The Great *Exhibition* AT HOME

Welcome to the Great Exhibition at Home Challenge. Inspired by the Great Exhibition of 1851, we are exploring how engineers can help protect the planet.

This is the start of a 7 week STEM adventure. You can keep all the exhibits that you create in the first 6 weeks to display in your Great Exhibition at Home in week 7 – they may even feature in your challenge video!

Start by reading our introductory pages and then use the printable worksheets to take up the challenge! Each week, learn about 1 invention from the original Great Exhibition and 1 inspiring engineer from 2020, then take part in exciting engineering challenges.

Contents

INTRODUCTION

TAKE UP THE CHALLENGE

What was the original Great Exhibition all about?

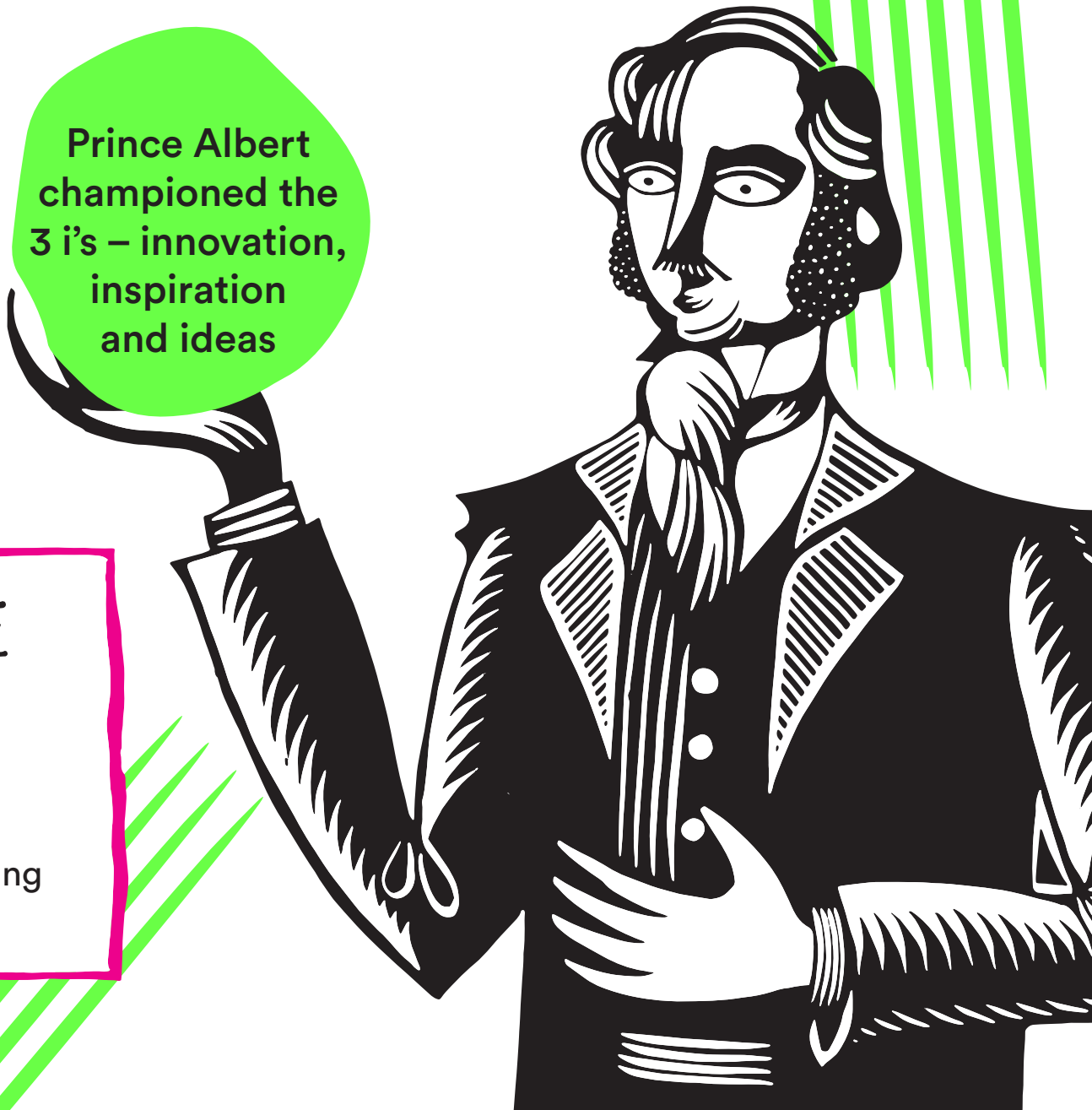
In 1851, The Royal Commission, led by Prince Albert wanted to celebrate the global advances of the Industrial Age within the context of the British Empire and amongst the wider international community.

They decided to organise a worldwide showcase of modern technology, industry and design to be judged as part of a huge competition, named The Exhibition of the Works of Industry of All Nations, or The Great Exhibition.

Not only did they hope that such an exhibition would show that Britain had some of the leading engineers and innovators in the world, but also that the international exhibits would inspire and educate British manufacturers and the British public.

As the original World Trade Fair, The Great Exhibition is now considered one of the most memorable and influential cultural events of the 19th century.

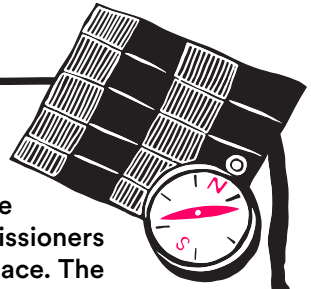
Prince Albert championed the 3 i's – innovation, inspiration and ideas



PRINCE ALBERT FACT FILE

- Born in Germany ***26 Aug 1819***
- Married to ***Queen Victoria***
- ***Loved photography***, Prince Albert's portrait from 1842 is the earliest surviving photograph of a royal family member

Albert's Ingredients *for making a Great Exhibition*



LOCATION, LOCATION, LOCATION!

