FITDigit

A Green Future in the Digital World - *FitDIGIT*

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Educational materials for teachers and exemplary lessons for pupils based on story telling (2)

How can car companies reduce pollution

Project Result 1
Digital stories for Environmental Education-Handbook
Authors: Aksantys Team

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Introduction

“A Green Future in the Digital World” is an Erasmus+ project designed especially to support the innovative digital educational curricula supporting environmental and digital education is schools all around the Europe. Implemented by six partners, it gives strong educational boost to support sustainable green environmental awareness.

One part of the project (WP3) was designed to create interdisciplinary pedagogical model and educational tools to help teachers and their pupils to gain cognitive skills in environmental change with “real life” application. As a result a huge bunch of educational materials has been created, which are divided into two Parts:

Part 1. Digital Stories for Environmental Education.

Part 2. E-coding curriculum for Environmental Education.

This Handbook is the 1st element of the first Part of the educational materials, and it provides insightful and innovative information about the local initiatives to help to fight climate change in cities.

These educational materials are divided into the following parts:

- Theoretical part – presenting theoretical materials on how cities can help combating negative effects of climate change- for teachers;
- Practical part – presenting local initiative mitigating the negative effect of climate change in cities. This is a story telling exercise, which can be used by teachers during their classes;
- The third part presents the lesson plan, and it is supported by Quizzes, and Exemplary video materials and games to be used during classes;
- The Handbook is supported by interactive presentations in Canva, supporting teachers in their daily activity.

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At the end of the lesson pupils should acquire the knowledge, skills, and competencies on the sustainable initiatives supporting fight with excessive trash production, green skills related to food saving, composting, and social community skills.

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THEORETICAL PART

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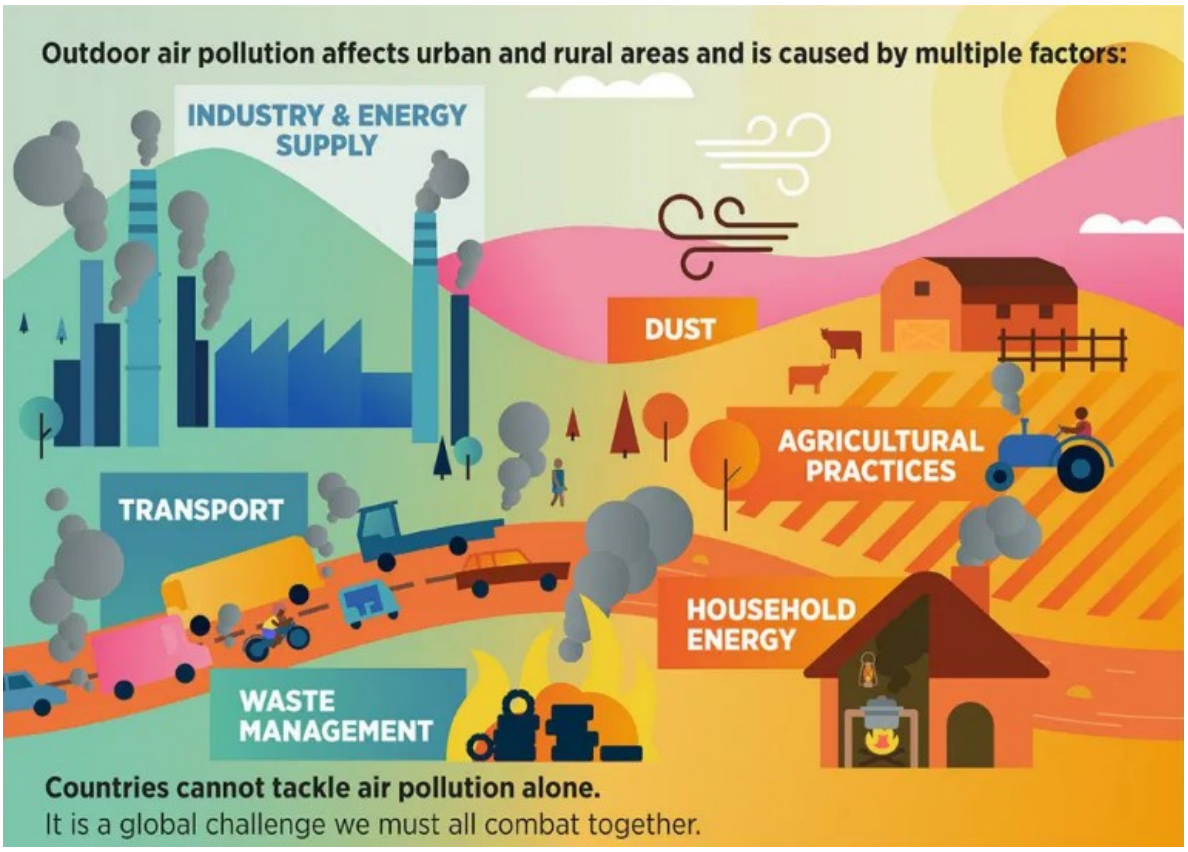

