
# OUR PART

## HOW WE'VE CONTRIBUTED TO THE CLIMATE CRISIS, AND IDEAS FOR MEANINGFUL CHANGE

# OUR CARBON FOOTPRINT

**A carbon footprint is the calculation of the total amount of all of the greenhouse gases produced by a given activity, person, country, business or product. Most activities produce carbon dioxide, even just breathing, so the idea of reducing your footprint might sound challenging at first!**

## THE SUM OF ALL PARTS

To understand the entire footprint of a product, we need to look at the emissions caused in every stage of its production and use. Let's look at the footprints of some everyday items.

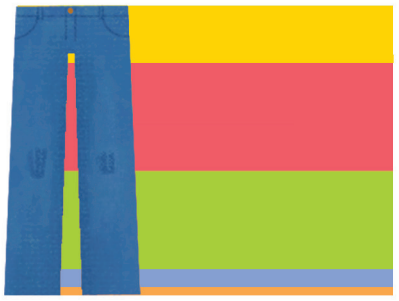
## KEY

- MATERIAL
- MANUFACTURE
- DISTRIBUTION
- USE
- DISPOSAL

'$CO_2e$' is shorthand for carbon dioxide or equivalent greenhouse gases.

TOILET PAPER - 730G (25.5OZ) $CO_2e$

The biggest piece of this footprint is manufacturing (the processing and bleaching of the paper).



JEANS - 6KG (13.2LB) $CO_2e$

The manufacturing process and the use of the jeans (washed around 70 times in their lifetime) are the biggest factors. The material plays a part too, due to the fertiliser and energy used to grow and harvest the cotton.


SHAMPOO - 16.6KG (36.5LB) $CO_2e$

The greatest impact comes from our use of it, which is likely to be in a hot shower where a lot of energy is needed to heat the water.

SPORTS BAG - 35.3KG (77.8LB) $CO_2e$

Manufacturing is by far the biggest part of the footprint, as it will have involved spinning, weaving, dyeing and finishing.

## changemaker

### Azza Abdel Hamid Faiad
### Alexandria, Egypt

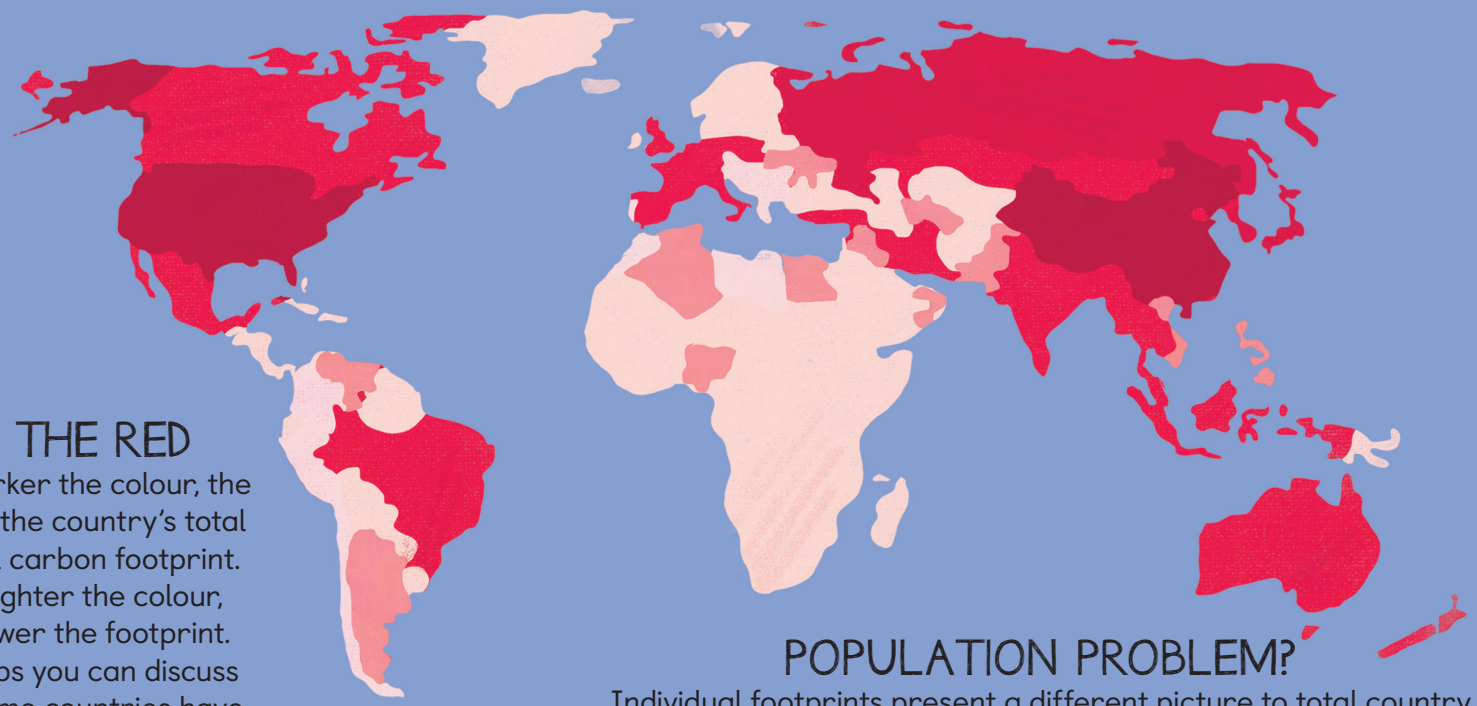
When Azza was 16, she learnt that oil was not only damaging the environment but it was also very expensive for many people. She decided she needed to find a cheaper and sustainable alternative. So, after lots of research she discovered an inexpensive way to turn plastic waste, which Egypt has plenty of, into useful biofuel, and she won an award for her work.

