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Name .....

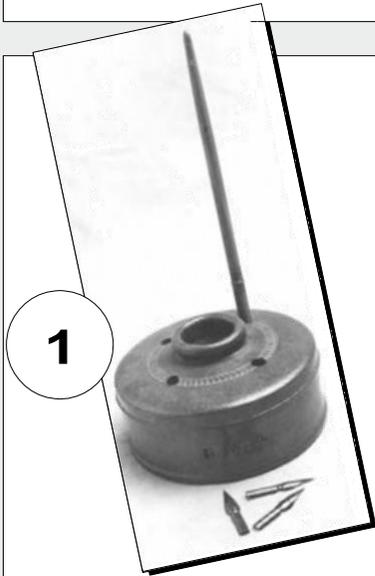
Here is a collection of things that you can see in the display cabinets around the Museum. They are numbered in the order you will find them.

**When you have found the object in each picture, try and answer these questions.**

**What is it?  
Why was it needed  
or what was it used for?  
Who would have used it?**

**Answer these if you can:**

- What is it made of?
- Do we still use it today?
- Do we use something else instead?
- What do we use instead?
- How is it different?



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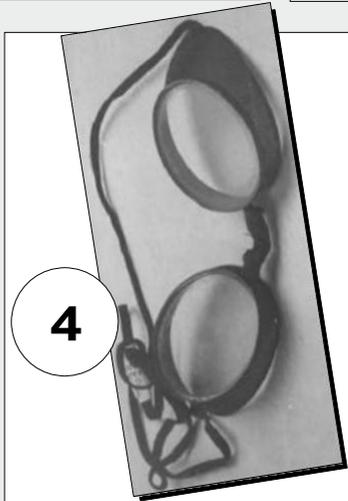
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P.T.O. →



# The Works

# A GWR Apprentice

Name .....



## Introductory video

3 words to describe conditions in the Swindon Works.

1) ..... 2) ..... 3) .....

**Difficult Conditions**

## Foundry

When did the working day begin in Victorian times? .....  
Find and draw the object that was used to pour hot metal.

**Long Hours**

## Pattern Shop

4 different materials used to make a metal part from a pattern.

1) ..... 2) ..... 3) ..... 4) .....

**Materials**

space to draw

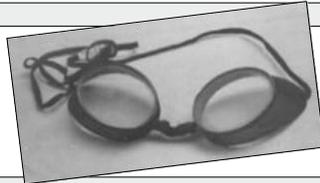
## Carriage and Wagon Shop

Find this object in the display case. What is it made of? .....  
Why was it needed? .....

**Avoiding Accidents**



## Machine Shop



How could these help keep you safe? .....  
Why were they necessary in the machine shop? .....  
.....

**Keeping Safe**

## Boiler Shop

Most workers were deaf by the age of .....

**Noise**

## Erecting Shop

Find the brass time 'checks' on the wall. These were used to make sure workers arrived on time.

What do the checks on hooks 60, 31 and 17 have in common? .....

.....

What do the checks 33, 62 and 80 have in common? .....

.....

What do you think these symbols could mean? .....

.....

**Timekeeping and Discipline**

Where would you least like to have worked and why? .....  
.....

**Congratulations! You have now passed your GWR apprenticeship at STEAM.**

Name .....

### Find the Pattern Shop

The wooden shapes on the shelf are called patterns. Patterns were cut and carved into shape and then pressed into sand to make specially shaped holes. The shaped holes were filled with hot liquid metal. When the metal cooled and went hard, it made different parts for the engines.

**Draw three of the patterns inside the boxes.**

Can you work out which parts of the engine each pattern was for?

You may need to go and look at an engine before you can answer this question.



What skills do you think pattern makers needed to be good at their job?

.....  
.....  
.....  
.....

[Large empty box for drawing a pattern]

.....  
.....

[Large empty box for drawing a pattern]

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.....

[Large empty box for drawing a pattern]

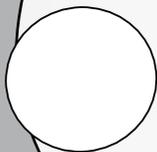
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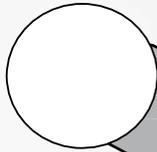
Name .....

The following descriptions of the Swindon Works were written by Alfred Williams, who worked 'inside' from 1892 to 1915. As you go through the 'Works' section of the Museum, match them to the part of the factory which you think the description best fits. Choose from the Foundry, the Carriage Shop, the Machine Shop and the Boiler Shop. Write the first letter of the Shop in the space beside the quotation.

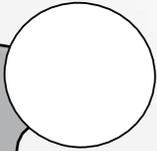
*'The space between the roof and the floor seems to be entirely occupied with swiftly-revolving wheels and belts...everything is in a state of perpetual motion. The wheels revolve almost without sound, the shafting turns and spins silently. The lathes are nearly noiseless in operations.'*



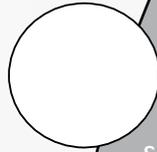
*'The wooden cars... of the vans must be fitted built with the precision and on the shrink away parts would the open, or fall to'*



*'Hundreds of hammers are falling, banging and clanging perpetually, with an indescribable noise and confusion. If you would be heard you must shout at the top of your voice and make yourself hoarse in the attempt.'*



*'On this side are rows of drills, saws, slotting and planing machines; on that are the punches and shears, screeching and grinding, snapping and groaning with the terrible labour imposed on them. The long lines of shafting and wheels whirl incessantly overhead, the belts flap on the rapidly spinning pulleys.'*





'As soon as the moulds are finished the dark, grimy labourers bring the molten liquid, either carrying it in a thick iron vessel lined with firebricks and having a spout on one side...or wheeling it along in a big cauldron that swings like a pot.'

'The heat there is overpowering....and the air, puffed out from the furnace, strikes you full in the face, so that you are almost suffocated with it.'