Air Pollution in Seoul - What You Need to Know (breathesafeair.com)

Air pollution in cities is primarily caused by human activities that release harmful pollutants into the atmosphere. The main sources of air pollution in cities include:

Vehicle emissions - particulate matter, nitrogen oxides, and carbon monoxide are among the air pollutants released into the atmosphere when fossil fuels are used in automobiles, trucks, and motorbikes.

Industrial emissions - factories, power plants, and other industrial facilities release pollutants like sulfur dioxide, nitrogen oxides, volatile organic compounds (VOCs), and particulate matter during the production process.

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Residential emissions - the burning of fuels like wood, coal, oil, and natural gas for cooking, heating, and lighting in residential areas can release pollutants such as smoke, soot, and harmful gases.

Power generation - fossil fuel-burning power facilities, such coal-fired power plants, release particulate matter, nitrogen oxides, and sulfur dioxide into the atmosphere.

Construction and demolition activities - dust and emissions from construction sites and demolition activities contribute to air pollution in cities.

Agricultural activities - the use of fertilizers, pesticides, and livestock farming can release pollutants like ammonia and methane into the air.

Waste and landfills - Methane gas is a powerful greenhouse gas that is produced during the breakdown of organic waste in landfills and adds to air pollution.

While natural events like dust storms and volcanic eruptions may also cause air pollution, it is crucial to remember that human activity is the main cause of pollution in urban areas. The percentages can change based on the particular city, its features, and the degree of urbanization and industrialization.

Cars impact on the environment

One of the main industries contributing to air pollution and CO_2 emissions is the transportation industry. Every second, two more cars reach the roads. It will be longer than four seconds by 2030. It is anticipated that 127 million automobiles would be produced worldwide by 2030. There may be two billion cars on the road by 2035.

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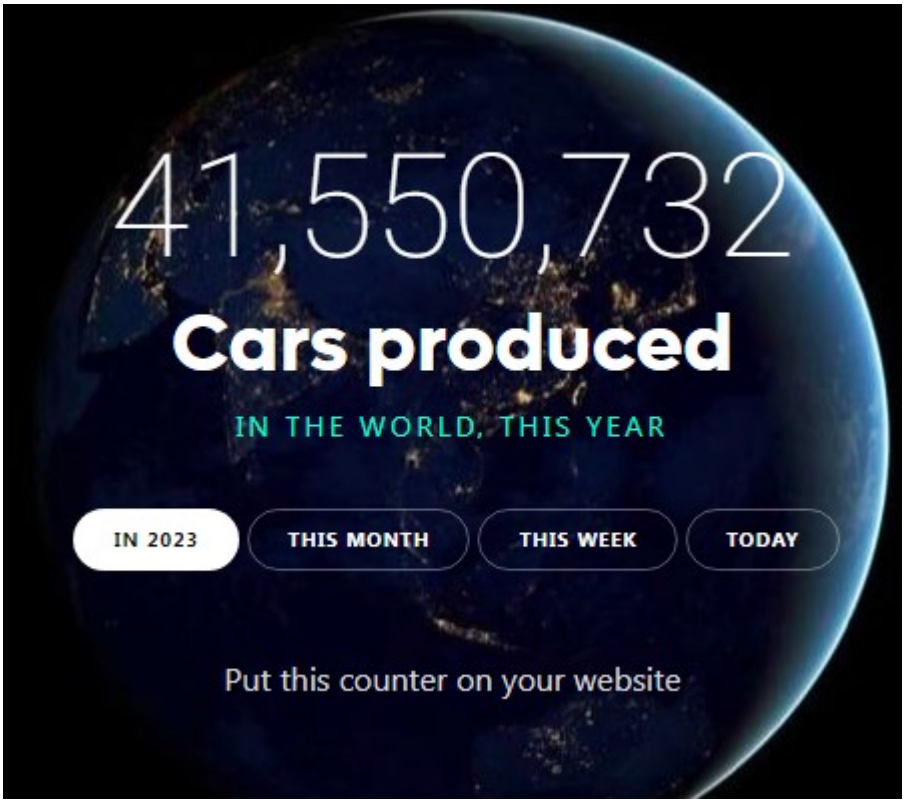