There were no existing buildings large enough to house such a huge exhibition, so Prince Albert and his commissioners ordered the construction of the astounding Crystal Palace. The enormous glass structure was inspired by a greenhouse and designed by english gardener, Joseph Paxton. The entire Crystal Palace was erected in Hyde Park in under 5 months, an impressive feat of engineering. At 1,848 feet long, equivalent to 51 London buses, it became the largest building in the world at that time!

WORLDWIDE WONDERS

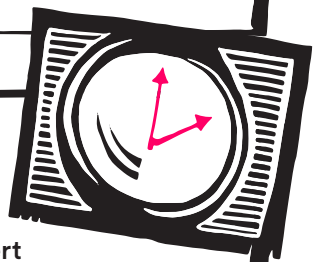
Such an amazing space needed plenty of exhibits to fill it. By the opening ceremony on the 1 May 1851, over 100,000 exhibits from 13,937 exhibitors had been transported across land and sea from all over the globe. From a British printing press to a Canadian fire engine, guests to the Great Exhibition could marvel at materials, industry and inventions from far and wide. They were composed of four categories – Raw Materials, Machinery, Manufactures and Sculpture and the Fine Arts.

CURIOUS CROWDS

More than six million people – equivalent to a third of the entire population of Britain at the time – visited the exhibition during its opening period between 1 May and 11 October 1851. The Exhibition attracted an average daily attendance of 42,831 with a peak of 109,915 visitors on 7 October 1851!

ENGINEERING A BETTER WORLD

Visitors to the Great Exhibition marvelled at the cutting edge technology displayed, which hoped to revolutionise Victorian living. Prince Albert wanted his Exhibition to demonstrate how forward-thinking Britain was in 1851. He wanted to show how curiosity, research and progress could engineer a better world.



BUILDING A LEGACY

The Exhibition was a great success, making a profit of £186,000 (equivalent to £159 million today)! Prince Albert and his Commissioners used this money to buy a large plot of land in South Kensington, at the time it was a market garden, and establish a cultural quarter in London. Nicknamed 'Albertopolis' by The Times, this iconic site still remains today. It includes world famous institutions such as The Royal Albert Hall, the Natural History Museum, the Science Museum, the V&A, as well as Imperial College London, the Royal Colleges of Art and Music and many more.

Introduction to engineering

The engineers of the Great Exhibition in 1851 hoped their inventions would influence the future. This is still the case for engineers today.

Engineers find solutions to problems, make things work and then make them work better. They apply Science and Maths to find solutions and use practical skills that can be learnt in Design and Technology to achieve this. Engineers need to be problem finders and solvers, think creatively and work well in a team. They can adapt their ideas and learn by making mistakes. Engineering is diverse and cutting edge. Engineering shapes the world around us.

To learn what engineering really looks like visit
thisisengineering.org.uk

Here are some examples of the types of engineers who are working to create a better world:

MATERIALS ENGINEERING

As a materials maker you shape the products of the future. Working in manufacturing and materials engineering, you could work out how to get the best out of all the materials available to us in the greenest way possible, turning raw materials into finished products. ***Meet our engineering trailblazer Lucy in week 6.***

MECHANICAL ENGINEERING

As a mechanical marvel you keep the world in motion. You could work in the field of mechanical or biomechanical engineering. Your work might involve anything from designing Formula 1 cars and building planes to creating artificial heart valves and developing prosthetic limbs. ***Meet our engineering trailblazer Halvard in week 5.***

CHEMICAL ENGINEERING

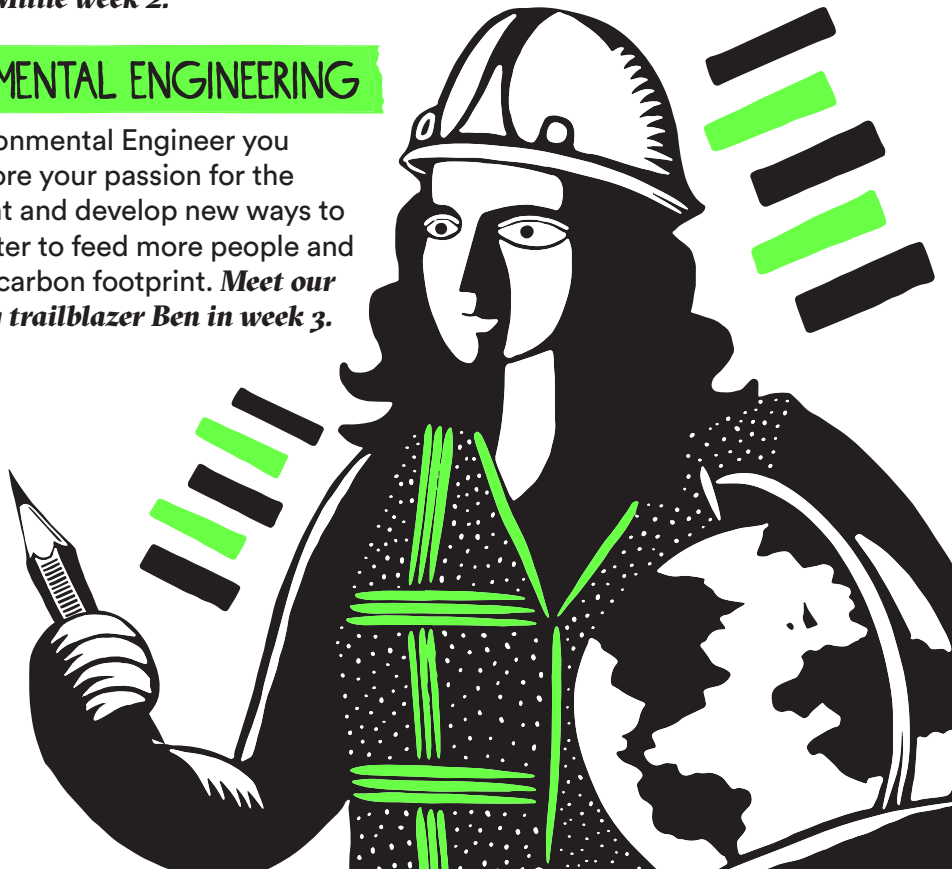
As an electron pioneer you improve every element of everyday life and turn raw materials such as oil into everyday products such as smartphones. You could be solving problems on a chocolate production line, creating new technologies to combat air and water pollution. ***Meet our engineering trailblazer Enass in week 4.***