'Though you shout at the top of your voice you hear nothing – nothing at all. You are deaf and dumb and stupefied. You look at the operator, there he sits, standing or stoops. You see his movements and the apparatus in his hands but everything is absolutely noiseless to you.'

'The floor is of soft yielding sand'

'As great care and cleanliness are required for their work, (the men) are expected to be spruce and clean in their dress and appearance....in the evening (the men) prosecute (their) craft at home and manufacture furniture and decorations.'

One of Alfred Williams' descriptions of the Swindon Works is as follows;

- It is dreadful, it is overpowering; it is unearthly; but it has to be borne, day after day and year after year.'

Is this a positive or negative comment?



Listen carefully to the videos.

Can you find any different or opposite points of view about the Swindon Works? If you can, make a list below.

Name .....

Look carefully around the locomotive and on the walls and banner.  
Write your answers in the spaces.

Objects on Caerphilly Castle's Coat of Arms?

Empty oval space for answer.

How Many Large (Driving) Wheels?

Empty oval space for answer.

How Many Small Wheels?

Empty oval space for answer.

Types of Metal Used?

Empty oval space for answer.

Place Built?

Empty oval space for answer.

Other Materials Used?

Empty oval space for answer.

Colours Used on Caerphilly Castle?

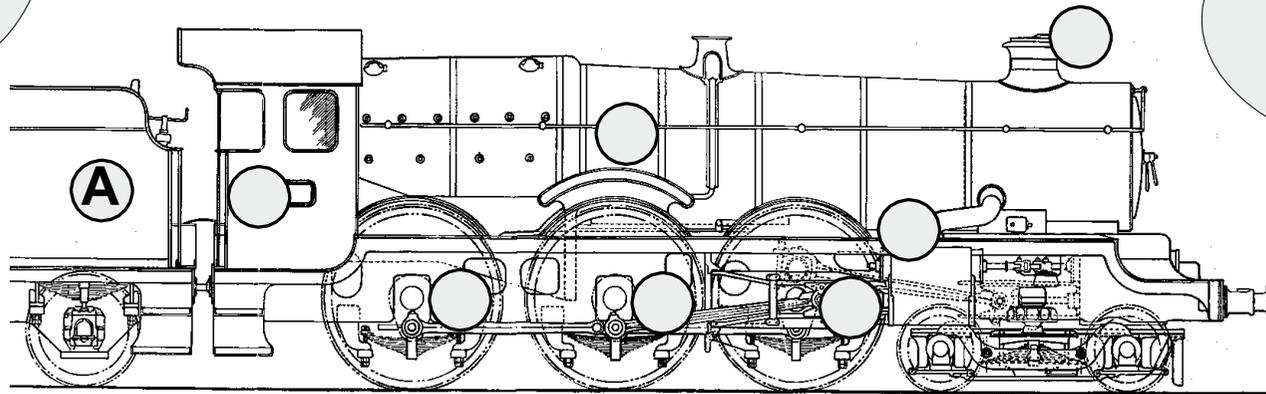
Empty oval space for answer.

How many Medium Wheels?

Empty oval space for answer.

Shapes on Caerphilly Castle?

Empty oval space for answer.



PPIDlaactc  
eeBBuutiitild  
t?t?

Empty oval space for answer.

Size of Driving Wheels?

Empty oval space for answer.

Caerphilly Castle's Loco Number?

Empty oval space for answer.

Match the letters to the parts of the locomotive.

- A** Tender where water and coal are stored
- B** Boiler where water is held
- C** Chimney
- D** Driving wheels
- E** Cab for the driver and fireman
- F** Tubes that carry steam



Name .....

There are 14 steps needed to make a locomotive move.  
Can you put the steps in the right order?  
Number them 1 - 14. Number 1 has been done for you.



The movement of the pistons pushes a connecting rod.

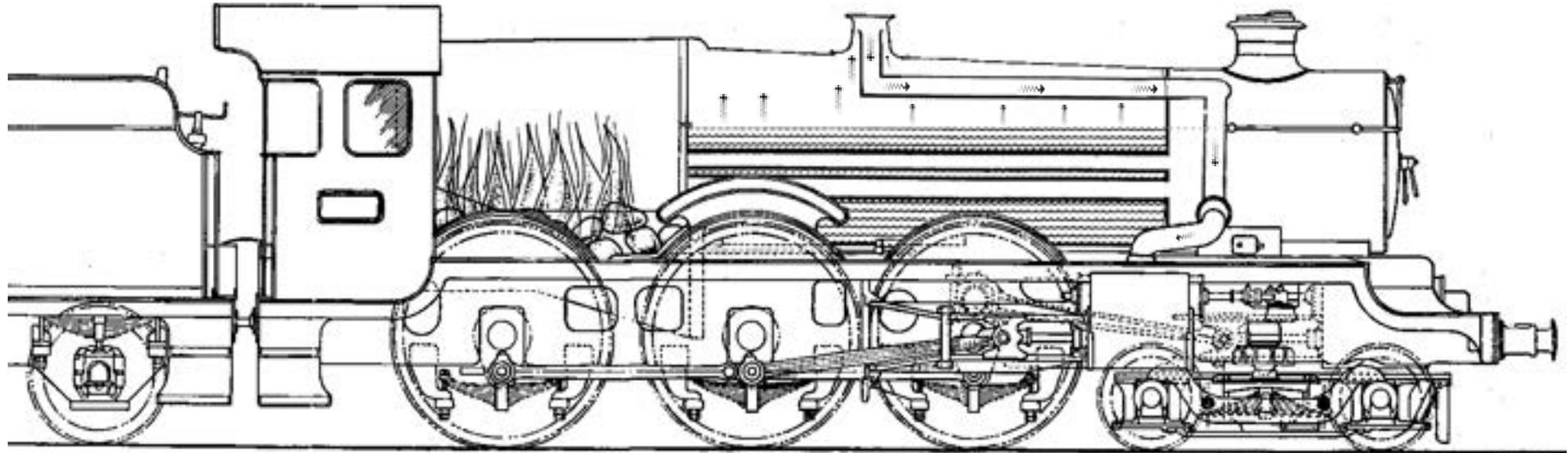
The driver checks the condition of the locomotive. **1**

The movement of the connecting rod turns the driving wheels.