## WHAT'S YOUR FOOTPRINT?

There are lots of calculators out there but the good ones will ask you about the most important things that you do that produce greenhouse gases, such as what you eat, how you travel, what type of home you live in, how you heat it and the things you buy. Take a look at the World Wildlife Fund's calculator: **www.footprint.wwf.org.uk**. None of these calculators can take everything into consideration, but they are still useful.

# FOOTPRINTS OF COUNTRIES AROUND THE WORLD

Today, China has the largest total carbon footprint of any country – accounting for more than one quarter of global $CO_2$. However, a large amount of China's footprint comes from making products for people around the world. China is followed by the USA (15%), the European Union (10%), India (7%) and Russia (5%).



## IN THE RED

The darker the colour, the bigger the country's total annual carbon footprint. The lighter the colour, the lower the footprint. Perhaps you can discuss why some countries have higher footprints than others with your friends?

## POPULATION PROBLEM?

Individual footprints present a different picture to total country footprints because many countries export goods or services that their people do not use. Countries with bigger populations often have low footprints per person; so the problem is not simply our growing numbers, it is more to do with what we consume.

The global average carbon footprint per person per year is **4.7 tonnes** (5.2 short tons) $CO_2$.

North Americans and Canadians have the biggest average footprints - over **15 tonnes** (16.5 short tons) per person each year!

Sub-Saharan Africans have the smallest average footprints - around **0.1 tonnes** (0.1 short tons) per year for each person.

## CLIMATE INJUSTICE

A UK resident will emit the same amount of $CO_2$ in five days as someone in Rwanda does in a whole year! Yet overall, climate change is affecting countries with smaller carbon footprints more severely than those countries with higher footprints.

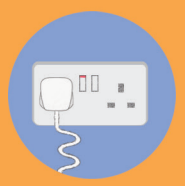
## WHAT CAN WE DO?

Cut down on flying. One long haul flight produces more carbon emissions than the average person in Burundi or Paraguay produces in a year.

Eat less meat and if you have pets, reduce or cut out their meat too. A vegan diet could reduce your carbon footprint by up to 20% but just cutting out beef will make a big difference too!

Heat and cool your home efficiently. You could save 320kg (705lb) of $CO_2$ a year by turning the thermostat for the heating down a degree.

Where possible, walk or cycle instead of getting in the car. Cutting out 8,050km (5,000mi) a year in the car will save more than a tonne of $CO_2$ – about 15% of the global average annual footprint.



Try to switch off electrical appliances when not being used. You can save 30kg (66lb) of $CO_2e$ every day by switching all of the power off at night in your house.

For a low-carbon snack, look no further than the banana! Grown in natural sunlight, transported by boat and without packaging, one banana produces about 80g (3oz) $CO_2e$.

Calculate your family's carbon footprint – and be honest!

