



Find the electricity hotspots

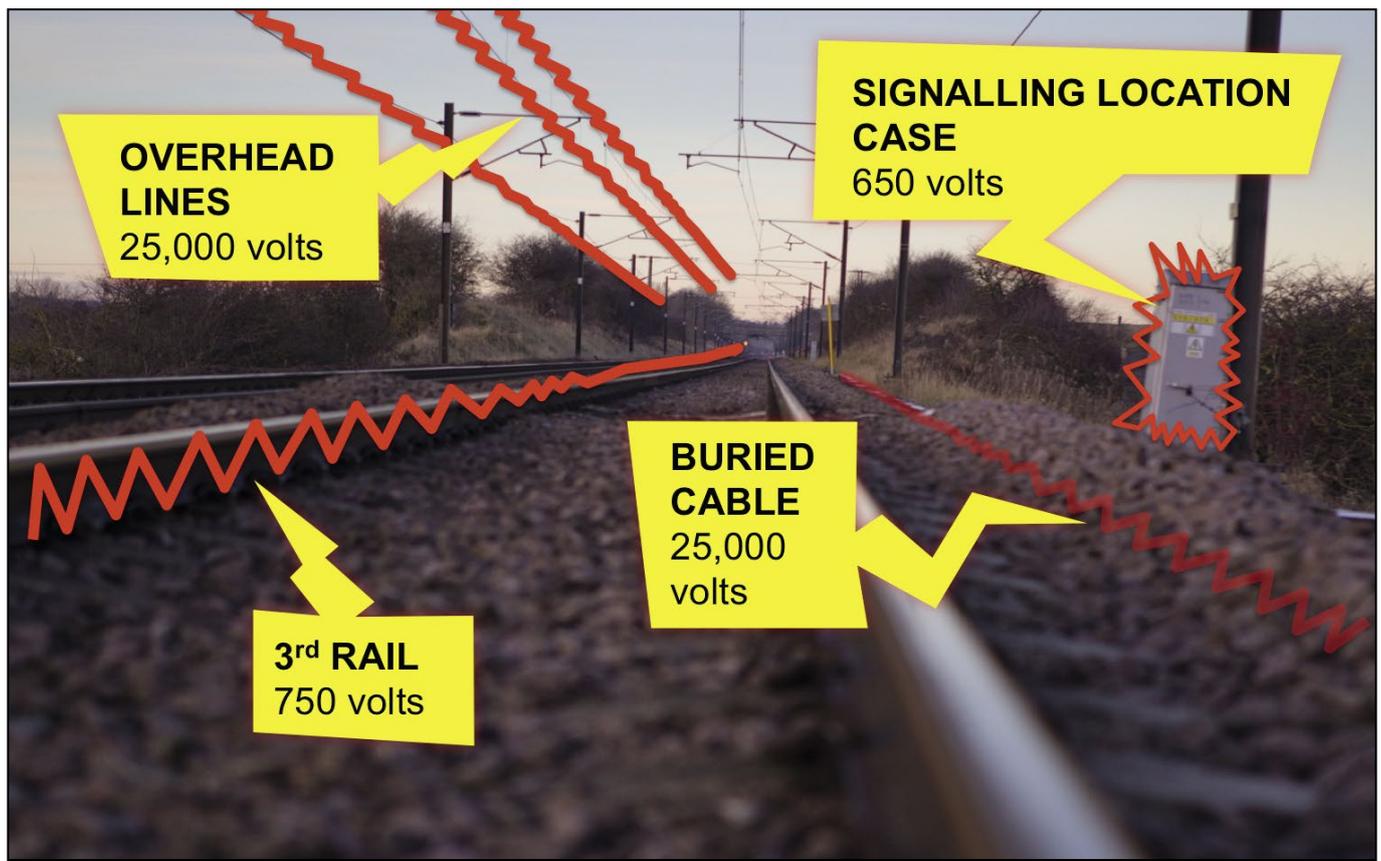
Here's a picture of the railway with overhead power lines.
Draw circles around where you think electricity can be found.