Coal is shovelled into the firebox.

In the cylinders, the pressure of the steam pushes the pistons backwards and forwards.

The water turns into steam and steam pressure builds up in the boiler.



The fire is lit in the firebox.

From the steam space, the steam is taken through the main steam pipe to the cylinders.

As the driving wheels turn, the engine starts to move.

Water is put into the boiler.

The heat passes through small tubes in the boiler and heats up the water.

The fire produces heat.

The driver opens the regulator, which allows steam to escape from the boiler and the steam space into the main steam pipe.

The steam rises up and collects in a dome above the boiler called the steam space.

Name .....



My name is Isambard K\_\_\_\_\_ B\_\_\_\_\_.  
I was engineer of a new railway from L\_\_\_\_\_ to B\_\_\_\_\_  
\_\_\_\_, planned in 1833.  
It was called the G\_\_\_\_\_W\_\_\_\_\_R\_\_\_\_\_

I am a n\_\_\_\_\_. We built the railway. It  
was very hard work.  
We ate b\_\_\_\_\_ and b\_\_\_\_\_  
and drank b\_\_\_\_\_.  
Carefully draw one of us at work.

I also designed bridges, tunnels, ships and the P\_\_\_\_\_ Viaduct.  
It was built in 18\_\_\_\_\_. The steam engine you can see is called N\_\_\_\_\_  
\_\_\_\_\_ S\_\_\_\_\_. It was designed by another famous engineer,  
R\_\_\_\_\_ S\_\_\_\_\_ to run on my new railway. It was  
built in N\_\_\_\_\_ on T\_\_\_\_\_.  
(Look around the locomotive very carefully).

Find the picture of the modern 'Intercity 125' locomotive on the wall.  
How many differences can you spot between the old and new loco?  
(You can write your answers on the back of the sheet).



Name .....

When was  
North Star built?  
18 \_\_\_\_

Who built North Star?

R\_\_B\_\_\_\_\_S\_\_\_\_PH\_\_\_\_S\_\_N

How many wheels are there on  
each side of the loco?  
1 2 3 4 5 6

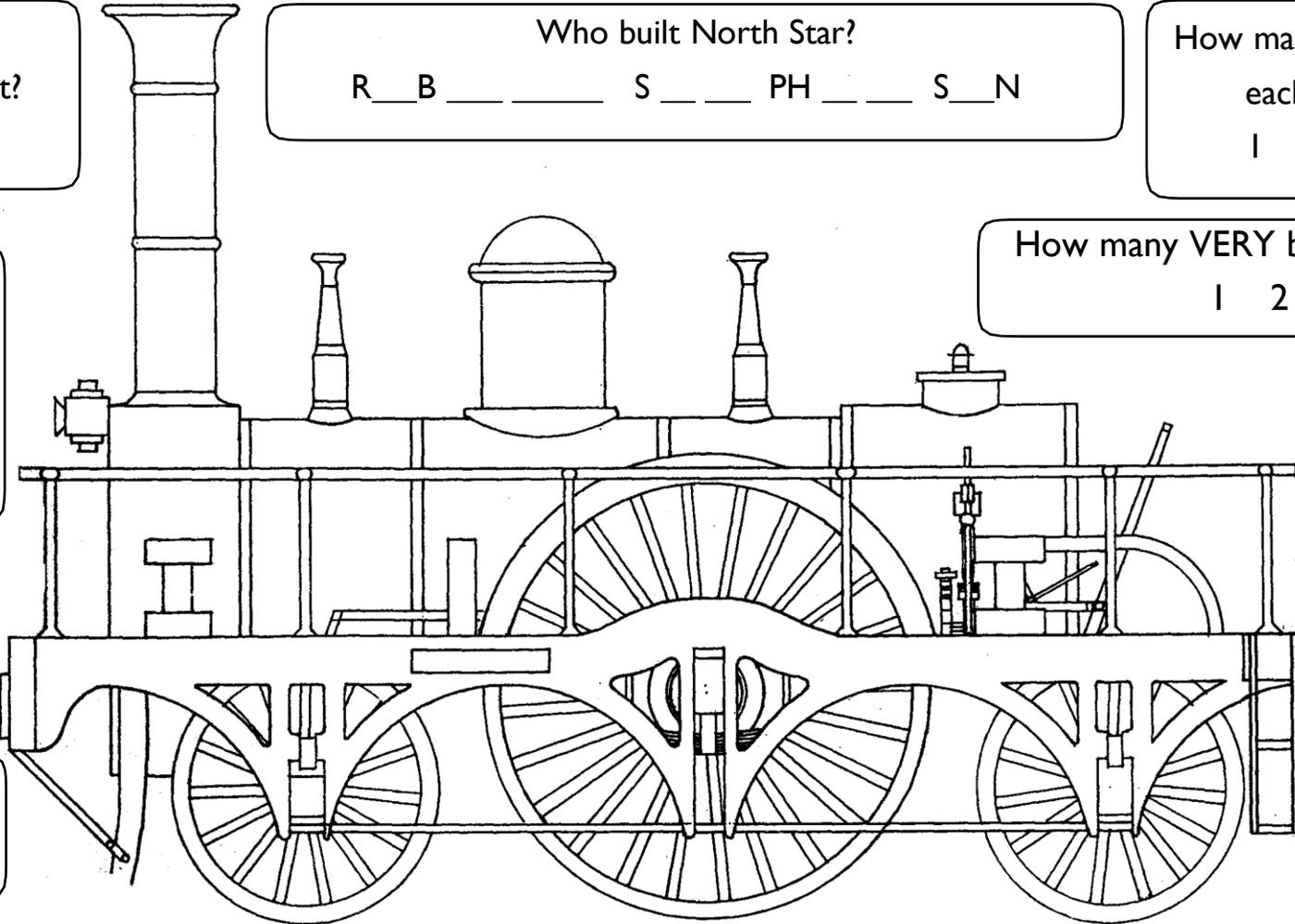
What colours  
can you see on  
North Star?