CIVIL ENGINEERING

As a civilisation saver you create the cities of the future. You could use your civil and environmental engineering skills to keep us safe from flooding, design transport systems and construct hospitals, schools and sports arenas, while minimising the impact on our environment. ***Meet our engineering trailblazer Millie week 2.***

ENVIRONMENTAL ENGINEERING

As an Environmental Engineer you would explore your passion for the environment and develop new ways to use less water to feed more people and reduce the carbon footprint. ***Meet our engineering trailblazer Ben in week 3.***



1851*der* Worksheet 1: *The Yacht Piano*

There were all manner of inventions, exhibits and curiosities shown inside the Crystal Palace at the original Great Exhibition - in fact there were more than 100,000 exhibits!

These inventions were cutting edge for their time and sought to revolutionize Victorian living.

Whatever the size of your yacht, it is not complete without a piano, or so William Jenkins, a British inventor and manufacturer, thought. His answer was to produce a folding piano complete with collapsible keyboard to squeeze into tight spaces such as a yacht, saloon or 'ladies' parlour'.

The clever design was exhibited at The Great Exhibition and inspired the manufacture of other Yacht Pianos to be stocked in London department stores. The first record player wasn't invented until 1877 so in 1851 musical instruments were an important source of entertainment – even at sea.

Take up the challenge!

Yacht pianos kept wealthy Victorians entertained. Today yachts are being used by climate campaigners, including Greta Thunberg, as way to travel between continents. But what about places that aren't near the sea?

Can you think of new and exciting ways to travel on land which don't harm the environment? Try drawing or writing about your ideas, you may even want to test them yourself – can you travel from one side of the room to the other in an innovative way?

On the next page, meet an engineer who is finding ways to harness human travel to help combat climate change…

Laurence Kemball-Cook

Laurence founded Pavegen after graduating from Loughborough University. Since then his invention, which converts people's footsteps into energy, has captured over 1/2 billion footsteps.

What is Pavegen?

Pavegen is a smart flooring system which harnesses the kinetic power of people's footsteps and converts it into off grid energy and personalised data.

How does it work?

As people step on the top surface, their weight causes generators underneath the tiles to rotate, creating off-grid power via electromagnetic induction. Electromagnetic induction involves magnets moving around a coil of wire to create an electrical current. All magnets have a south pole on one end and a north pole on the other end. Poles which are the same repel and push away from one another whereas opposite poles attract, pulling towards each other. By alternating push and pull at timed intervals the magnets will rotate around the coil of wire producing an electrical current. It is this energy that can be harvested to power things such as lights!

Pavegen walkways also have integrated Bluetooth sensors built into their tiles that capture and analyse data such as the number of steps and energy harvested.

How can Pavegen be used?

Pavegen has been installed over 200 times around the world, helping big and small communities with LED lighting, environmental sensors, and charitable donations from footsteps.

In 2019, Pavegen built an energy-generating running track in a Hong Kong office building. This meant that workers exercising during the day could help to power lights inside the office from their steps.

How can Pavegen help the environment?

Not only are we running out of non-renewable energy sources such as fossil fuels, but changing our everyday behaviours to combat global warming with renewable energy is harder than ever. Consequently finding alternative ways to generate energy and change our habits takes a long time. Pavegen offers a smart energy that puts people at the heart of its technology, empowering citizens to make their city greener.

NOW IT'S YOUR TURN

Can you think of a new way to generate renewable energy? Would it utilise weather, humans or machines?

Get ready for week 2, where you can discover another inspiring engineer, intriguing inventions and extra challenges!

1851*der* Worksheet 2:
Tempest Prognosticator or Leech Barometer

This invention exhibited at The Great Exhibition by George Merryweather used live leeches to predict the weather.

It worked by keeping twelve leeches inside twelve small bottles inside the device. When the leeches became agitated by an approaching storm they would attempt to wriggle up and out of the bottles, dislodging a piece of whalebone and triggering a small hammer to strike a bell. The likelihood of a storm could then be predicted by how many times the bell was heard.

We may not use leeches in this way in the 21st Century, but predicting weather is just as important today. Engineers are working hard to find solutions to the complicated problems that extreme weather, caused by Climate Change brings to our communities. Learn about an inspiring engineer who is doing just that on the next page...

TAKE UP THE CHALLENGE!