# OUR FOOD

**The food we eat is responsible for about a quarter of the world's greenhouse gases every year, but different foods have wildly different 'foodprints'! Transportation, processing, storage and packaging all play a part, but the land used to produce the food is responsible for the biggest impact, not to mention those methane burps...**

## A MEATY PROBLEM

Meat has the largest footprint of all food, particularly when new land is cleared to raise livestock. The footprint of beef raised on land where forest has been converted into pasture is much higher than that for beef raised on existing pasture.

Chocolate also has a big footprint because trees are often cleared to grow the cacao beans it is made from. The footprint of farmed fish comes from the food it is fed, which can cause deforestation, and rice's footprint comes from the methane released from the paddy fields it is grown in.

## CARBON FOODPRINTS

These figures show the average amount of greenhouse gases produced when 1kg (2.2lb) of that food is made, shown in kilograms of $CO_2e$.

BEEF
60KG (132LB)

CHEESE
21KG (46LB)

CHOCOLATE
19KG (42LB)

POULTRY
6KG (13LB)

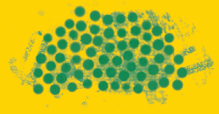
FARMED FISH
5KG (11LB)

EGGS
4.5KG (10LB)

RICE
3.9KG (8.5LB)

MILK
3KG (6.6LB)

PEANUTS
2.5KG (5.5LB)



PEAS
1KG (2.2LB)

## A TOMATO'S JOURNEY

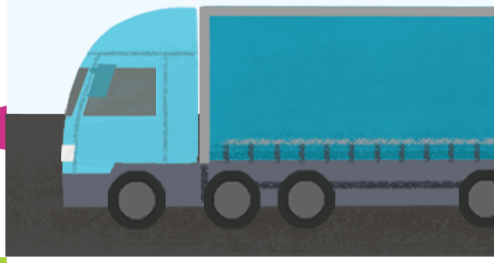
Tomatoes can have a very small footprint if they are grown locally in the summer without pesticides and heating. But their impact can be almost as bad as beef if they are produced like this...

1. SEED PLANTED
First, seeds are planted in the soil in big heated tunnels made of plastic.

2. JUST ADD...
Water and fertiliser (made from fossil fuels).

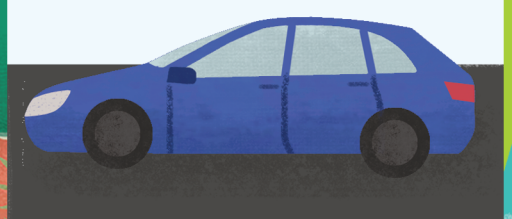
3. PICK, PACK, PROCESS
Mechanically harvested and packed in plastic.

4. JOURNEY TO RETAILER
Planes or lorries used to transport.



5. IN THE SHOP
Stored in energy-hungry fridges under bright lights.

6. FROM SHOP TO HOME
Driven home in your car.



7. COOK & EAT
Grilled in a gas oven.

One kilogram (2.2lb) of organic cherry tomatoes grown in heated polytunnels creates 50kg (110lb) $CO_2e$.

Why not grow your own?

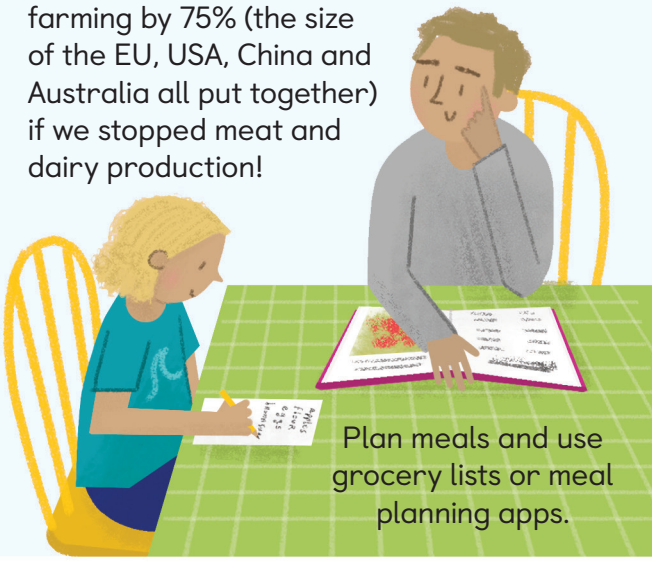
# FOOD WASTE

30–40% of the food produced in the world is never eaten. That's a harsh reality in a world where an estimated 821 million people don't have enough to eat.

Buy ugly fruit and veg! Lots of produce is thrown away because its size, shape or colour isn't perfect.