How many **VERY** big wheels are there?  
1 2 3 4

How  
many  
letters  
are there  
in North Star's  
name?

How many wheels  
are there altogether?  
1 2 3  
4 5 6 7  
8 9 10

What materials  
can you see on  
North Star?



Draw some shapes that you can see on North Star. Write the name of the shape if you can.

Name .....

## Fill in the missing words

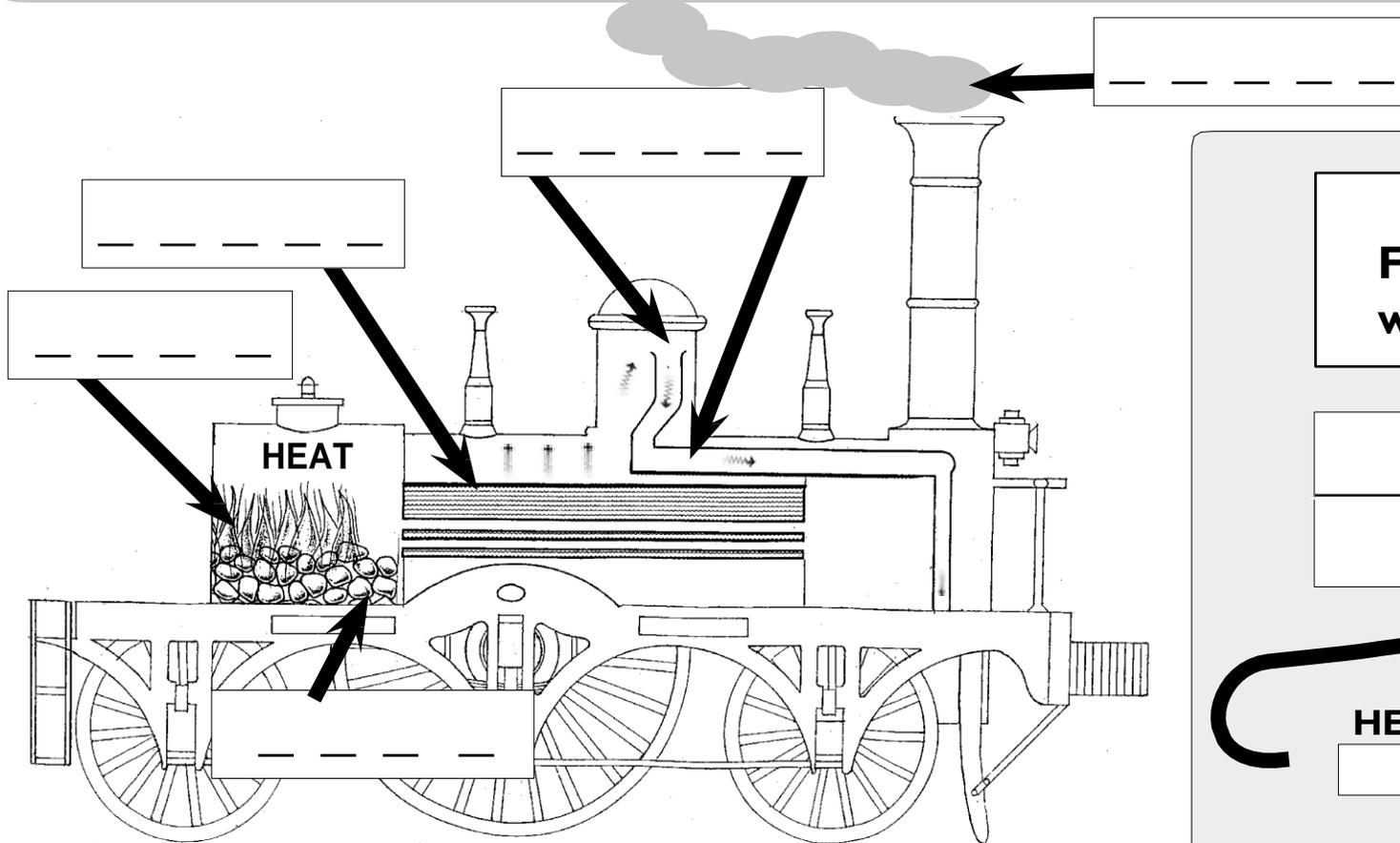
smoke

coal

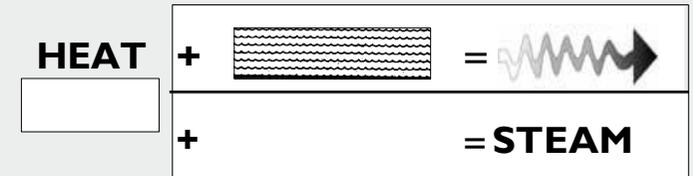
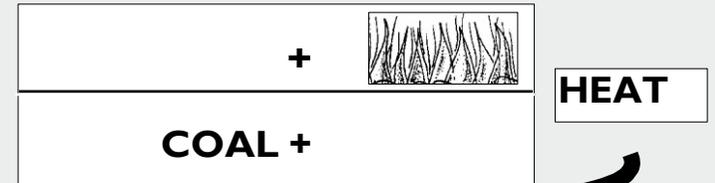
fire

