HOW A STEAM LOCOMOTIVE WORKS (1)

A steam railway locomotive uses the power of **steam** to drive the **wheels** which make the locomotive move.

Steam is created by heating water in the **boiler**. The steam is sealed and not allowed to escape. It builds up **pressure**, and if this pressure is not carefully controlled, the boiler will blow up! It is the **energy** in this pressure which drives the locomotive.

GETTING A LOCOMOTIVE READY FOR WORK

To heat the water in the boiler, the **fireman** lights a **fire** in the **firebox**. The locomotive carries **coal** for the fire. A larger locomotive carries coal in a **tender**, which is attached to it. A smaller locomotive carries its coal in a **bunker** behind the **driving cab**.

The **water** for the boiler is carried in **tanks**. A larger locomotive has these tanks in its tender; a smaller locomotive may carry its water in a '**saddletank**' over the boiler, or in '**sidetanks**' either side of the boiler.

Air comes into the **firegate** underneath the **firebox** and helps the fire to burn. The **hot air**, **gases** and **smoke** created by the fire travel along many small **tubes** which run through the boiler. This heats the water in the boiler, the water boils and creates steam.

The smoke collects in the **smokebox** and escapes through the **chimney**.

The steam collects at the top of the boiler, where the pressure is very high. The **driver** can check the steam pressure on special **gauges** in the cab. If the pressure gets too high, **safety valves** allow the steam to escape safely.

DRIVING A STEAM LOCOMOTIVE

To start the locomotive, the driver moves the **regulator handle**. This opens a **regulator valve** in the **dome** on top of the boiler, and this allows steam to enter through valves into the **cylinders**.

Each cylinder contains a round **piston**. The valves let steam into the cylinder, first at the front, pushing the piston backwards, then at the back pushing it forwards. The pistons are connected to **piston rods** which are, in turn, connected to the **driving wheels**. As the pistons move to and fro, they push the rods backwards and forwards, which make the wheels turn round, making the locomotive move. Usually there are 2, or 3 or even 4 pairs of driving wheels which are linked together by **connecting rods**, so that all of the driving wheels help to make the locomotive move.

Once the steam has been used, it escapes from the chimney via a **blast pipe**, making the 'chuff, chuff' noise we know so well. As the steam goes up the blast pipe it draws more air in through the fire, making it burn more fiercely to produce more heat. This in turn makes more steam to continue driving the locomotive. See the diagram of a locomotive on the next sheet.