## DID YOU KNOW?

We could cut land used for farming by 75% (the size of the EU, USA, China and Australia all put together) if we stopped meat and dairy production!



Plan meals and use grocery lists or meal planning apps.

Donate what you don't use to a food bank, community fridge or food waste app such as Olio.

Use every piece of the food you're cooking with – leave the skin on cucumbers and potatoes, and cook broccoli stems along with the florets as these often contain the most nutrients too.

Make smoothies with over-ripe fruit, use wilting vegetables to make soups or just juice them all!

## changemaker

### Shalmali Tiwari
### Raipur, India

Shalmali decided that leftovers from lunches shouldn't go to waste, so she set up a vermicomposting project at her school – the leftovers feed worms that produce compost. Shalmali used some of the compost on the school grounds and sold the rest to buy equipment for her school. She has been sharing her work and many other schools have taken on her ideas.

## WHAT CAN WE DO?

Cut down on meat and eat more plants, such as fruit, veg, nuts, legumes and whole grains. Or why not try eating insects if you dare? High protein, low footprint. Grasshopper, anyone?

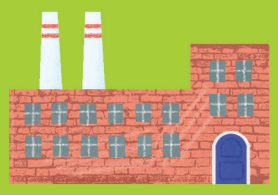
Reduce the amount of dairy you eat. Hemp milk has one of the lowest footprints of all alternative milks and it actually regenerates the soil as it grows!

Check your favourite chocolate bar to find out where the cacao came from and whether it contains palm oil. Look for the Rainforest Alliance logo to make sure it doesn't contribute to deforestation.

# OUR CLOTHES

**Before the 18th century, most people wove or knitted their own clothes out of wool. Things began to change with the Industrial Revolution in the 19th century. Machine-powered textile mills making large volumes of fabrics enabled clothes to be mass produced in factories. The invention of plastic in the early 20th century created a shift from natural cotton and wool to artificially made fabrics such as acrylic and polyester.**

HARVESTING MATERIALS



SPINNING AND WEAVING

MACHINE OR HAND SEWING AND STITCHING

USE OF DYE

INDUSTRIAL WASHING


TRANSPORTATION

PACKAGING

SHOPS

MARKETING CAMPAIGNS

CLOTHES SOLD

WASHING AT HOME

LANDFILL

## DIRTY FASHION

We are buying and then throwing away more clothes than ever before. The USA alone chucks out 9.3 million tonnes (10.2 million short tons) of clothes each year. Like our food, clothes go through a lot of stages before even being worn, and each stage uses a lot of energy. Sometimes, all of this happens only for clothes to be thrown away without even being worn!

Sadly, many of these clothes also have a large hidden cost. Often, very cheap clothes are made by factory workers who may be treated poorly, not paid enough to feed their families or forced to work in unsafe conditions. But it doesn't have to be this way. We can begin to think differently and love our clothes a little more!

### DID YOU KNOW?

When we wash synthetic clothes, plastic fibres wash down the drain into the sea and are eaten by fish. One synthetic top alone can shed 1,900 microfibres.

### DID YOU KNOW?

A rubbish truck full of clothes is taken to landfill every second, where they produce methane as they rot.

# IT'S GETTING HOT IN HERE

Making clothes uses a lot of energy and produces a lot of greenhouse gases. Polyester has double the carbon footprint of cotton because it is made from oil, a fossil fuel.

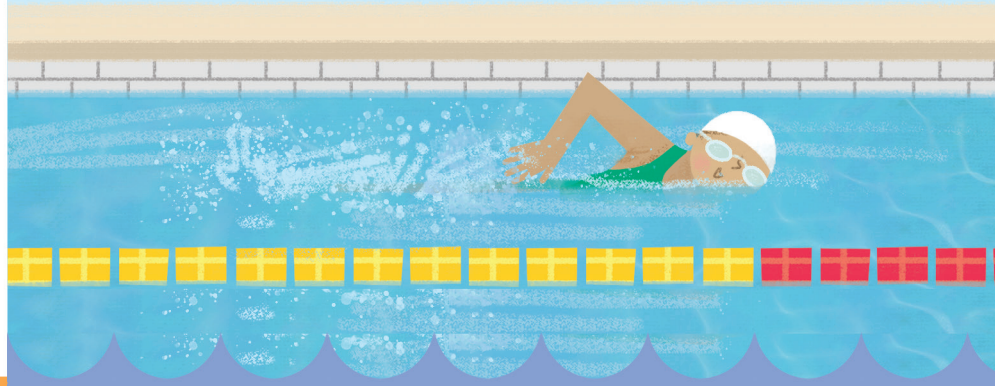
Christmas jumpers have a big footprint because they are often made with acrylic, a plastic made from oil. This year, why not make your own or customise another jumper?