Engineers are curious about the world around them. They make observations and use them to design innovative systems to solve problems. Think about George Merryweather:

1. He observed that leeches appear to become agitated before a storm

2. He tested his theory by observing and recording the leeches behaviour

3. He engineered a contraption which could utilise his observation

4. He built the leech barometer

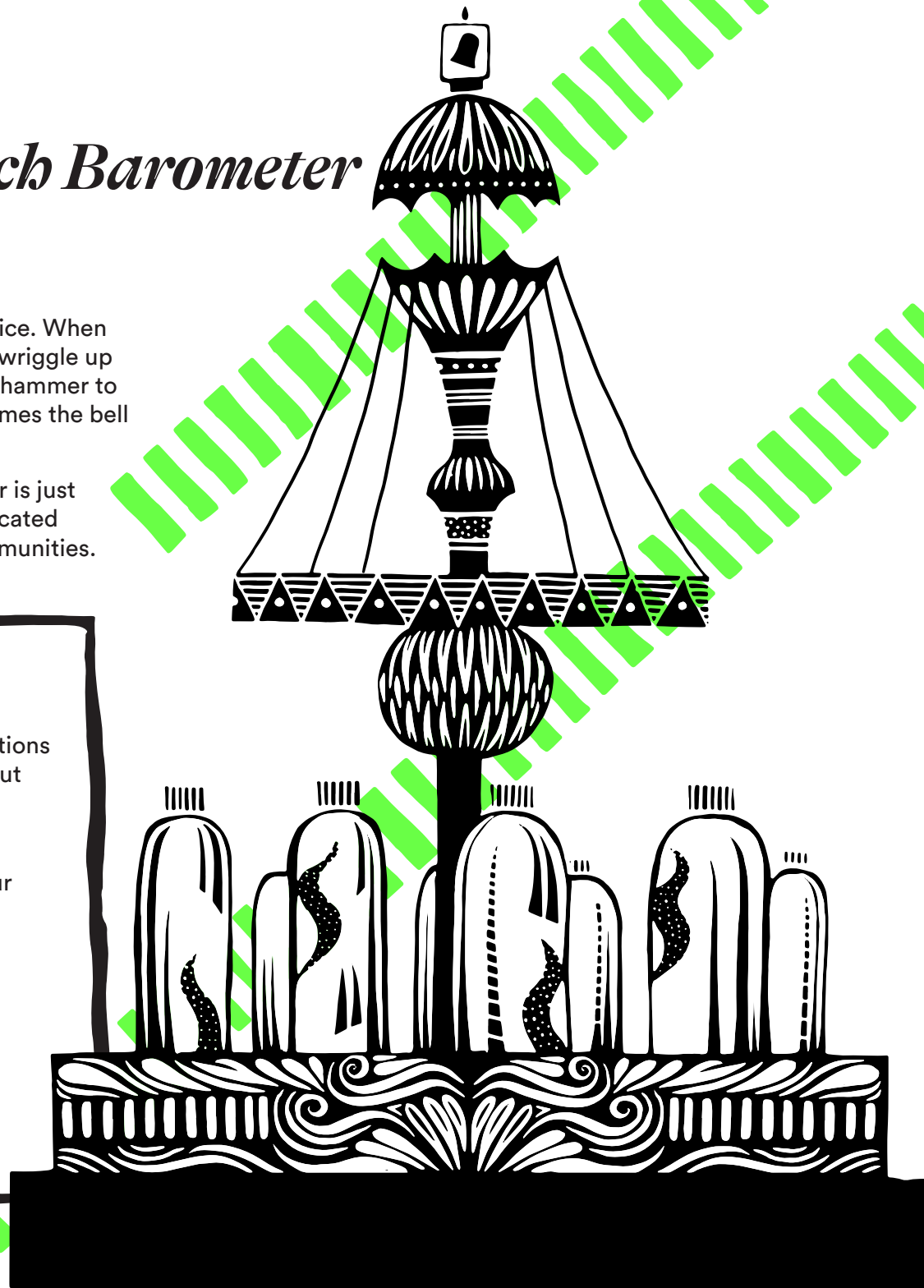
Follow these 4 steps to design your own invention:

1. Make an observation

2. Test your theory

3. Design a contraption

4. Draw or build a model



Milly Hennayake

Milly is a civil engineer who is passionate about using her skills to keep communities safe. Milly grew up living in Sri Lanka and the UK before going on to study Civil Engineering at the Unversity of Cambridge. She is now a civil engineer in the water engineering team at Arup.

What does Milly do as a civil engineer?

Milly works with other experts to manage flood risk to communities. As part of this, she designs drainage systems to stop water from building up, keeping people's houses safe and dry even after big storms. While doing this she ensures that her designs leave a minimal impact on the environment. In fact, Milly works with nature: from rivers and lakes, to trees protecting river banks to manage rainwater in storms.

Why did Milly get into civil engineering?

Milly didn't always know she wanted to be an engineer. Growing up she considered going into medicine like her parents, however, she decided to pursue civil engineering when she realised that she would be able to make real impact on people's lives and the world around her.

Milly began by volunteering for a charity called Engineers Without Borders UK. It was here she discovered the ways in which engineers work in developing countries to help people access clean water and improve health with safe sanitation and drains, among many other things.

Why is Milly's work important for the planet?

With extreme weather conditions worsening around the world, it is so important that engineers work together to keep our homes safe. As global warming causes ice caps to melt, our sea levels are rising meaning the risks of flooding are higher and Milly's work is becoming ever more important. Finding clever ways to work with nature and live alongside this weather without disruption will help us all live comfortably.

Learn more from Milly at ***bit.ly/2ThzK76***

NOW IT'S YOUR TURN

Can you design and/or create a flood proof house? Think about the land around it, the material it's built from and how you can use nature to help you. You may even want to create a model and test it in your bath or sink!

