbone inscribed stone (SS 8320 4735); Caractacus inscribed stone (SS 8898 3355); Porlock church; Dunster; Badgworthy deserted medieval settlement (SS 7935 4445); Ley Hill deserted medieval settlement (SS 891 450); Culbone Church (SS 842 483)

2. IRON PRODUCTION IN PRE-HISTORY AND MEDIEVAL TIMES

There is evidence of iron being mined and produced on Exmoor in the Iron Age, Roman and Medieval times.

The production of iron follows this pattern:

Prospecting → Mining → Smelting → Smithing → Artefact

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Prospecting

This is the process of finding the iron ore. The prospector relied upon the surface appearance of rocks, soil, and types of vegetation to indicate the presence of minerals. There was little scientific basis to this, and the prospector had to rely heavily on experience.

Mining

Mining is the extraction of ore. The simplest form of a mine was an open cast one which was open to the elements. The material could be dug from the ground straight away. Other forms of mining included a shaft or adit below ground leading to the ore. The

exact way in which ore was mined depended on the shape of the ore deposit and whether it outcropped at the surface.

Smelting

Smelting is the method of producing metal from an ore. This includes extracting iron from iron ore to produce iron and requires heat and fuel. Smelting produces large volumes of waste material known as slag, and dumps of this material form the most obvious sign of smelting in the past. After production, the iron was reheated, and formed into artefacts by the process of smithing).



West Somerset Mineral Railway Project

THE
OLD
MINERAL
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	Iron Age	Roman	Medieval
How was iron mined?	<ul style="list-style-type: none"> ○ Usually open cast mines. ○ Ore would be removed with a pick, hammer, chisel or shovel. 		
How was iron produced?	<ul style="list-style-type: none"> ○ In pre-historic times the technology did not exist to create temperatures high enough to fully melt iron. ○ This meant that unlike bronze or copper objects, iron objects could not be cast using moulds, but instead had to be forged. It was heated until it was soft enough to be hammered into shape. ○ Once the raw ore was removed from the mine, it would be crushed, then washed, leaving behind the iron oxide. ○ Charcoal was an extremely important fuel in the ancient world. It is made from wood. ○ Small pieces of iron ore and fuel (charcoal) were placed in a small bowl or clay shaft furnace. The fuel was fired and blasted with air from a hand or foot operated bellows. ○ The melting temperature of iron is 1535° C, but in early furnaces only temperatures of between 900°-1100° C could be achieved. A chemical reaction meant that the oxygen in the heated ore combined with the carbon in the fuel to form carbon dioxide, reducing the ore to metallic iron, whilst other impurities combined to form slag. ○ The iron and slag formed a soft lump known as a 'bloom'. ○ The bloom was hammered while hot to expel much of the slag, leaving a lump of impure wrought iron. ○ A blacksmith's toolkit has not changed much since the Iron Age. ○ The remaining slag was removed and generally dumped. 		

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	Iron Age	Roman	Medieval
What was iron used for?	<ul style="list-style-type: none"> ○ Iron working revolutionised many aspects of life, most importantly agriculture. ○ Iron tipped ploughs could churn up land far more quickly and deeply than older wooden or bronze ones, and iron axes could clear forest land far more efficiently for agriculture. ○ Iron was used to make tools, brooches, swords, and even vessels. 	<ul style="list-style-type: none"> ○ There was a big increase in use in Roman times. ○ Tradesmen's tools. ○ Transport. ○ Domestic equipment e.g. knives, razors, locks, toilet implements. ○ Military equipment, e.g. armour, nails, weaponry. 	<ul style="list-style-type: none"> ○ Weaponry e.g. cannonballs, long swords, battle axes, chain mail. ○ Agricultural equipment e.g. ploughshares, harrows, sickles, billhooks. ○ Agricultural and household implements need to be sharpened.

3. MODERN DAY IRON PRODUCTION

- The technique of using mineral coal instead of charcoal, by part burning it to produce coke, was pioneered by Abraham Darby at Coalbrookdale.
 - Coke could be produced in large quantities. This meant ironworks could be built with several furnaces on the same site.
- ☞ For more information about modern iron production please refer to the Smelting activity in the WSMR in Watchet Teachers' Pack.
 - ☞ For more information about the products of iron smelting please refer to the All about iron activity in the Bearland Ventilation Flue Teachers' Pack.