water

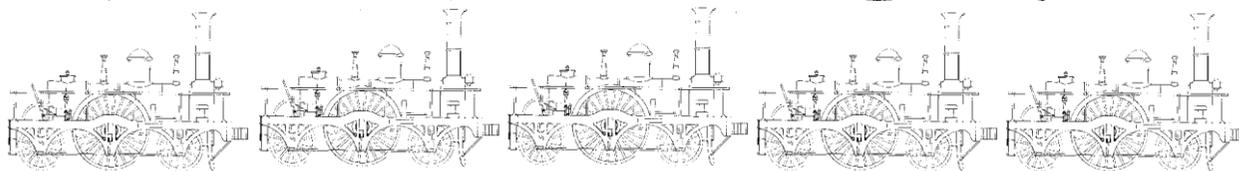
steam



**Crack the code.  
Fill in the missing  
words and symbols.**



## Steam makes the engine go



Name .....

Look around the Operating the Railway section. Decide what is **true** and what is **false**.  
Put a **T** next to the things that are true and an **F** next to the things that are false.

TRUE FALSE TRUE FALSE

- 1) The cab of Dean Goods locomotive is painted green.
- 2) There are two white lamps on the front of Dean Goods locomotive.
- 3) Dean Goods locomotive is made of wood.
- 4) Dean Goods locomotive has 8 wheels.
- 5) Dean Goods locomotive has the number 2516 on its side.
- 6) The fireman drove the engine.
- 7) The driver stood on the right hand side of the cab.
- 8) The driver and fireman working in the cab would not get wet if it rained.

TRUE FALSE TRUE FALSE

- 9) The brake van is painted yellow.
- 10) It was dark and lonely working in the brake van.
- 11) A signalman worked in the brake van.
- 12) Guards used red and green flags.
- 13) A guard worked in the signal box.
- 14) There are 2 red levers in the signal box.
- 15) There are 8 black levers in the signal box.
- 16) It was very dangerous indeed working as a shunter.

Count up the number of true things.  
Put the number in the box.

Count up the number of false things.  
Put the number in the box.

Name .....

Look around the Operating the Railway section. Decide whether the following statements are true or false. Put a T for true or an F for false in each circle. If the statement is false, you need to change the statement to make it true using the dotted line to write on.

TRUE FALSE TRUE FALSE

- 1) The number of Dean Goods locomotive is 2516.
- 2) Dean Goods was built at Oxford in 1890.
- 3) Dean Goods is made of wood and plastic.
- 4) The driver stood on the left side of the cab.
- 5) The fireman drove the engine.
- 6) The train driver shoveled coal to keep the fire going in the engine.
- 7) To become a train driver, men had to work for many years as first cleaners and then firemen.
- 8) The driver could work out the speed of the engine from the sound of the train wheels on the track.
- 9) The fire was lit 12 hours before the journey started, to build up enough steam to power the engine.