Get ready for week 3, where you can discover a comical invention, a new inspiring engineer, and exciting challenges!

1851*der* Worksheet 3: *The Comical Creatures*

Some of the inventions exhibited at the Great Exhibition were more curious than others!

A particularly strange exhibit found within the Crystal Palace was by German taxidermist Hermann Ploucquet. Visitors to the exhibition could peer at a display of stuffed animals doing distinctly human things, such as a frog carrying an umbrella, a pair of sword fighting mice and hedgehogs on ice skates! The display captured the imagination of the Victorians and even Queen Victoria herself described Ploucquet's display as "really marvellous".

TAKE UP THE CHALLENGE!

Unfortunately even being able to sword fight wouldn't save animals from extinction in today's climate. See if you can find out more about different animals who are finding it increasingly hard to survive on the planet. Make a display or poster about the animal that interests you most and raise awareness of the challenges that it faces, can you think of any ways that engineers can help?

Ben Crowther

Ben is a young engineer from Reading who is passionate about the environment. After studying engineering design at the University of Bristol he co-founded LettUs Grow with two friends from university who were equally passionate about reducing food waste and C02 emissions.

What is LettUs Grow?

LettUS Grow is a company who have developed a new method of farming which uses less water, needs no pesticides and can be set up anywhere in the world: from cities to deserts.

How does it work?

Instead of growing plants in soil, LettUs Grow cover the roots of their plants in a mist filled with nutrients. This means the plants need 95% less water to grow than traditional agriculture!

This unique style of growing means the beds can be placed under a light source of either the sun or LED lamps so it can be used in greenhouses or basements. The system dramatically reduces the operational cost of indoor agriculture, whilst delivering an average of a 70% increase in growth rate across a range of crop species.

How can LettUs Grow help the environment?

This new style of farming helps to address some of the biggest environmental concerns facing our world – CO2 emissions, waste, ecosystem collapse and food security.

Due to our growing population food production needs to increase by 70% by 2050 to feed the nearly 10 billion people living on earth. As a consequence we must find new ways to grow food with less land and an unstable climate. LettUs Grow's methods are more efficient and sustainable than current methods and encourage people to grow their food locally rather than having food travel to get to plates.

NOW IT'S YOUR TURN

Can you try growing something of your own? You don't need soil or a garden to do this. Like Ben you can grow indoors too – follow our simple guide to growing cress in your home.

1. Get your parent or guardian to help you order some cress seeds online

2. Find a punnet, tray or egg box – this can be a great way to reuse and recycle

3. Line your container with wet kitchen roll or cotton wool and evenly sprinkle the cress seeds on top

4. Cover with cling film and place on a warm windowsill where it can access full sunlight

5. Keep an eye on your seeds, if they seem a little dry add small amounts of water. After about 5-7 days the cress shoots should be reading for harvesting. Snip off the shoots using a pair of scissors and add them to your sandwiches!

If you are not able to grow in your home why don't you try designing your own contraption which grows food more efficiently. How would it work and what would it grow?

Learn more from Ben at ***bit.ly/3asHglv***

Come back to discover week 4 – learn about a truly unique 1851*der*, our next inspiring engineer, and an extra special challenge!

1851*der* Worksheet 4: *The Stereoscope*

The stereoscope was an exciting new device for viewing photography. It transformed 2D pairs of images into 3D images before the viewer's eyes. The 'original' virtual reality.

The original stereoscopic apparatus was invented in 1838 by Sir Charles Wheatstone, however it was not until the Great Exhibition that stereographs gained international recognition and became a real craze with the Victorians! Queen Victoria was said to be a great fan and was greatly impressed by the Stereoscope display by Jules Duboscq, a pioneering French photographer at the Great Exhibition. Stereographs of inside the Great Exhibition still exist today and allow us to imagine what it might have been like inside the Crystal Palace.

The stereoscope helped to share the wonders of the Great Exhibition with Victorians who couldn't be there in person. Your Great Exhibition video will do the same - how will you make your exhibits as engaging as possible for people who may not be able to see them in person?

How to create a stereograph for static subjects

When the subject of your image is still, taking a stereoscopic photo is very simple. Two photographs need to be taken from slightly different perspectives, ideally offset by the same distance as your pupils (about 63mm). The simplest way to do this is the one-legged method which is as follows:

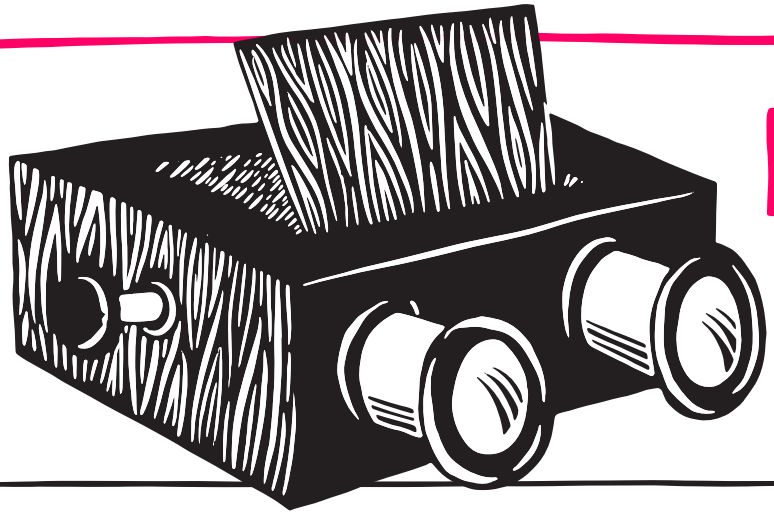
- Stand with the camera pointed at the subject of choice and transfer the weight of your body to one leg
- Click the shutter
- Keeping the camera pointed at the subject, transfer the weight of the body on to the other leg Click the shutter again
- This manoeuvre is the easiest way to capture two view of your subject from roughly the same distance apart as eyes.