Cars Impact On The Environment (theworldcounts.com)

The majority of the world's petroleum is used in the transportation sector, which also contributes significantly to greenhouse gas emissions worldwide. Air pollution is also a major problem. Vehicles are heavy CO2 emitter and a major source of air pollution, releasing large volumes of particulate matter, carbon monoxide, and nitrogen oxides. The environmental effect of automobiles is mostly caused by fuel consumption and the emissions of greenhouse gases and air pollution.

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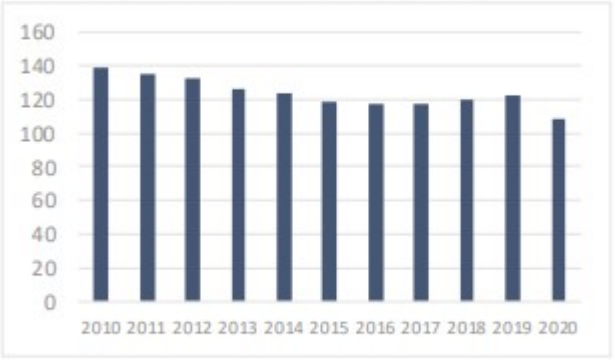
Figure 1 – Average CO_2 emissions of new passenger cars in the EU (g CO_2/km)



Data source: ACEA.

CO_2 emission standards for new cars and vans (europa.eu)

The efficiency with which we transition to electrified vehicles, as well as more fuel-efficient vehicles will determine how automobiles affect the environment.

Here are the main points on how cars can impact our environmental.

Production and destruction

Even before they hit the open road, cars use a lot of energy. Because materials like steel, rubber, glass, plastics, paints, and many more have to be produced before a new vehicle is ready to be driven, the creation of automobiles has a significant environmental impact.

In the same way, an automobile's lifespan does not eliminate its environmental effect. Toxic battery acids, plastics, and other products could remain in the environment. Thankfully, piles of junkyard debris are getting far smaller than they used to be. The good news is that much of a typical automobile nowadays, including its steel frame, can be recycled. Approximately 75% of it.

Environmental costs associated with production, recycling, and disposal are hard to measure and mostly outside the control of most customers. It's also true that the majority of an automobile's environmental impact – roughly 80-90% – will result from

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fuel use and emissions of greenhouse gases and air pollution, which are the main causes of global warming according to climate experts.

Energy consumption

Fossil fuels like gasoline and diesel are what power cars. These fuels' extraction, refinement, and transportation all contribute to air pollution and greenhouse gas emissions. Additionally energy-intensive, shipping fuels can occasionally result in environmental catastrophes like oil spills.

Because they don't burn fossil fuels, electric or solar-powered cars can help reduce environmental consequences as global demand grows.

https://www.youtube.com/watch?v=pS9nO2DnU5U

Emissions

When driving, cars release a variety of pollutants, including particulate matter (PM), carbon monoxide (CO), and nitrogen oxides (NOx). Vehicle emissions of smog, carbon monoxide, and other poisons are particularly concerning since the tailpipes of these cars are located at street level, where people breathe the contaminated air straight into their lungs. This can make the pollutants released by industrial smokestacks high in the sky less of an urgent health hazard than car emissions. For certain people, this degradation in the air we breathe may result in respiratory

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problems. In extremely polluted locations, smog - a combination of smoke, gasses, and moisture - can also develop and cover the sky like a thick layer of fog.

Waste generation

The production and utilization of cars generate significant amounts of waste throughout their lifecycle. This includes manufacturing waste, such as metal scraps and plastic waste, as well as end-of-life disposal. Proper waste management is essential to minimize the environmental impact of car-related waste.

