



School Project Sheet

Power at Combe Mill



Educational visits to Combe Mill are organised jointly by the Combe Mill Society and the Blenheim Palace Education Department.
Contact details can be found at the end of this document.

In the early 1700s there were four main forms of power:- human, animal, water and wind. Each form had its limits >>>>>

Humans tended to get tired, ill and could moan a lot!



Animals had the advantage of being much stronger than humans and they tended not to complain although they could be stubborn. The problem with animals was that they needed feeding, they too could get ill and if overworked they would die.



Illustration by John Hancox, with permission - original can be purchased from www.hancoxart.co.uk

Waterwheel: provided enormous power compared to animals and humans. They were used to power machines in textile mills, or as here at Combe Mill, to power a variety of tools for craftsmen and for sawing timber. Waterwheels did have their limitations too. They could only be put near a fast-flowing stream, where the pressure was great enough to turn a waterwheel. In the winter the water could freeze or in the summer the



Windmills were an effective source of power and were often used to power the grinding stones of flour mills. The main problem with windmills was that they could only work on windy days.

Many people worked hard to find a solution to the problems with human, animal, water and wind power. The answer eventually came in the form of the steam engine.

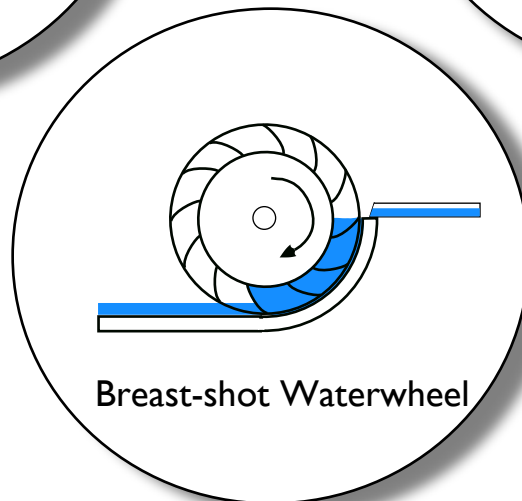
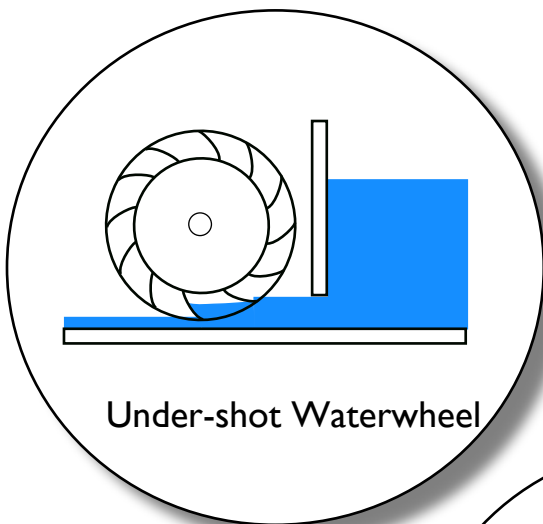
The first British steam engine was made by Thomas Savery in 1698. His machine was used to pump water out of Cornish mines. Thomas Newcomen later made an improved version of the steam engine which again was used in the Cornish mines. It was James Watt and Matthew Boulton who in the 1770s produced an efficient steam engine.

1] As you walk round Combe Mill note down examples of human power.

2] In the Mill which machines were once powered by the water wheel?

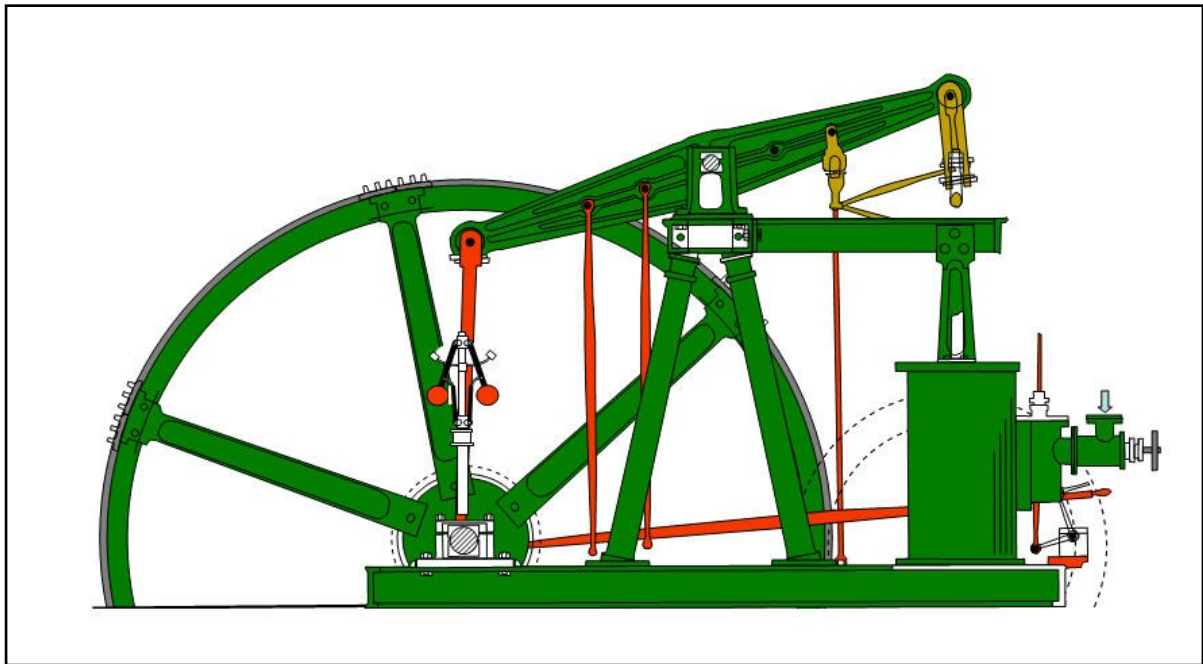
3] How was the power transferred from the water wheel to the machines?

4] There are 3 main types of water wheel: Under-shot, Over-shot and Breast-shot.
Which of the three types is the Combe Mill water wheel?



5] Look carefully at the beam engine. What do you notice about its size?

6] Look carefully at the diagram below of a beam engine. Label the beam, the governor and the steam cylinder.



Back at School

A] Create a poster which shows how steam power was more effective than all other forms of power.

B] Design an advert for a Victorian newspaper trying to persuade factory owners to buy a Boulton & Watt steam engine. It must be hand drawn as all adverts were in Victorian times. You could use in the advert Mr Boulton's famous words spoken to a visitor to his engineering works "*I sell here, Sir, what all the world desires to have - power.*"

C] Write a diary entry for Matthew Herbert in 1864. He was a stable lad for the 7th Duke of Marlborough. The diary entry will describe what he saw when he was sent for the first time on an errand to Combe Mill. He was sent to the Blacksmith at the Mill because one of the Duke's horses had lost a shoe. In the diary entry describe all the craftsmen he saw working at the Mill; describe the forge; the water wheel and the beam engine; the noise and the smells.