For Moving Subjects

Creating a stereoscopic image of a moving subject is a little bit more difficult, but certainly doable. For this you will need two cameras (phone cameras may be easiest for this method).

- Stand facing your subject
- Take the two cameras (or mobile phones) and line each camera lens up with one of your eyes
- Click the shutter of both cameras at the same time

Once you have taken your stereoscopic photographs, please email them to **1851@big-ideas.org** to be in with a chance of featuring on the 1851*der* app!



TAKE UP THE CHALLENGE!

Create your own stereoscope! Research different stereographs from the 1851 exhibition and create your own stereograph inspired by the topic of the climate.

Dr Enass Abo-Hamed

Enass, is an activist, business woman and entrepreneur from Palestine. She co-founded H2GO, an engineering company developing new ways to store clean energy at the age of just 28.

What is H2GO?

H2GO power is an energy storage company that provides long term storage for renewable energy in the form of hydrogen. It provides an efficient and cost effective alternative to electrical and gas grid networks.

Why did Enass create H2GO?

During a trip to Africa when studying for her PhD, Enass realised how much of a luxury electricity was, with some hospitals only receiving power for 12 hours of the day, and households rushing to do all their cooking and reading while the electricity lasts. Enass saw this as a problem that engineering could fix, and in the process, help save lives and the environment too.

Why does the world need H2GO?

Over 1 billion people in the world don't have regular access to electricity. Being able to store energy for a long period of time allows people to keep a supply of energy to use when access fails. Without building new power stations or a power grid.

How can a hydrogen battery benefit the environment?

The only waste product of H2G0's hydrogen batteries is water. The waste products of many electricity sources are Carbon Dioxide and Nitrogen Oxide, which are toxic and contribute to global warming. Enass believes that there is 'scope for hope' in the future, her engineering work focuses on sustainable energy solutions that are accessible for everyone.

Learn more from Enass at ***bit.ly/2TBKSun***

NOW IT'S YOUR TURN

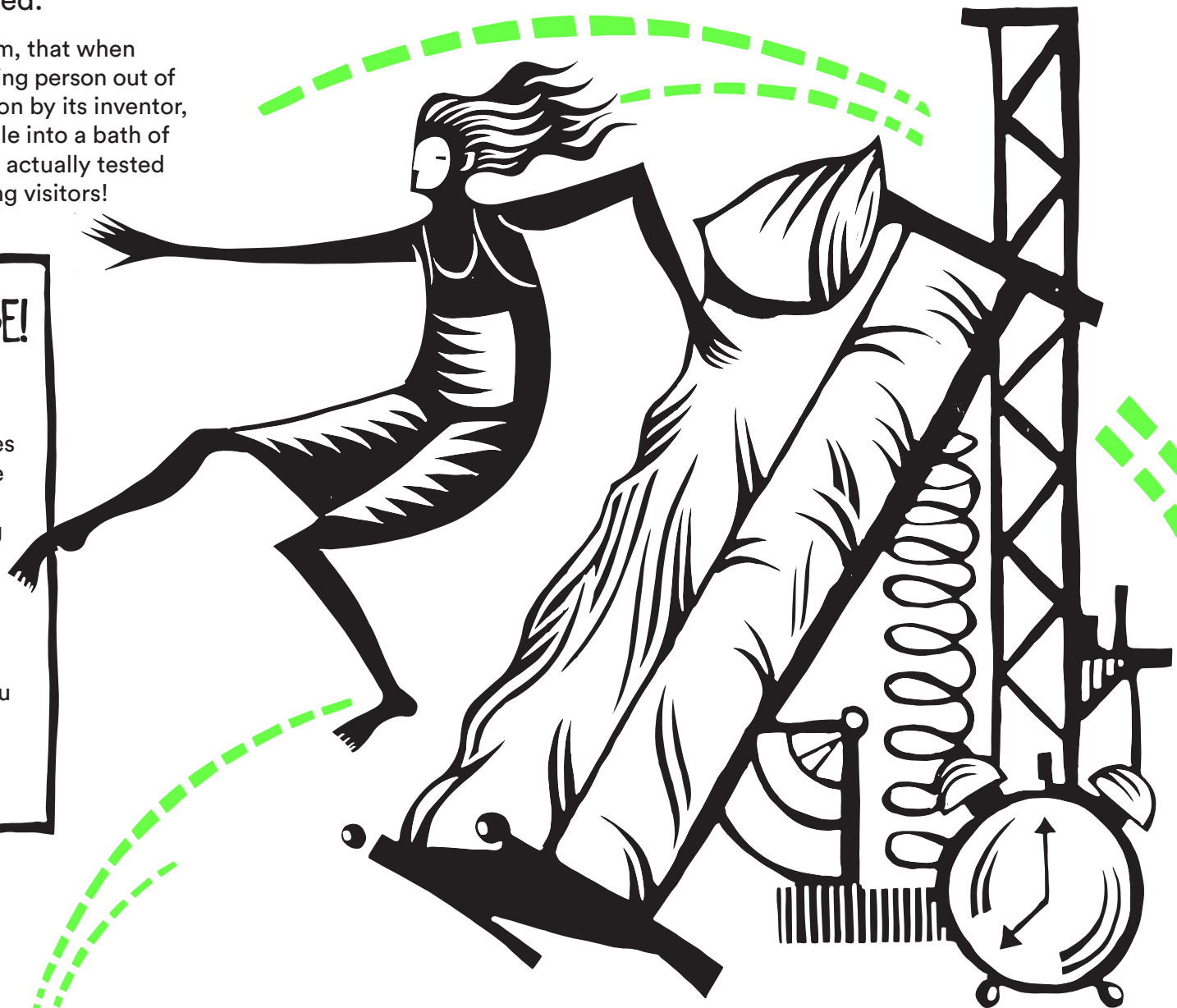
Can you identify a climate issue in another country and engineer a sustainable solution? Do some research and get designing!