Infrastructure

The construction of highways to accommodate automobiles and the subsequent urban sprawl are two additional, harder-to-quantify effects of vehicles. Land, resources, and energy are needed for the building and upkeep of roads, highways, and parking lots for automobiles. Deforestation, biodiversity loss, and the destruction of natural ecosystems are possible outcomes of this. Not only is it challenging to isolate this problem from other issues like population expansion and resource use, but technology developments like electric propulsion and fuel economy also pose challenges.

Noise pollution

The noise produced by cars' engines, tires, and horns contributes to noise pollution. Human health can suffer from excessive noise in a number of ways, such as stress, sleep disruptions, and hearing issues. It can also interfere with animals' natural habitats and communication patterns of animals.

Other environmental damage

When nitrogen oxide and water combine in clouds, acid rain is created, which harms both plant and animal life.

ALTERNATIVE SOLUTIONS

Encouraging alternative modes of transportation, such as walking, cycling, public transportation, and electric vehicles, can help reduce the environmental impact of

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cars. Transitioning to electric vehicles, which produce zero tailpipe emissions, can significantly reduce air pollution and greenhouse gas emissions. Additionally, supporting sustainable transportation systems and infrastructure can contribute to a greener and more sustainable future.

Car companies have been actively taking steps to reduce environmental pollution.

Some of the key activities they have undertaken include:

Development of electric and hybrid vehicles

Car companies are investing heavily in the research and development of electric and hybrid vehicles. These vehicles produce fewer emissions and reduce the dependency on fossil fuels.

Improved fuel efficiency

Car manufacturers are constantly working to make their cars more fuel-efficient. This covers the implementation of lighter materials, aerodynamic shapes, and more efficient engines.

Use of alternative fuels

Many car companies are exploring and promoting the use of alternative fuels such as biofuels, hydrogen, and natural gas. These fuels contribute to less pollution and have fewer carbon emissions.

Recycling and eco-friendly materials

Car manufacturers are increasingly using recycled and eco-friendly materials in the production of vehicles. This helps reduce the environmental impact of the manufacturing process.

Sustainable manufacturing practices

Car companies are adopting sustainable manufacturing practices to reduce their carbon footprint. This includes using renewable energy sources, minimizing waste generation, and implementing efficient production processes.

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Collaborations and partnerships

Car producers are collaborating with other organizations, including governments and environmental groups, to collectively work towards reducing pollution. They are sharing knowledge, resources, and best practices to develop sustainable solutions.

Environmental certifications

Some car companies have obtained environmental certifications such as ISO 14001, which signifies their commitment to environmental management and reducing pollution.

Education and awareness

Car companies are also actively involved in educating consumers about the environmental impact of their vehicles. They provide information on eco-driving techniques, vehicle maintenance, and the benefits of choosing more environmentally-friendly options.

The automobile industry's initial green efforts, such "clean diesel" vehicles, were insufficient. Nevertheless, in an effort to become more sustainable, automakers have lately significantly changed their business practices. Numerous automakers made commitments to lower carbon emissions while simultaneously increasing the range and design of their electric cars (EVs).

Automakers have also invested in more advanced technologies. Almost all automobiles have been powered by the same internal combustion engine and mechanical transmission combination for more than a century. But electric vehicles are based on a fundamentally different platform, consisting of a large battery and electric motors driving the wheels. This transformation requires huge operational shifts. Additionally, a lot of automakers are undergoing this change in only one car generation.

Accelerating the electric transition

Right now, there aren't many electric vehicles on the road. In the US fewer than 2% of automobiles are electric. Europe as a whole has comparable EV rates, with certain regions having significantly lower rates. Large government incentives have