# ARE YOUR CLOTHES TOXIC?

20% of global industrial water pollution comes from clothing factories. They release chemicals and dyes into water systems, causing huge damage to aquatic life. Cheap clothes sometimes contain substances that can be harmful to us too. Check the label and find out what you are putting against your skin.

# THIRSTY WORK

Imagine all the water you've drunk over the last two and a half years. That is how much it takes to make one cotton T-shirt! Each year, 5 trillion litres (1.1 trillion gallons) of water is used for fabric dye to colour our clothes – enough to fill two million Olympic-sized swimming pools! This is far too much for our water-stressed world.



# LOOKING GOOD

It is possible to create clothes in ways that are gentler on our people and planet...

Organically grown materials, such as hemp, are very helpful to the soil.

Fairtrade clothes are made by workers who are paid and treated fairly. Look for the FAIRTRADE Mark when you shop.

FAIRTRADE®

Some fabrics are biodegradable, such as Tencel, which is made from natural wood pulp.

If your passion is fashion, look into sustainable fabric development or textile design. Make beautiful clothes that don't cost the Earth!

## changemaker

### Maya Penn
### Georgia, USA

Maya set up her own eco-fashion label (Maya's Ideas) when she was eight. She makes and sells sustainable accessories and clothes. She also makes and then donates reusable sanitary pads to girls without access to them. She gives 10% of her profits to charity and has even been on television... She's become a bit of a celebrity!

# WHAT CAN WE DO?

Buy second-hand clothes from charity shops or apps such as Depop.

Be original and make your own clothes from the many free patterns available or customise them with accessories, embroidery and natural dyes.

Ask a friend if you can borrow something for a special occasion or host a swishing (clothes swap) party.

Turn down the washing machine's temperature, hang clothes out to dry and avoid power-hungry tumble dryers! Use a special laundry bag to catch plastic microfibres from synthetic clothes.

# OUR HOMES

**After transport and travel, our homes are generally the next biggest piece of our carbon footprint. And while we might not be able to change what our house is made of, there is a lot we can do to reduce the greenhouse gases that our house produces, as you'll see.**

Solar panels can produce electricity and hot water. But if you can't fit them on your home, you could talk to your school about switching to solar. Visit **www.solarforschools.co.uk** for help.

Green roofs and living walls keep buildings cool in summer by absorbing the Sun's radiation and provide insulation in cooler months. They also combat air pollution by absorbing particles from the air.

Using wood as a building material turns the house into a carbon store, rather than a carbon emitter because $CO_2$ stays locked into the wood even once it is chopped down.

Batteries can store energy from solar panels that can be used when the Sun isn't shining. This energy could be used to charge an electric car!

Smart controls reduce energy usage in buildings by turning things on and off when they are needed or not in use.

Natural ventilation systems circulate air from outside to inside. They keep the air fresh and at a constant temperature.

Rainwater can be used to flush toilets to save water and energy.

Thick walls are excellent insulators.

Heat pumps take heat from either the air or the ground and transfer it efficiently to your home.

Efficient LED lighting uses very little energy compared to older light bulbs.

Triple glazing and smart glass control the amount of solar radiation a building absorbs.

Plants can improve indoor air quality.

Insulation, such as thick curtains, carpets and blinds is a very efficient way to reduce the need for heating and cooling.

Rainwater can be collected in water butts.

Underfloor heating can be more efficient than radiators, and it keeps your feet lovely and warm!

District heating is a local heating source through insulated pipes, shared with neighbours.

## WHAT CAN WE DO?

Try taking a short shower instead of a bath to save water at home. But if you love having a bath, use the water on your garden or plants afterwards.

Do you need your room as warm or cool as it is? Could you change your clothes rather than turning on the heating or air conditioning?

Get rid of air leaks or your heating/cooling systems will have to work even harder! Drop a feather in front of doors, windows and chimneys and see if it is blown outwards. If it is, then plug those holes!