TURN THE PAGE TO
SEE IF YOU GUESSED
CORRECTLY



The answer:



RAILWAY ELECTRICITY IS 100 TIMES MORE POWERFUL THAN ELECTRICITY IN THE HOME.

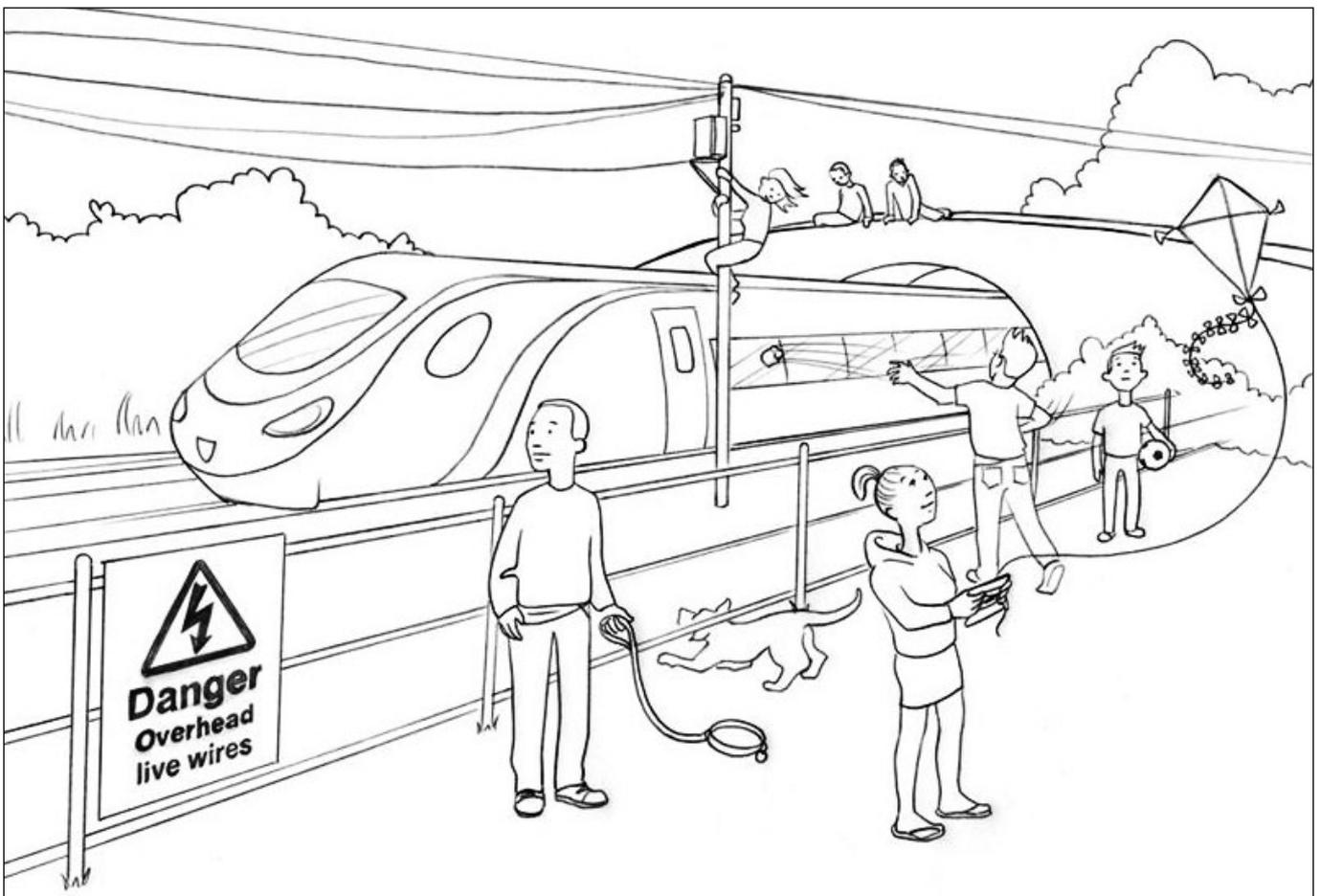
It is very dangerous so remember the **Rail Life 'Safety Top 3'**:

- **STAY CLEAR OF THE TRACKS.** Is it worth putting your life on the line?
 - electricity can jump up to three metres.
 - don't play with kites or balloons near overhead power lines.
- **USE THE LEVEL CROSSING.** Shortcuts across the railway can kill.
- **KNOW THE SIGNS.** Be alert to railway signs, they could save your life.