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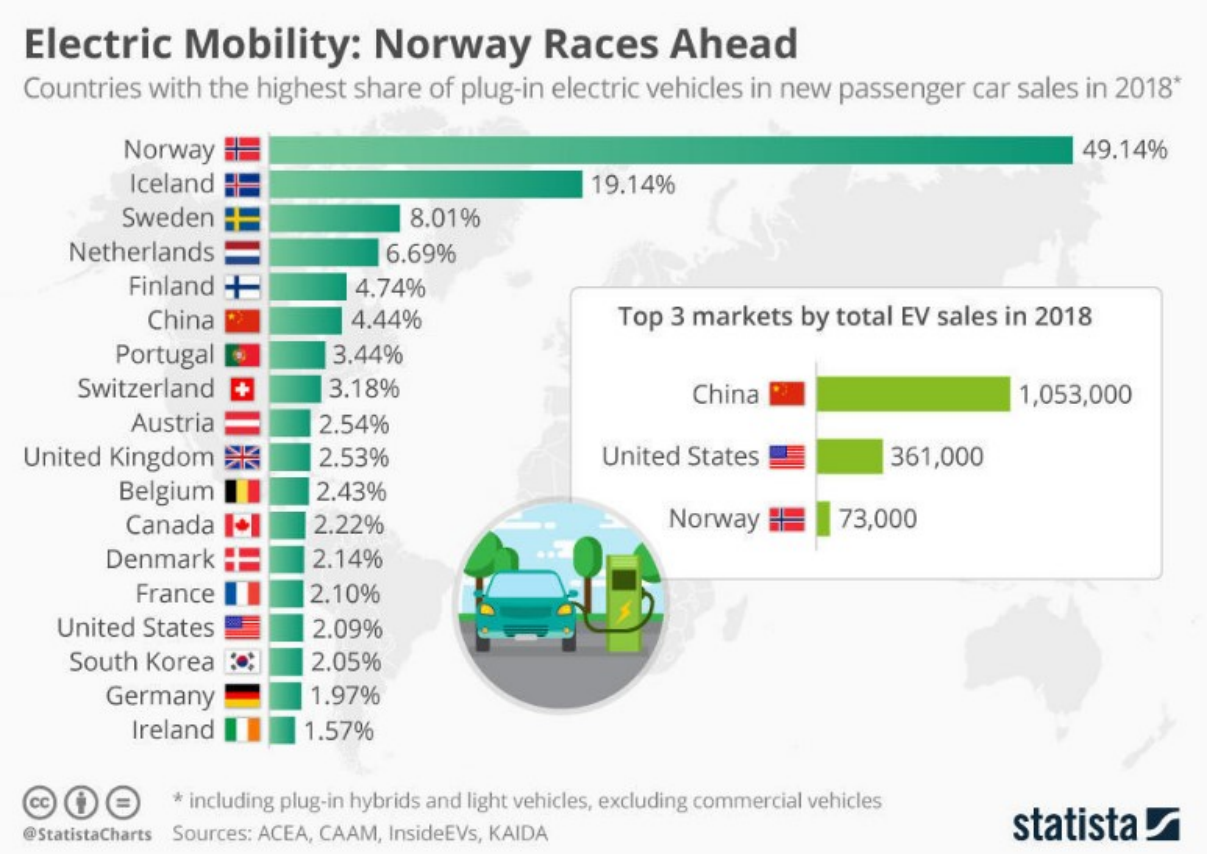
been used by the few nations, for example Norway, with higher EV rates, to increase sales.



What the car industry has done to help fight climate change – and what it needs to do next | World Economic Forum (weforum.org)