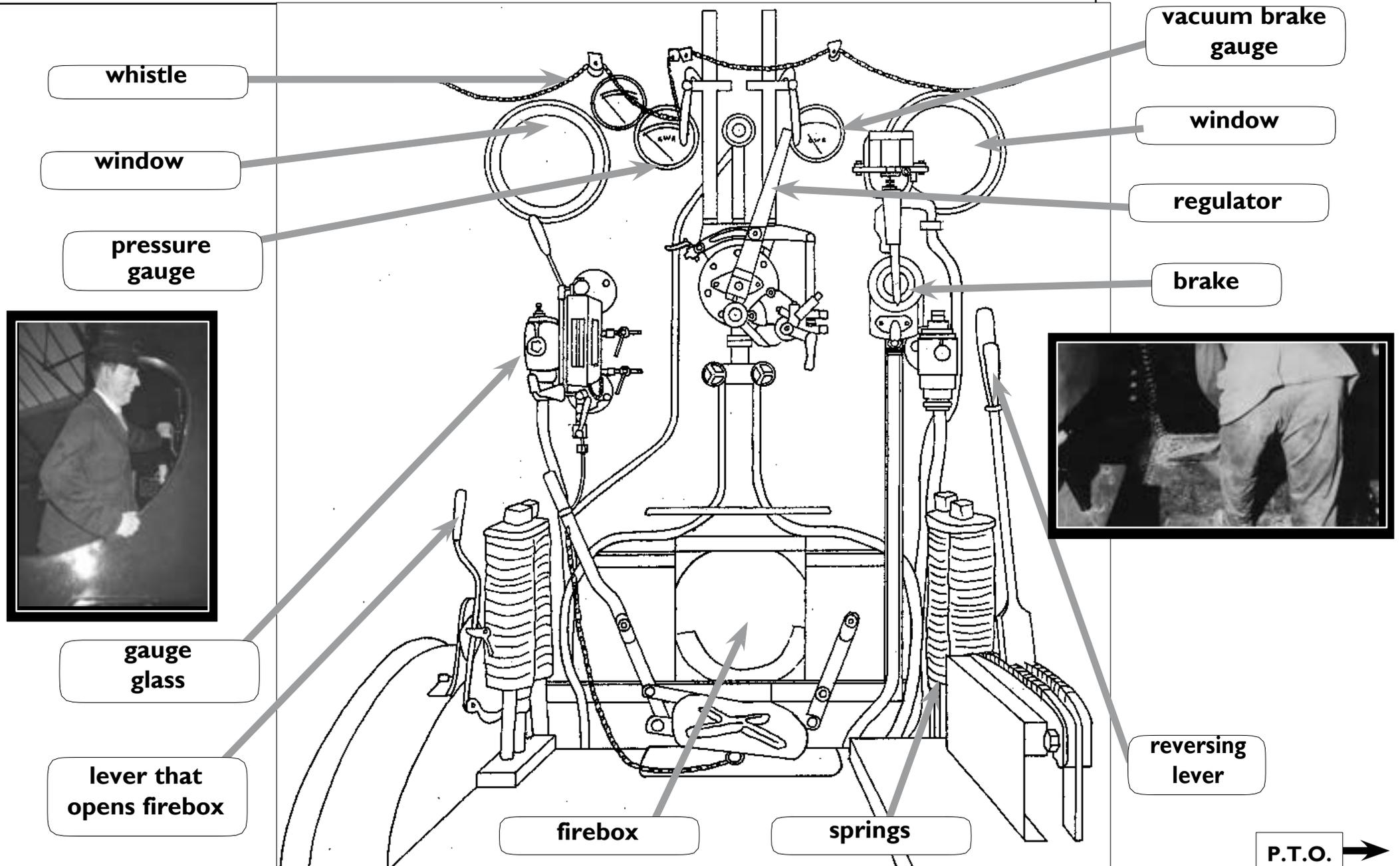
TRUE FALSE TRUE FALSE

- 10) Drivers could be sent for to work at any time of the day or night.
- 11) Coal and water were kept in the tender.
- 12) Cleaners at Bristol before 1914 took 4 hours just to clean the side of the engine.
- 13) The brake van is painted yellow.
- 14) Working in the brake van was often dark and lonely.
- 15) There are 5 red levers in the signal box.
- 16) Signal boxes had armchairs and newspapers for the signal men.
- 17) There are 2 black levers in the signal box.
- 18) In the 1880s, shunters only worked 20 hours each week.

Finally, add up the question numbers of all the statements that are true. Put the total in this box. 

# On the Footplate

Name .....



P.T.O. 

**Match the parts of the cab labelled in the picture overleaf to their function.**

One example has been done for you. You will need to use the engine driving simulator close to Dean Goods locomotive to work out all of the answers.

**Function**

**Parts**

**Function**

shows how much water is in the boiler.

**Regulator**

help to make the journey more comfortable in the cab.

shows how much of a vacuum has been created in the system for the brakes to work.

**Brake lever**

**Reversing lever**

shows how much steam pressure has built up in the boiler.

operates brakes on the locomotive and on the carriages behind.

**Vacuum brake gauge**

**Pressure gauge**

is where the coal fire burns to heat the water in the boiler so that it turns into steam.

changes the direction of travel of the locomotive and changes the amount of steam going into the cylinders.

**Firebox**

**Firebox lever**

is blown when the locomotive starts to move, in emergencies and to let people know that the train is coming.

give an additional view of the railway line ahead for the driver and fireman.

**Cab windows**

**Gauge glass**

allows steam to travel from the boiler into the cylinders, where it drives the pistons backwards and forwards and moves the wheels. This is like the accelerator on a car.

is used for opening and closing the firebox when shovelling more coal onto the fire during the journey.

**Whistle**

**Springs**

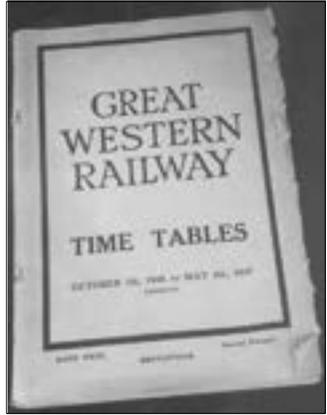
Find the sign inside the cab of Dean Goods. It is on the left hand side of the cab. What could happen if you ignored the instructions on the sign?

.....

.....

Name .....

Find out who would have used each of these items. Use the word bank to help you.  
Write your answer on the line underneath each picture.



Timetable

.....

**WORD BANK**

GWR police

passenger

fireman

station master

ticket collector

engine driver

booking clerk



GWR truncheon

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Station master's cap

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Driver's cap

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Free train passes

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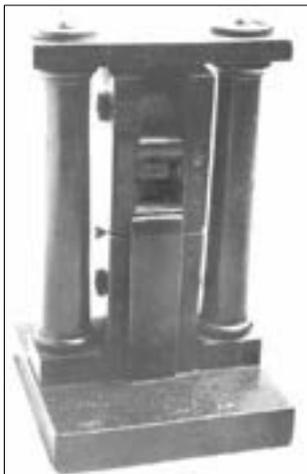
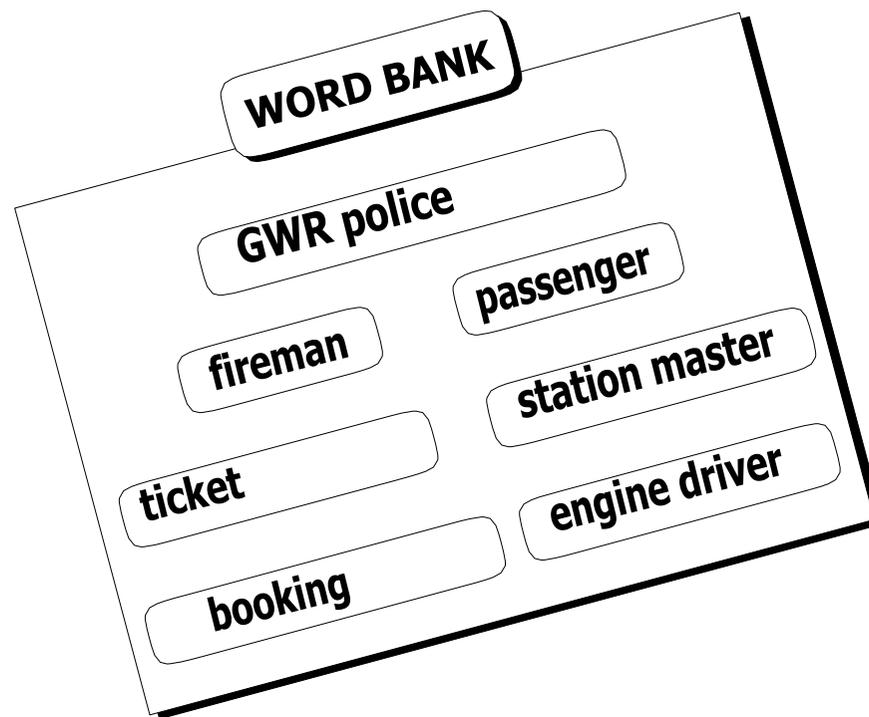
Railway tickets

