

Calling all  
Derby City School Children -  
It's Competition Time!

# Design a Train of the Future!

Can you design a Train that is Sustainable and Green? Would you like to win fantastic prizes for you and your school?

## Now is your chance!

**The Challenge:** Design a poster of your futuristic train and write a summary of the train's features with a focus on what makes it Green. Your train must run on Renewable Energy. You can name your train and remember to make it stand out with plenty of colour. You can choose to design it on paper or using a computer or tablet.

## Prizes:

**First Prize:** An individual £50 Amazon Voucher and a £250 voucher for your School to purchase STEM Equipment.

**Second Prize:** An individual £30 Amazon Voucher and a £150 voucher for your School to purchase STEM Equipment.

**Third Prize:** An individual £20 Amazon Voucher and a £100 voucher for your School to purchase STEM Equipment.

Competition entries must be  
submitted by 15th May 2020

All competition entries must  
be emailed to  
[Vision@porterbrook.co.uk](mailto:Vision@porterbrook.co.uk)

The winning entry will be featured on Porterbrook's website and all winning and runner up entries will be displayed on Learn by Design's Wall of Fame and Social Media. Runner ups who get their poster displayed online will also receive a certificate by post.

Now switch your imagination on  
and have some fun!

In association with

LEARN  
bydesign



# Design a Train of the Future! Competition Guide



**The competition is open to all children who attend a Primary or Secondary school in Derby. Only one entry per pupil will be accepted. There is no restriction on the number of entries received from schools.**

Each entry must include a creative poster designed on paper or made on a computer or tablet. The entry must be clearly labelled and include some wording to explain the train's features, with a focus on what makes it Green. The wording can be done by an adult on behalf of younger children.

**Submit your entry via e-mail to [Vision@porterbrook.co.uk](mailto:Vision@porterbrook.co.uk) no later than midnight on 15th May 2020.** Please include in your e-mail the child's full name, year group, school name and school address.

There will be three Winners. First Prize wins a £50 individual Amazon Voucher and a £250 Voucher for their School to purchase STEM Equipment. Second Prize wins a £30 individual Amazon Voucher and a £150 Voucher for their School to purchase STEM Equipment. Third Prize wins a £20 individual Amazon Voucher and a £100 Voucher for their School to purchase STEM Equipment.

**Winning schools will be notified in writing by 1st June 2020.**

Ten runners up will also be selected for their entry to be displayed on Learn by Design's website and Social Media.



porterbrook

## Who are Porterbrook?

Porterbrook has been at the heart of the UK rail network for over 25 years and owns almost a third of Britain's passenger trains. Over 1.5 million passenger journeys are made on Porterbrook trains every day and our trains travel almost 7 million miles each week (equivalent of travelling to the moon and back over 14 times).



## Who are Learn by Design?

We work on behalf of schools, corporate and public sector clients to provide quality, value for money, educational products and services to inspire future generations. To find out more about us and the organisations we work with please visit [www.learnbydesign.co.uk](http://www.learnbydesign.co.uk)

## Our future Derby

Our Future Derby aims to inspire children and connect primary schools in Derby with the world of work, helping businesses to engage with primary aged children and excite young people in the city around the types of careers that they may one day want to explore. This is an exciting project made possible with funding from Derby City Council supporting the Department for Education's Opportunity Area Programme.

**Terms & Conditions:** Porterbrook and Learn by Design reserves the right to reproduce and utilise in whole or in part the entries submitted by pupils for information, publicity and promotional purposes. By entering, each school agrees to secure parental agreement and authorises the use of names and addresses of the establishment to which it belongs and the names of participating teachers and pupils in any information, publicity or promotional activity linked to this competition. Entering this competition implies full and complete acceptance of these terms and conditions of which entry instructions form a part. Promoter: Learn By Design, 49 Kepler, Tamworth, Staffordshire, B79 7XE

# Design a Train of the Future!

## Useful Facts

### Sustainable? What does that mean?

We use the term 'sustainable' to describe the way we use natural resources when this use is kept at a steady level that is not likely to damage the environment.

Examples of natural resources are:

- Air
- Wood
- Natural gas
- Iron
- Coal

**Earth's precious resources are valuable and should not be wasted.**

### Green you say? No, not the colour! But what does green energy mean?

It means clean energy that doesn't harm the Earth or give out harmful gases.  
Remember Green energy means energy which is clean!

**Green means clean!**

### What is Non-renewable Energy?

We burn coal, oil and natural gas to generate energy. These non-renewable energy resources are still commonly used, but will eventually run out. Most importantly they produce lots of pollution as they are burnt which leads to climate change.

### What is Renewable Energy?

Rather than burning coal, oil or natural gas, which will eventually run out, we do have some alternatives...

**Sun, Wind, Waves, Geothermal Heat and Hydrogen!**

We can use renewable technologies, such as wind turbines and solar panels, to generate electricity. These will not run out and are better for our planet.

Renewable energy resources release far less pollution than non-renewables, so avoid contributing further to climate change.

## Task: Match the words on the left to the descriptions on the right

Hydrogen Fuel Cell

Energy from a source that nature will not run out of like wind, water and sunshine.

Sustainable

Clean energy as it doesn't pollute the air or the water.