## changemakers

### Eco Squad, Hertfordshire, UK

The Eco Squad at Howe Dell Primary meet regularly to discuss how to make their Green Flag-awarded school even more eco-friendly. They use solar panels, collect rainwater for their veg patches and to flush their loos, and recycle or reuse everything they can. The squad also created an art exhibition from reused materials to engage the local community on environmental issues.

# OUR STUFF

**Almost every single thing around us has a carbon footprint and makes an impact on our world. From the chair you are sitting on, to a pen, to this book. If you added up the carbon footprint of everything in the room you are in now, you might be surprised at how big the number is...**

## THE HIDDEN CARBON COST

These figures are estimates of the footprints of some of the products (and people!) around us. They show the amount of greenhouse gases produced, handily transformed into kilograms of $CO_2e$, so we can compare them. They take into account what the products are made of, how they were produced and transported, and how we use and dispose of them.

A native broadleaf tree sucks up one tonne (1.1 short tons) of $CO_2$ in its lifetime.

**Red rose**
From garden 0kg
From heated greenhouse 2.1kg (4.6lb)

**House (new two-bed)**
80,000kg (176,370lb)

**Apple**
From garden 0g
From overseas 150g (5oz)

**Paperback book**
1kg (2.2lb)

**500ml (17oz) plastic bottle of water**
160g (5.6oz)

**iPhone 11**
(including use)
72kg (158lb)

**Laptop**
(including use)
210kg (463lb)

**Pair of jeans**
6kg (13.2lb)

**Pair of shoes**
11.5kg (25lb)

**Toilet roll**
Virgin paper 730g (25.8oz)
Recycled paper 450g (15.9oz)

**Baby** (UK average over the course of a lifetime)
373,000kg (822,320lb)

**Thick carpet**
290kg (639lb)

**Pint of tap water**
0.14g (0.005oz)

# WHAT A LOAD OF RUBBISH

What do you put in your rubbish bin that could be useful to someone or used for something else? Maybe that packaging could be used in a craft project? And that old toothbrush can be sent to a recycling programme (or used to clean your shoes!).

# CIRCULAR ECONOMY

More companies are making their products using waste materials now, which is great news for the planet. Look out for skateboards made from old bottle tops, surfboards made out of old plastic bottles and wetsuits made from... old wetsuits!

# SHOPPING CHALLENGE

Do you think you could live for a whole month without buying anything new, other than food? Why not give it a go with your family – you might be surprised at how much fun it is to salvage things, buy second-hand or borrow from friends.

# PLASTIC PROBLEM

When plastic ends up in the ocean, most of it sinks to the deepest parts and is buried in sediment on the sea floor. Over time it breaks down into tiny microplastics and even smaller nanoplastics, which can get into the bloodstreams and cells of creatures, including us...

# SAVE THE TURTLES

It is thought that more than half of all sea turtles have eaten plastic. A good reason to avoid single-use plastics wherever you can.

## DID YOU KNOW?

The OceanHero search engine will clean one plastic bottle from the ocean for every five searches you carry out!

# WHAT CAN WE DO?

Charity shops are great places to find new (to you!) books, clothes and toys. You can also donate anything you no longer want.

Have a look in your recycling bin to see if it contains single-use items that you could swap in future for reusable or waste-free alternatives.

Find out if there is a Library of Things close to you. You can rent almost anything from there at very low cost.