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Ticket snippers

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Ticket press

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Oil can

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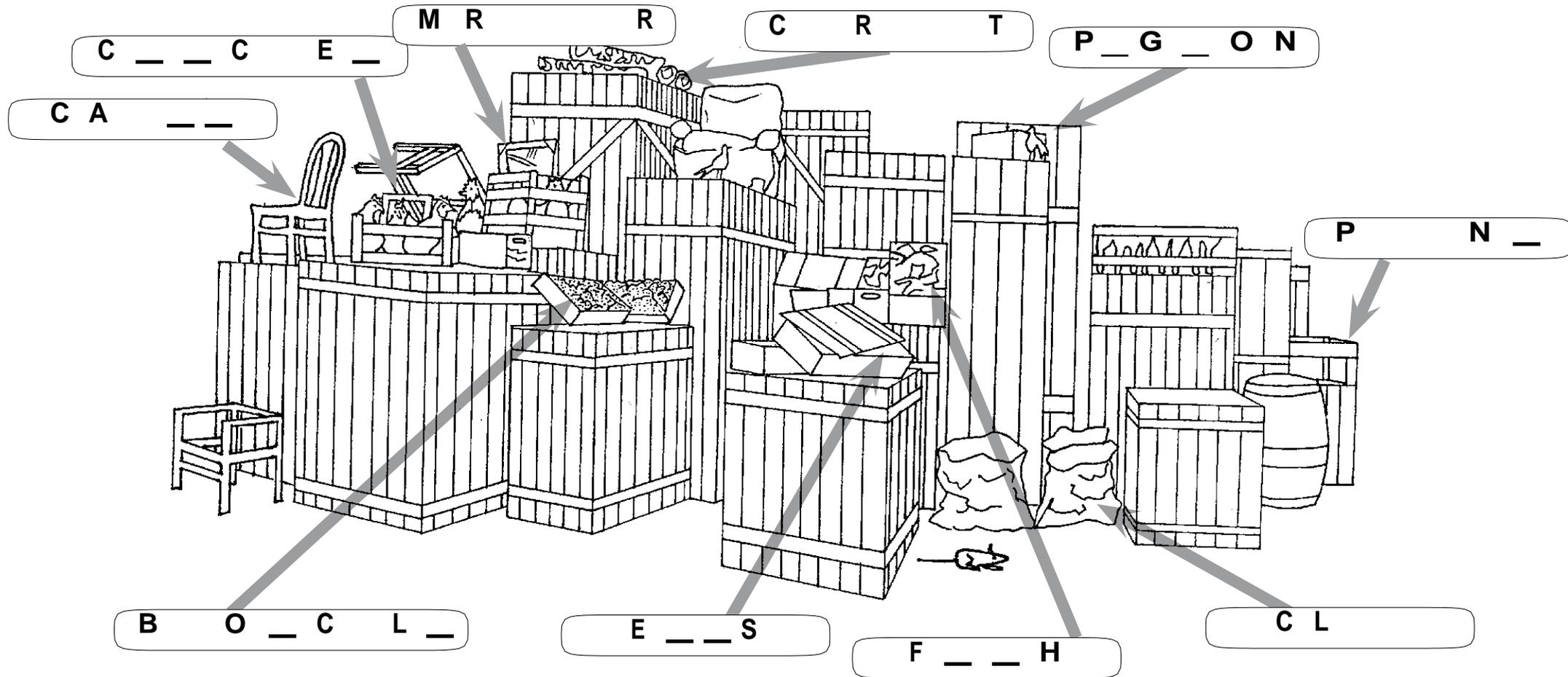


Flasks

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Name .....

Look at the pile of goods and this picture. Fill in the missing words.  
Things are moved around on the pile of goods occasionally so look carefully.