Discover week 5, with a dynamic invention, futuristic engineer, and fun new challenges!

1851*der* Worksheet 5: *The Alarm Bed*

One of the most intriguing inventions at the Great Exhibition was a silent alarm bed.

This contraption worked through a mechanism, that when connected to an alarm clock would tip a sleeping person out of bed at a time of their choosing. One suggestion by its inventor, R.W. Savage, was that the bed might tip people into a bath of cold water. This slightly soggy method wasn't actually tested in the Crystal Palace – a relief for unsuspecting visitors!



TAKE UP THE CHALLENGE!

Although the Alarm Bed didn't take off, there are even more inventors in 2020 making weird and wonderful technologies to help improve our lives. Many of these gadgets can help us to be more eco-friendly day to day, for example a folding bicycle that helps people to drive less, or a reusable water bottle to cut down on plastic – all these things will have been designed by engineers.

Can you design a new gadget to help you be more eco friendly? Perhaps it would help you get to school, waste less food, or use less electricity.

Halvard Grimstad

Halvard is a robotics engineer from Norway. He decided to study mechanical engineering because he loves putting things together and knowing how things work. Halvard now works for a company called Saga Robotics and is using his skills to create robots that will revolutionise farming.

What do these robots do?

The agricultural robots which Halvard works on help to do farming work to grow our food. They are complex mechanical structures who can do a variety of agricultural tasks such as ploughing and weeding, to picking strawberries and testing the soil. They are also designed to work on lots of different terrain and can be quickly customised to work in various environments such as greenhouses, tunnels, open fields or orchards!

How does Halvard help to make them?

As a robotics engineer, Halvard's work is different every day. He helps to design sensors and gadgets and gets to help build the robots in the workshop as well as test them out in the field. One day he will be in the lab and the next out at a school talking to children about robots!

Find out more about all our engineering trailblazers at **www.thisisengineering.org.uk**

How can agricultural robots help the environment?

Halvard's work uses robots that are able to farm in an effective and sustainable way by precisely measuring water and soil. With the world's population growing rapidly we need to find ways to grow more food! Farming is a difficult skill, and the better we are at using the land and growing sustainably the healthier our fields will be.

Learn more from Halvard at ***bit.ly/2vzLybU***

NOW IT'S YOUR TURN

Think about the sustainability of your meals. Can you calculate the food miles of your lunch this week? Find out where all the food has come from – you should be able to find this information on the packet of most ingredients. Then use an online map to work out the number of miles it has taken to travel to your plate. If you want to take this further you could even do some research on which foods we can grow here in the UK and plan an eco-lunch with as few food miles as possible!

Get ready for week 6, where you will learn about two final 1851ders and meet the last of our inspiring engineers!

1851*der* Worksheet 6:
Perfume Fountain & Public Toilets

PAID FOR PUBLIC TOILETS

In 1851, for the first time ever, individual cubicles with flushing toilets became available for members of the public to use. Before then, flushing public toilets for men were not available and public toilets for women didn't exist at all! Engineer George Jennings, a plumber from Brighton, installed the first paid-for flushing public toilet at the Great Exhibition, where visitors spent one penny for the luxury of a clean toilet seat, a towel, a comb and a shoe shine. This was the start of the phrase 'spend a penny' – although records show that during the original Great Exhibition 675,000 pennies were spent, an expensive trip to the loo!

TAKE UP THE CHALLENGE!

Although our services and hygiene have improved since 1851, waste disposal is still an issue we face today. From recycling to biodegradable plastic alternatives, engineers are working to reduce and reuse all the things we throw away. Can you use rubbish to create something new? Grab some plastic bottles and tin cans and create your own invention.

PERFUME FOUNTAIN

Eugene Rimmel, a perfume maker, who was born in France but lived in England for most of his life, created a giant fountain for The Great Exhibition. The fountain sat on top of a splendid base featuring glass cases filled with bottles of 'Great Exhibition Bouquet' perfume. If the stylish bottles didn't convince customers, then ladies could try the perfume on their handkerchiefs – by asking for a spritz from the fountain itself!

TAKE UP THE CHALLENGE!

You may recognise Eugene Rimmel's name. Although he died in 1887, the cosmetics brand that he created, Rimmel London, is still sold around the world today.

How can cosmetic brands be more sustainable? Chemical engineers are working to find Eco-friendly alternatives for beauty products. Can you create your own perfume using all non-toxic ingredients and 'waste smells'? For example, using discarded orange peel to create a citrus scent!

Lucy Hughes

Lucy Hughes is a 24 year old engineer from the UK. While studying product design at the University of Sussex, she developed an exciting new material called MarinaTex, which is causing waves in the engineering industry.

What is MarinaTex?

MarinaTex is a new material which could provide an alternative to plastic packaging. Unlike plastic, MarinaTex can biodegrade in just 4-6 weeks and does not give off harmful chemicals meaning it is suitable for home composting.