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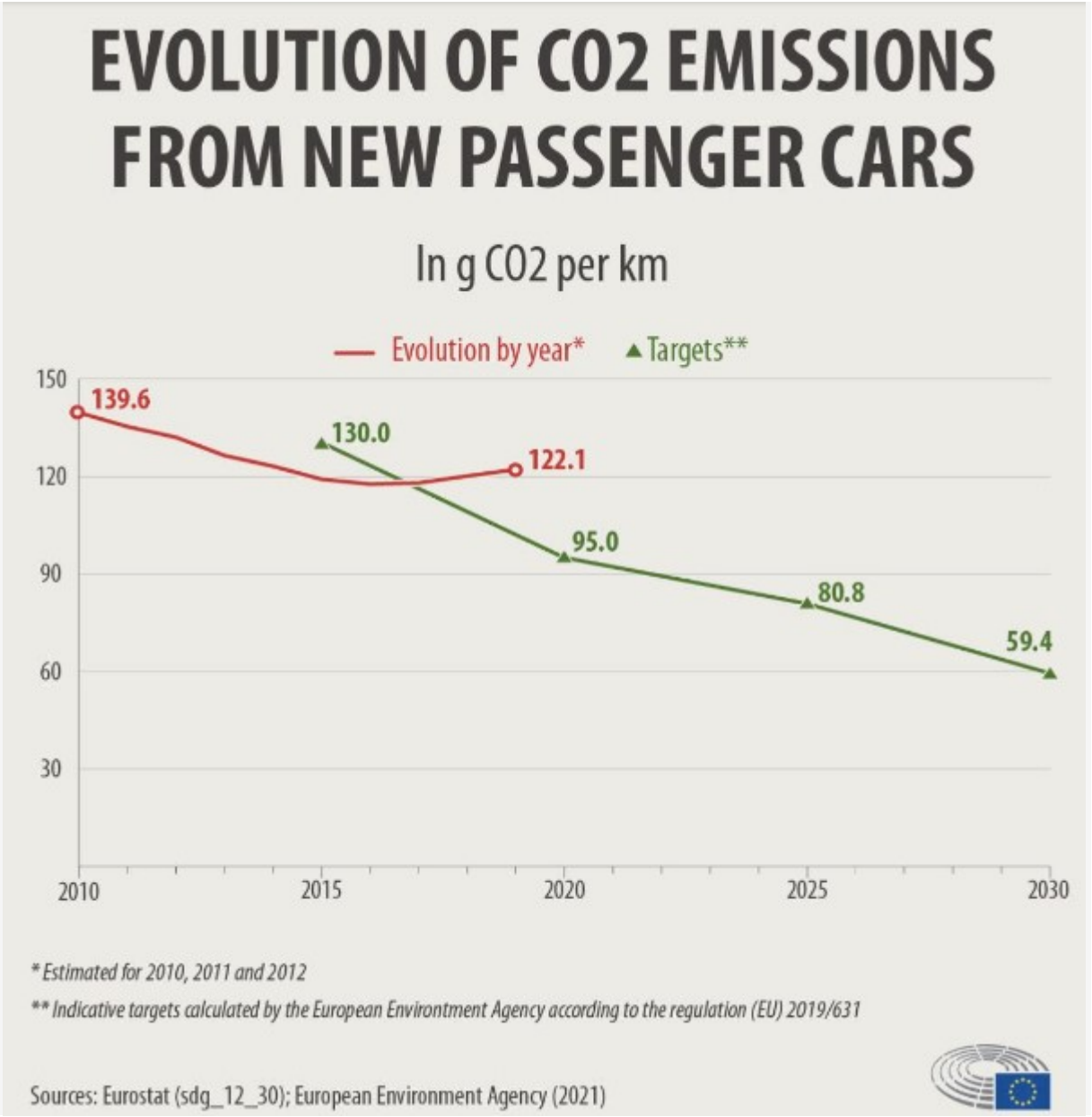

CO_2 emissions from cars: facts and figures (infographics) | News | European Parliament (europa.eu)

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ECO TRAVELLING - HOW WE CAN REDUCE AIR POLLUTION?

Probably the most widely used mode of transportation in the world today is the automobile. However, too often, our kids believe that taking the family car is the only way to get from point A to point B and that taking the aircraft is the only way to go on vacation. It's crucial to inform people about travel practices that hurt the environment and to provide them with a practical, "green" alternative.

Whenever possible, try to use the least hazardous mode of transportation. Remember that your travel style can also impact the total environmental cost of your vacation, so consider how you choose to explore your destination and get to the airport. There certainly will be times when you need to use your automobile, but think what other alternatives are available to reduce the environmental impact of driving.

Packing and luggage

Try to limit the amount of packing you take with you; this will help you travel lighter and need less garbage disposal at your destination. Increased weight requires burning more fuel, which increases emissions.

Recycle as much of your rubbish as you can, particularly if you are visiting a place without recycling facilities.

Reduce the amount you carry if you use your automobile as an extra accommodation. To make your car lighter and more fuel-efficient, empty everything inside. Additionally, watch out that roof boxes and racks aren't left on continuously.

Share the burden

Looking at the statistics, this should be obvious. The lift-share scheme is really the simplest and most environmentally friendly way to get children to school. By sharing the burden of driving between parents, emissions can be reduced and cars can be kept off the roads.