Spot the hazard

Have a look at this picture of a typical railway scene.
Circle all of the things you think might be dangerous.
Once you've done that you can colour the picture in!



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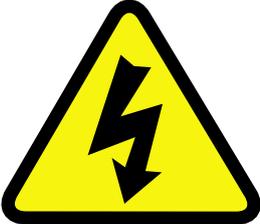
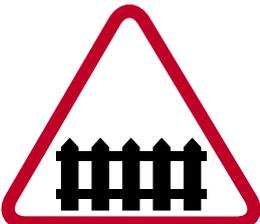
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Signs of danger

Electricity on the railway is very powerful and very dangerous. Have you ever seen the warning signs below? If you have seen them tick the small box. Have a think about what they mean and write it down in the space provided.

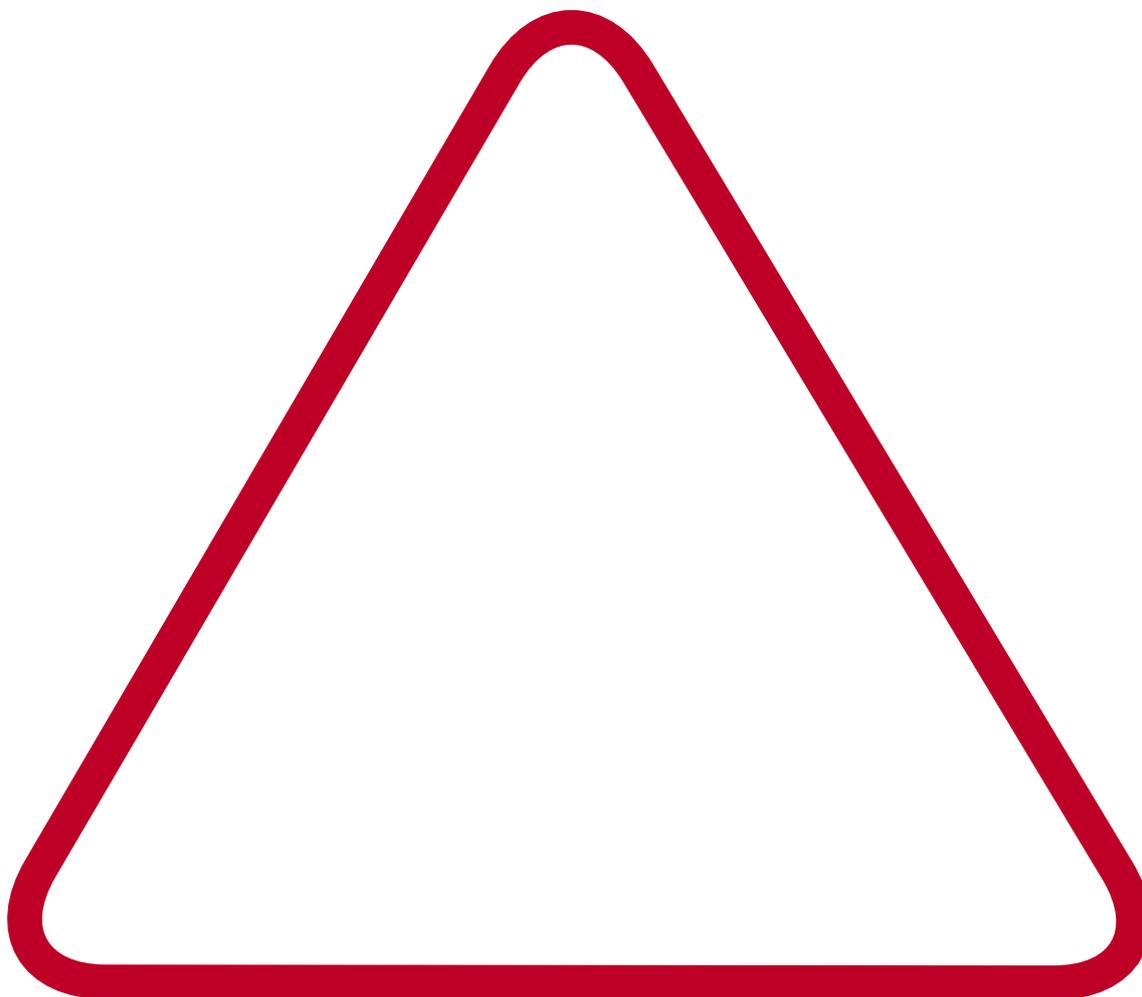
Sign	Seen it! Tick box	What does it mean?
		