Green Energy

Hydrogen and oxygen are combined to produce electricity, heat, and water with no harmful gases being made.

Renewable Energy

Energy that is made from burning coal, oil and natural gas. These resources will eventually run out and produce lots of pollution as they are burnt.

Non-Renewable Energy

When chemicals and gases mix with the air and cause the Earth, Humans and Animals harm.

Air Pollution

Able to continue for a long time causing little or no damage to the environment.

# Sustainable Trains Fact File

**Hydrogen and Electrical Trains are better for the environment as they lessen air pollution.**

Pollution happens when harmful gases get mixed with the air we breathe. Experts believe that it can affect people's health. We all need to be concerned with air quality as it can affect our breathing.

**Hydrogen Trains only produce water and no harmful gases. This means that no pollution is created.**

Rail Travel is one of the Greenest forms of transport, as Trains emit the lowest carbon gases out of all transport – less than 0.6% of the UK total emissions! We want this lowered even further to make it better for the Environment

The Government are investing 48 Billion Pounds into enabling cleaner, more efficient journeys. That's 9 zero's after 48!  
48,000,000,000!

This sustainable upgrade is being done by replacing Diesel Trains with Hybrid and Electric Trains.

## The HydroFLEX

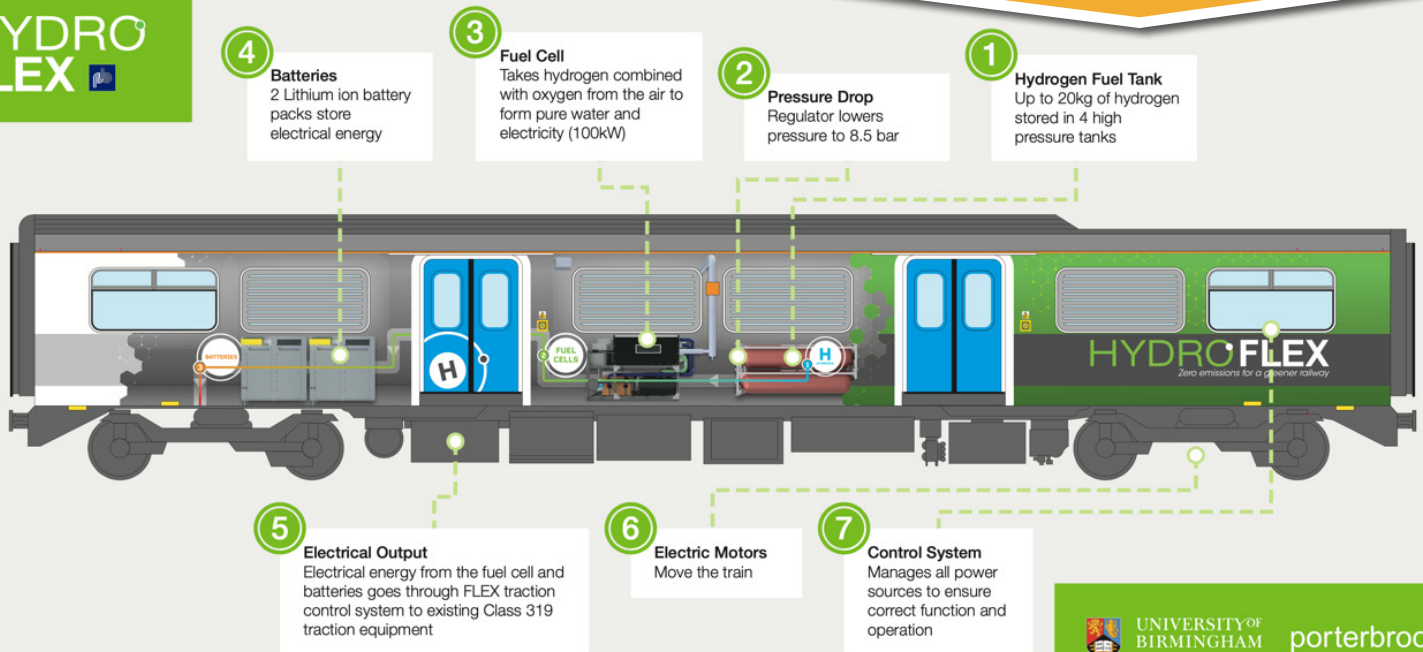
Porterbrook teamed up with the University of Birmingham to invent the HydroFLEX Train in just 9 months!

This was the first project in the WORLD to fit Hydrogen Technology onto an existing train

- The HydroFLEX has zero bad emissions, so no carbon fumes are let out.
- A hydrogen fuel cell combines hydrogen and oxygen to produce electricity, heat, and water. Fuel cells are often compared to batteries. Both convert the energy produced by a chemical reaction into usable electric power. However, the fuel cell will produce electricity as long as fuel (hydrogen) is supplied, never losing its charge.
- This new technology can be used on buses and other vehicles in the future!

**Take a sneak peak inside the HydroFLEX Train.**

**HYDRO FLEX**



UNIVERSITY OF BIRMINGHAM

porterbrook

## Let's play a quick Quiz!

Can you spot the Hydrogen Fuel Tank?

How many battery packs are needed?

What are the electric motors for?