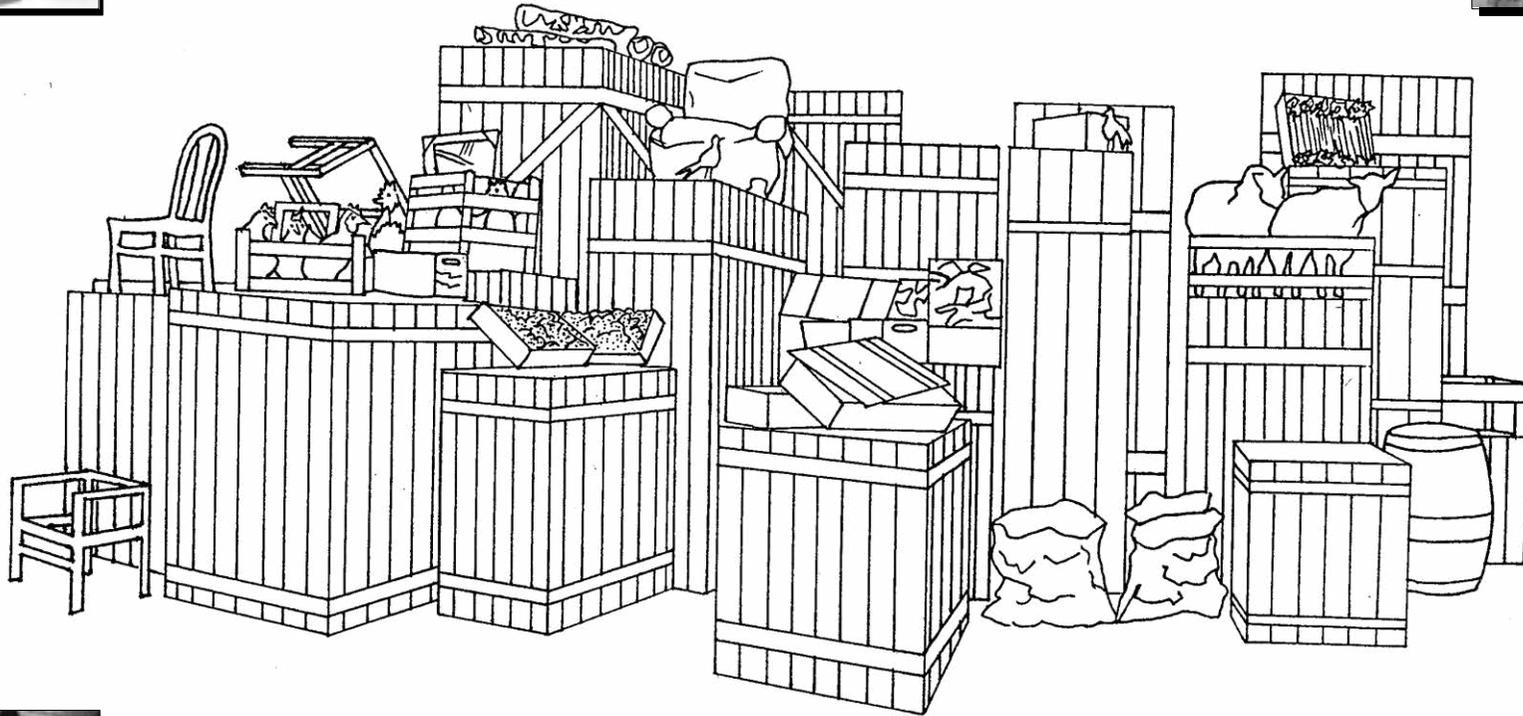


- I The sheep are missing from this picture. Draw them on this picture in the right place.
- I Spot the difference between the pile of goods and this picture. Put a circle around it.

- I Find the long list of the goods carried by GWR trains.  
Find something that begins with the letter **M** \_ \_ \_ \_ \_
- Find something that begins with the letter **P** \_ \_ \_ \_ \_
- Find something that begins with the letter **S** \_ \_ \_ \_ \_
- Find something that begins with the letter **T** \_ \_ \_ \_ \_

Name .....

Use arrows to label some of the things you can see on the pile of goods.  
Look at the pile of goods and find the long list



P.T.O. →



**Food and Drink**

**Materials and Fuels**

**Look at the pile of goods and find the long list of goods carried by GWR trains. Write some examples in the boxes below and choose one to draw.**

**Animals and Birds**

**Furniture and Household Items**

Name .....

You can find all of these things in the display cases in **Speed to the West**.  
Use the word bank to write the name of each object underneath the picture.  
Write who you think would have used each object underneath the picture.



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### WORD BANK

board game   chamber pot   model of St David ship   model carriage   matches   soap  
picnic basket   children   travellers   hotel guests

Do we still use these things today? Put a tick next to the picture if we do and a cross if we don't.

Name .....

**In your team try to find all of the answers as quickly as you can, before any of the other teams do.**  
You need to look around all of the Speed to the West area including the posters and the display cases.

Which **D** is described as 'glorious'?

.....

Which **R** is described as 'Cornish'?

.....

Which **C** is the 'gem of sunny Somerset'?

.....

Which **M** is the 'gateway to Exmoor'?

.....

Which **T** are holiday makers encouraged to travel by?

.....

Which **W** is one season to visit Cornwall for mild weather?

.....

Which **S** does Cornwall have lots of?

.....

Which **N** is 'on the Cornish coast'?

.....

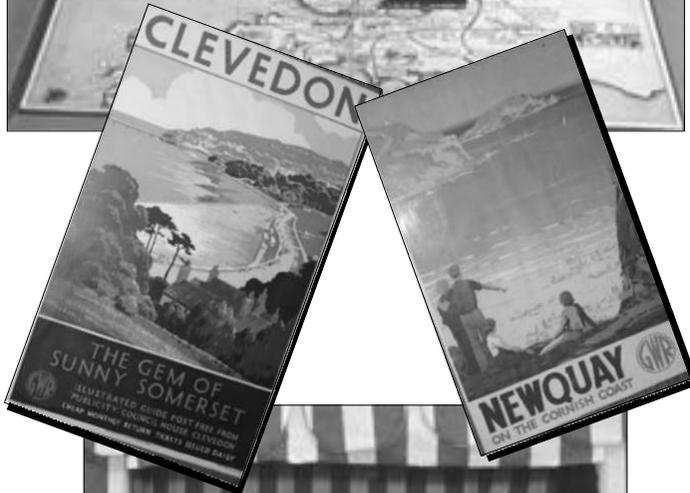
Which **J** did the GWR make for children to play with?

.....

Which **E** was the name for the Torbay and Cornish Riviera trains?

.....

Which **P** was the end of the GWR railway line from London Paddington to Cornwall?



.....

Which **S** is called St David?

.....

Which **L** has St Julien and Weymouth written on it?

.....

Which **T** did Swindon workers and their families go on every year in July?

.....

Which **P** goes with Judy?

.....

Which **W** was known as 'Swindon-by-the-Sea'?

.....

Which **B** can you see in a display case with shells and a swimming costume?

.....

Which **H** did the GWR build for holidaymakers to stay in?

.....

Which **S** was served in a tureen?

.....

Which **C** did the GWR provide in hotel rooms for their guests to use as a lavatory?

.....

Which **S** would you buy as a reminder of your holiday?

.....