		
		

Answers: 1. Electricity danger 2. Level crossing with gate or barrier ahead 3. Stop! (Light signal at level crossings for pedestrians).



Create your own sign!

Now draw your own sign to warn children and adults about the dangers of electricity on the railway.



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'Rail Life' is run by Network Rail. www.networkrail.co.uk/safetyeducation



The power jump

How high can people (and other things) jump?

Work in groups. One person holds up the tape measure (or another measuring implement) and the others jump as high up as they can. Each person then writes down their name and how high they jumped on the chart below. You can compare the height of the jump with other things that are tall or that can jump high!

My name:	How high I jumped (in cm):



Now, compare your jump with some other dizzying heights!

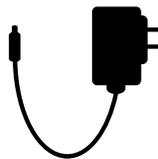


Now look at these objects which are powered by electricity:

TV



Mobile phone charger



Desk lamp



See if you can guess which one uses the most electricity. And which one uses the least. Write your answers here:

Uses the most electricity:

Uses the least electricity:

Now check the correct answers at the bottom of the page. How did you do?

Answers: A TV (42" HD) carries 240 volts (i.e. it uses the most electricity). A mobile phone charger carries 24 volts (i.e. it uses the least electricity). A desk lamp (with 60 Watt bulb) carries 120 volts.



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Key dates in the history of Britain's railway

Great Britain was the first nation to use steam locomotives, and Britain's railway is the oldest in the world.

The arrival of the railways contributed to the dramatic growth of industrialisation in the nineteenth century and massive social and economic change. The population increased, and the growth of industrial manufacture led many people to move from the countryside to the towns.

Alternative means of transport – the canals and roads – were not sufficient to meet the needs of the new industry. The railway filled this gap, developing rapidly alongside new means of producing iron and steel for construction, using more efficient steam locomotives. Today, the railway is being modernised again with improvements to major stations, upgrades to track and signalling and key routes being electrified.

DID YOU KNOW?

Brunel's walking stick was especially made to unfold to 7ft ¼ inch (2.14 metres) at the flick of a wrist. This was the width of his broad gauge railway track and enabled him to check whether it was being dug to the correct width.

Timeline

1804 The first successful steam locomotive (Richard Trevithick's Penydarren) runs on wheels and is used to transport iron across nine miles of track.

1807 The first passenger-carrying public railway is opened by the Oystermouth Railway. It uses horse drawn carriages on an existing tramline.



1812 The first successful steam powered commercial locomotive – the Salamanca – is built by John Blenkinsop and Matthew Murray for the Middleton Colliery Railway.



1825 The first public railway in the world to use steam power is opened at the Stockton and Darlington Railroad by George Stephenson. The railway moves 36 wagons of his steam-powered coal train 'Locomotion' across nine miles of track in two hours.

1829 George and Robert Stephenson's locomotive, 'The Rocket', sets a speed record of 47 km/h (29 mph) at the Rainhill Trials held near Liverpool.