How can MarinaTex help the environment?

Our current world is dependent upon single use plastic in our everyday lives. The lifespan of plastic is not suited for this purpose – it is estimated that a plastic bottle may take 450 years to biodegrade! With endless waste building up at landfill sites it is becoming more and more urgent to find new materials to replace plastic which do not have the same environmental footprint.

What is MarinaTex made from?

It is made using 100% organic materials. The main components are sourced from the sea. This includes agar from red algae and proteins from fish processing waste. In the UK alone, 172,702 tonnes of fish waste is produced annually from land based processing. Repurposing waste in this way means MarinaTex aims to work within a circular economy rather than adding to the problem.

How did Lucy create a new material?

Lucy noticed that there were lots of waste materials in the fish processing industry that were unused. She researched the different waste streams and she discovered that fish skins and scales had the most potential locked up in them, due to their flexibility and strength enabling proteins.

However, in order to give these proteins something to attach to and create a brand new material she had to find an organic binder. Keen to keep the solution local in order to reduce transportation, she looked to the Sussex coastline, experimenting with different organic marine binders before finally settling on agar. It took over 100 different experiments to refine the material and process, most of which she did on the kitchen stove of her student accommodation.

NOW IT'S YOUR TURN

Think more carefully about the materials you can find in your house. Do some research about which are the most eco friendly materials to build with, or make clothes out of. Once you have done this think about designing a brand new material like Lucy. what would it be used for? How would it be environmentally friendly? What problem would it seek to solve?

The Great *Exhibition* AT HOME

Week 7

This is week 7 of The Great Exhibition at Home challenge. Congratulations, you have made it to the final week of the challenge. This week you are going to start creating your very own Great Exhibition at Home!

All the fantastic work you have done throughout the challenge can now become part of making a final exhibition which tackles the challenge question:

How can engineering help protect the planet?

Use this week's worksheets to learn a little bit more about all the ingredients which went into making it GREAT. Then use Albert's ingredients to think about making your own exhibition and 1-minute video submission to be in with a chance of winning some amazing prizes, including:

- £500, £300 or £100 worth of equipment to supersize STEM subjects in your school
- A 30 minute meeting or video chat with one of the inspiring engineers featured in this pack for your school
- 30 prizes for individual participants

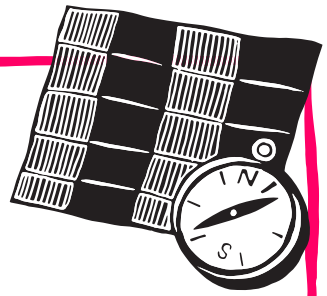
You have until the end of July to make your video the best it can be.

Let's get started!

How to make your own Great Exhibition at Home!

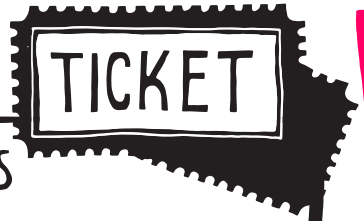
Now you have learnt all about our inspiring engineers and the original Great Exhibition it's time to start thinking about making your own, to present for your 1 minute film entry. Use Albert's key ingredients to make your exhibition truly Great!

LOCATION, LOCATION, LOCATION!



You may not be able to build your own Crystal Palace but think carefully about where you would want to hold your exhibition – you could hold it in one room, across lots of rooms in your home, in a garden or even design a new fantasy space!

CURIOUS CROWDS



The Victorians were truly amazed by everything they saw at The Great Exhibition. Think about who you could share yours with – you could video call a classmate, or family member and present your exhibition to them. Think about Curious Crowds when submitting your video entry - the judges will be excited to hear from you!

A LASTING LEGACY

Engineering is all about working to build a better future. The Great Exhibition had a huge and lasting impact and our engineers are working hard today for a better tomorrow. Consider what the impact of your Great Exhibition is, for you, your school and for the planet!

WORLDWIDE WONDERS

Prince Albert's exhibition included exhibits from all over the world. The different exhibits reflected the various skills, materials and resources of each nation.

You could even consider how engineering is used to address the different climate issues faced in different countries around the world.

ENGINEERING A BETTER WORLD

The original Great Exhibition was all about progress, developing technologies and using engineering to tackle problems of the day. Use your exhibition to create innovative solutions to one of the biggest challenges that our world faces today, climate change.

Learn more about trailblazing engineers who are already developing sustainable solutions in this pack.

Exhibition inspiration

When thinking about what a Great Exhibition in your Home might look like, always remember Albert's 3 i's – innovation, inspiration and ideas!

A Great Exhibition can be whatever you want it to be, but here are a few ideas to get you started...

- Hold an Exhibition in your bedroom, garden, even a shoebox!
- Showcase the work you have done over the past 7 weeks
- Create a display about one of our engineers
- Design or make your own own invention
- Conduct an experiment and display the results
- Create an animation about engineering and the environment
- Run a campaign to reduce plastic in your household
- Display posters in your window for the rest of your street

Documenting your Exhibition

To enter the challenge you will need to create a video, no more than 1 minute in length

The video should showcase your Great Exhibition at Home and explain how it tackles this year's challenge question:

How can engineering help protect the planet?

Once you have created your video ask a parent or guardian to send it to **1851@big-ideas.org** or submit online yourself at **big-ideas.org/athome** by the end of July.

If you are experiencing technical difficulties head to **www.big-ideas.org/teacher-support/** for more support.

Alternately please feel free to get in touch with us by emailing **1851@big-ideas.org**.

Thank you for taking part in The Great Exhibition at Home Challenge!