

Train Quiz

Do you know how a steam locomotive works?

Hint: Refer to the diagram on page 2..... if you need help

Answers on page 3

Match the sentence with the correct information

The cowcatcher was designed to.....catch any flying sparks.

Coal and water is carried inbends.

The fire tubes are located in ballast.

Wood or coal is lit the dome.

Heat from the fire is used to..... the track.

The chimney was designed to..... sweep away any animals on the track.

When the water boils, steam is collected in.....in the firebox.

The buffers are on smooth metal rails.

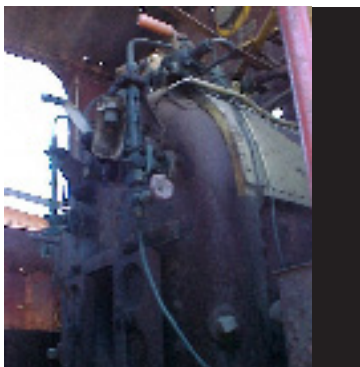
The sand pipe drops sand onto.....boil water, generate steam.

Sleepers are laid on..... the boiler.

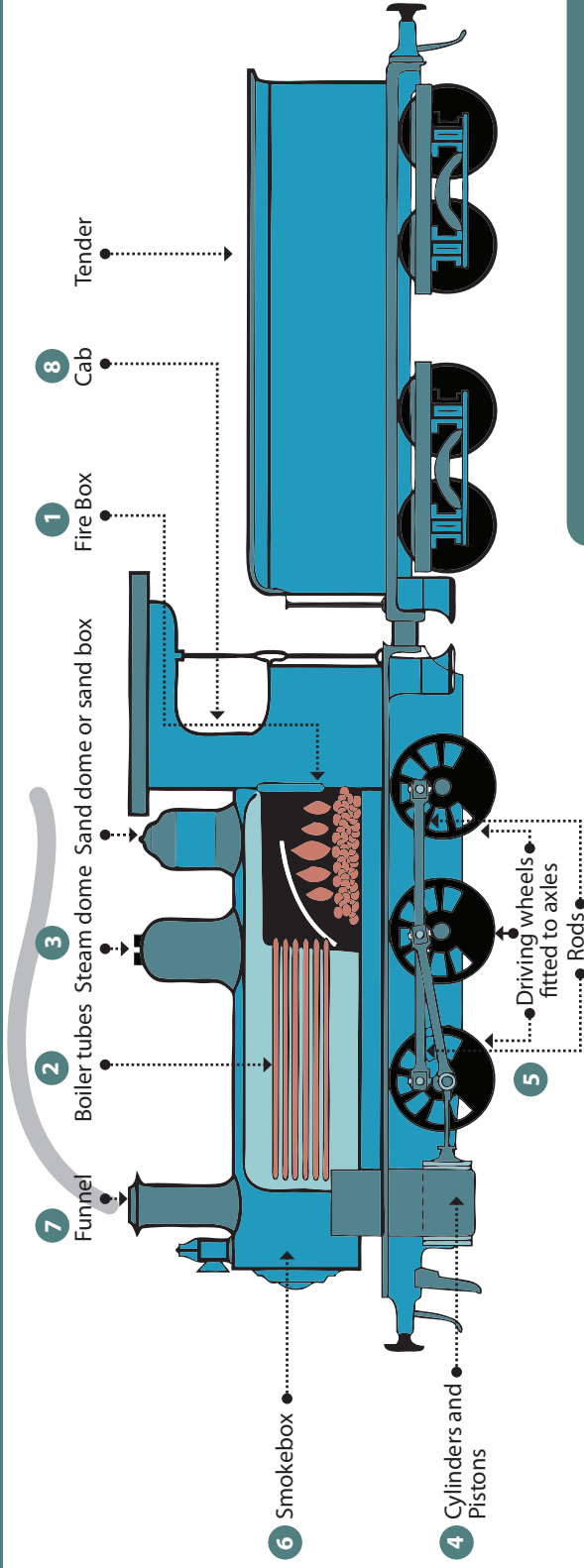
Trains cannot climb up.....steep hills.

Trains slow down on.....the tender.

Smooth metal wheels roll easilymassive shock absorbers.



How a Steam Engine Works



1 Firebox. This is where the fuel (with steam engines this was usually coal) is burned to create heat. Fuel and water is stored in the **tender**. The fireman shovels coal from the tender into the firebox.