1830 Robert Stephenson's 'Invicta' powers the first railway to run regularly scheduled passenger services in the world, linking Canterbury to the seaside town of Whitstable six miles away.

1838 The Great Western Railway from Paddington to Maidenhead, engineered by Isambard Kingdom Brunel, opens.



1840s Rapid expansion of the railway sees the first large-scale merging of several railways to form a single company.



1883

Britain's first electric railway opens in Brighton. It's the oldest in the world and is still operating! The inventor Magnus Volk was an engineer who grew up in Brighton and enjoyed experimenting with electricity. He was the first person in Brighton to have electricity in his house! The railway opened on 4 August 1883 and ran for over a quarter of a mile along the seafront.



1902

Automatic signalling makes its first appearance between Andover and Grateley.



1904

The first electrified suburban railway line was opened between Newcastle and Benton.

1914

First World War breaks out and the Government takes over the running of the railway until 1921, when the private railway companies regain control.



1921

An Act of Parliament is passed, merging 123 railway companies into just four: the Great Western Railway; London Midland and Scottish Railway; London and North Eastern Railway and Southern Railway.

1940

During the Second World War the rail companies effectively operate as one organisation to help Britain's war effort.



1947

The railways are nationalised to form 'British Railways' under the Transport Act.



1950s

Modernisation programme as diesel and electric trains are introduced to replace steam trains.

1960

The railways are re-organised with many secondary routes and branch lines closed to allow the network to make money.



1970s

Introduction of the high-speed diesel-electric Intercity 125 trains.



1990s

British Rail is broken up and Railtrack is created to run all tracks, signals and stations. Private companies start to run trains on many of the routes.

1994

The Channel Tunnel opens, beginning a rail service between London and Paris.



2002

Network Rail buys Railtrack and takes on its responsibilities.

2011

The number of rail journeys in Great Britain between 2010 and 2011 reaches a record 1.16 billion.

2013

Britain's railways are now the second safest in Europe (after Luxembourg) and Network Rail is delivering a major modernisation programme including electrification of key national and local routes.



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Power up! maths quiz

Here's a maths quiz about things in, and outside of, the home that are powered by electricity – you're a real bright spark if you get all of them right! Have a go!

Q1: A TV can carry up to 250 volts.

How much greater is the voltage running through the overhead lines than running through the TV?

.....

Q2. An Xbox console carries 232 volts.

A railway electrical substation carries 132,000 volts – what's the difference in volts between the Xbox and the substation?

.....

Q3. A mobile phone charger carries 24 volts.

The electrified third rail carries 750 volts – what's the difference in volts between the charger and the rail?

.....

Q4. How many times more powerful are the electrified overhead lines (25,000 volts) than the electrified rail (750 volts)?

.....

Answers: 1. Approximately 100 times greater voltage 2. 131,768 volts 3. 726 volts 4. 33 times.



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Whose choice is it?

Sometimes we can make decisions quickly and clearly. At other times we might think for longer and seek advice, particularly in a new or confusing situation. It can be difficult to know when to be confident about your own opinion when other people have different ideas! This exercise will help you to understand your approach to making decisions.

1. Think about what kind of ‘decision maker’ you are.

When you have to make a decision, what is most important to you?

- a. Making sure I look at all sides of the argument.
- b. Getting it over and done with as quickly as possible.
- c. Keeping other people happy.

2. When it comes to making decisions, which one of these types of character is most like you?

Mr or Miss Independent

I tend to know my own mind. I’m pretty confident and clear about what I think. I sometimes need to make sure I listen to other people and take their views on board – but I know my own limits and how to stand up for myself.



In the Mix

I can dither a bit and worry about making a decision. I know it’s good to spend time weighing up the pros and cons. I need to listen to myself and trust my own inner voice.