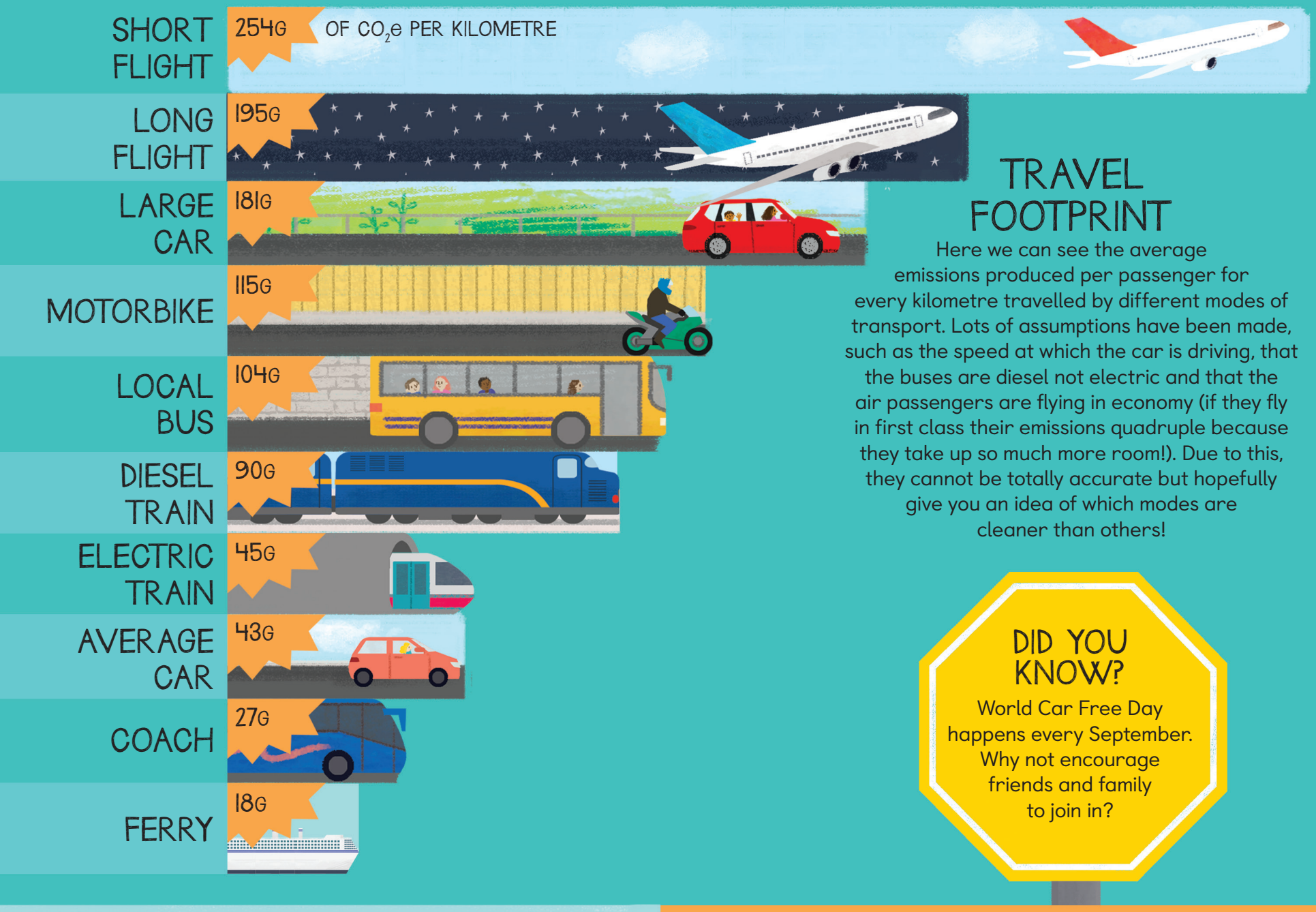
## changemakers


### Qier Qiu, Shanghai, China

Qier Qiu and her school friends realised how wasteful disposable chopsticks were and began chatting to people about the environmental benefits of reusable ones. They encouraged over 5,000 people to use reusable chopsticks and even developed a cleaning product for them! And in return they won a prize to help their school go green.

# OUR TRAVEL

**Travel can take us to see the most amazing places on Earth, but it can also have a big environmental footprint. The good news is that there are so many different options for how we can get around now, some with much lighter footprints than others. And remember, the journey is all part of the fun, so pack light (because this will also reduce your impact), get your seat by the window and enjoy.**




## TRAVEL FOOTPRINT

Here we can see the average emissions produced per passenger for every kilometre travelled by different modes of transport. Lots of assumptions have been made, such as the speed at which the car is driving, that the buses are diesel not electric and that the air passengers are flying in economy (if they fly in first class their emissions quadruple because they take up so much more room!). Due to this, they cannot be totally accurate but hopefully give you an idea of which modes are cleaner than others!

### DID YOU KNOW?

World Car Free Day happens every September. Why not encourage friends and family to join in?


## WHAT CAN WE DO?

Try slow travel on your next holiday. Take the train instead of flying and the bus instead of a taxi, if you can. If you really want to get to know somewhere, stay with locals.

Use public transport, walk or cycle wherever you can. Some cities offer free public transport now to help keep air pollution down. Cycling is the most efficient form of transport. With the same amount of energy, you travel three times faster by bike than by foot! You could hire an electric bike for a longer journey.

If you are planning a trip and want to find out the most carbon efficient way to get there, take a look at **www.ecopassenger.org**