2 Boiler. Hot gases produced in the firebox are pulled through a rack of tubes in the boiler. The tubes heat the water that surrounds them to produce steam. The steam collects in the steam dome on the top of the boiler water is forced into the boiler by the injectors.

3 Steam dome. Inside the steam dome are the regulator valve and sometime the safety valve, and whistle. The regulator valve is attached to the throttle in the cab. The engine driver uses the throttle to control the quantity of steam delivered to the cylinders. The safety valve opens to release steam when the pressure becomes too high in the boiler.

4 Valves, Cylinders, and Pistons. Steam is converted to mechanical energy in the cylinders. Entry and exit of steam to and from the cylinders is controlled by the valve gear. The piston in the cylinder is pushed in both directions by the steam. The driving wheels on each side of the engine are connected by a rigid axle.

5 Rods and Driving wheels. The pistons are connected to the driving wheels with rods. As the piston moves back and forth, it moves the rods which then make the wheels turn. In conditions where additional traction is needed, such as times when the railway track is wet or icy, sand held in the **sand dome or sand box** is deposited onto the rails by pulling the **rail sanding lever** in the cab.

6 Smokebox. Spent steam is released from the cylinders through the blast pipe below the funnel. This arrangement produces a reduction in pressure in the smokebox which draws the firebox gases through the boiler tubes. The harder the locomotive works, the more gas is drawn through the tubes, generating more steam.

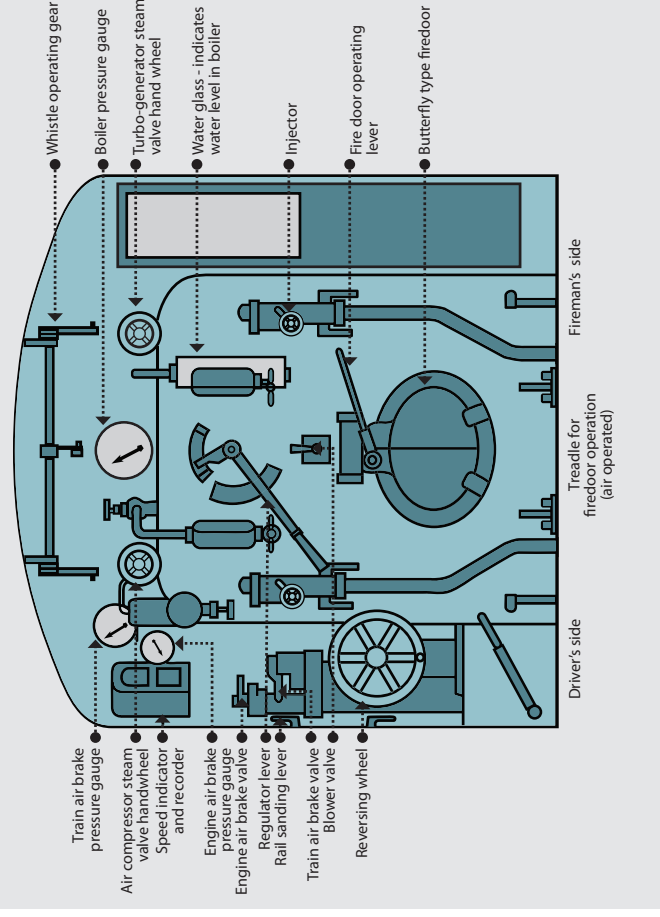
7 Funnel. The spent steam mixes with the gases from the boiler tubes and exits through the funnel. The harder the locomotive works, the more gases and steam comes out the funnel.

8 Cab. The train crew operates the engine from the cab. The fireman's job is to make the steam by controlling the fire in the firebox and the water supply to the boiler. The engineer uses the steam by operating the throttle and monitors the steam pressure, fuel, and water.

Other steam locomotive facts:

Steam locomotive lighting and braking systems are also powered by steam. Electricity for the headlight and other lights comes from a steam powered turbo generator. A steam powered air compressor supplies compressed air for the air brakes.

In the cab of the locomotive





Answer Sheet



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The fire tubes are located in the boiler.

Wood or coal is litin the firebox.

Heat from the fire is used to.....boil water, generate steam.

The chimney was designed to.....catch any flying sparks.

When the water boils, steam is collected in.....the dome.

The buffers aremassive shock absorbers.

The sand pipe drops sand onto.....the track.

Sleepers are laid on.....ballast.

Trains cannot climb up.....steep hills.

Trains slow down on.....bends.

Smooth metal wheels roll easilyon smooth metal rails.