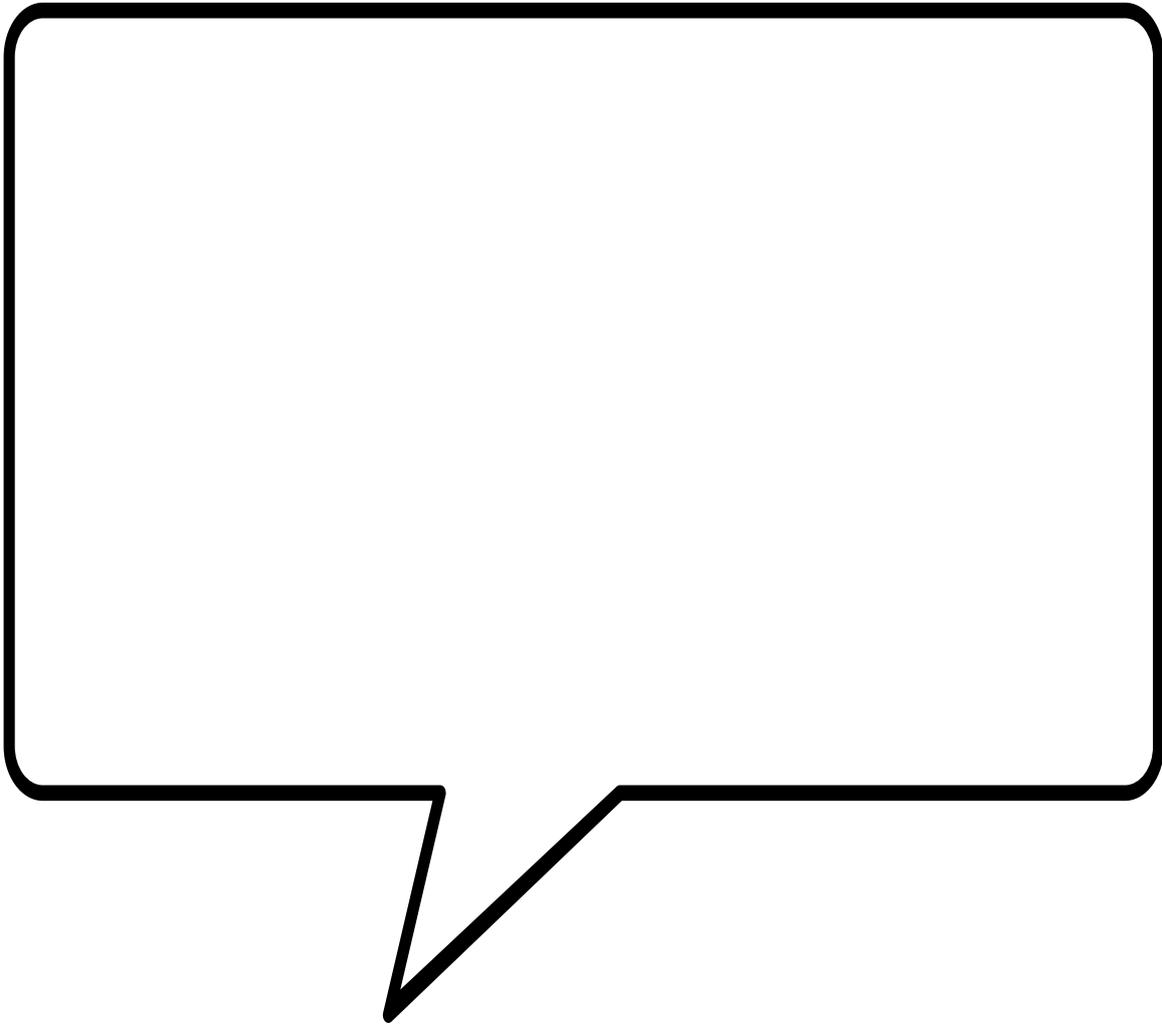
The Butterfly

I’m enthusiastic and fun to be around. I like to go along with the crowd – but it can sometimes get me into trouble. Sometimes I should slow down a bit, and think before I take the plunge.



4. What advice would you give to a friend who was being pressured into playing by the railway when they didn't want to?

Write down in the speech bubble what you would say to persuade your friend to stay safe and not take a risk.



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