Get on your bike

If you don’t drive or don’t want the hassle of driving, then a bike is a great investment. With child obesity on the rise, cycling is fantastic for getting children,

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and yourself, moving in the morning. But remember to invest in some basic safety equipment. A helmet should be a compulsory accessory, while lights and reflective gear are essential to be visible on the road.

Take a walk

Walking is the ultimate eco-friendly way to reach work or school on time. It's good for you too and doesn't require any special equipment.

School buses

Of course, if you live in a remote or rural area, lift-shares, walking or biking are not always going to be practical options. Unfortunately, budget cuts sometimes mean that school buses are not provided, but remember, school buses dramatically slash the amount of CO2 in the atmosphere and give children a chance to socialize before they hit the classroom.

Travelling by train

Trains are a type of public transport, which means that trains are able to carry large numbers of people at a time. Because buses, trains, and airplanes can move large numbers of people at once, public transportation is also referred to as "mass transportation."

The fact that trains are less polluting than, say, the same number of cars needed to carry the same number of people makes them a more environmentally friendly mode of public transportation. While trains packed with people do produce some pollution, this pollution is not as significant.

Reducing unnecessary travel

We should all strive to minimize needless travel, whether that means using public transportation more frequently, relying less on our automobiles, learning to ride a bike or walk instead of drive. In addition to keeping our kids healthier and more active, reducing the amount of fossil fuel-intensive travel we undertake will set a positive example for them and help them to adopt greener habits in the future.

Nowadays children are accustomed to traveling even short distances in a car. Because of parental concern, perceived (and actual) risks to our kids' safety, and

the general conveniences of contemporary life, we frequently take our cars for journeys that we might just as easily walk or ride our bikes.

What does it mean unnecessary travel?

Naturally, opinions on what is considered necessary and unnecessary will vary. Engage your kids in a conversation about travel and the things they believe are necessary while using a car or even an airplane. What other options do they have for the situations they come up with, and is it truly a practical, environmentally friendly option? Regarding our carbon footprints, traveling by plane to for a vacation may not be as environmentally friendly as driving or cruise.

Think about if you truly need to get there before choosing how to get there. For instance, are you driving to an out-of-town shopping center or retail park? Could you not purchase locally? Local prices may appear higher at first, but after accounting for parking, fees, wear and tear, and petrol expenses, they may really be less expensive. However, you may also place an online order or use a mail order service.

Keep in mind that over time, minor adjustments made bit by bit will have a huge impact on your environmentally friendly travels. After you go back home, you might want to think about reducing a carbon offset; one way to do this is for example by adding another tree to your garden.

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PRACTICAL PART

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ECOLOGICAL STORIES OF CAR COMPANIES

BMW

(200) Sustainability at the BMW Group - YouTube

BMW - 100% of the energy purchased at the plants comes from renewable sources

"A climate-friendly car is not only created by using green energy. We need to focus our vehicles on sustainability from day one - reducing the amount of materials used in their production and, above all, keeping reuse and recycling in mind from the outset. In the face of rising raw material prices, this is not only an ecological imperative, but also an economic one," said Oliver Zipse, Chairman of the Board of Management of BMW AG.

By 2030, the BMW Group wants to cut its carbon dioxide emissions by a significant amount and have a supply chain that is climate neutral.

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The strategy aims to reduce CO2 emissions by more than 200 million tones by 2030 – for the first time for the entire product life cycle, from supply chain through production to end of use.

CO2 emissions per vehicle are to be reduced by at least 1/3.

CO2 emissions during the use phase of the vehicles are to be reduced by 40% per kilometer compared to 2019.

The salt lakes at the confluence of the borders of Argentina, Bolivia and Chile account for about half of the world's lithium deposits. The BMW Group ensures transparency on the origin and extraction methods of this raw material.

The BMW Group aims to cut its emissions (manufacturing and plants) by 80% by the year 2030, following a reduction of around 78% in CO2 emissions per car from 2006 to that point.

The BMW Group is also playing a pioneering role as the first car manufacturer to set specific CO2 targets for its supply chain. The aim is to reduce CO2 emissions per vehicle by at least 20% compared to 2019.

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From 2021, the entire BMW Group's production, including the Group's plants worldwide, will be completely CO2-neutral.

The main focus of the strategy will be on significantly reducing the consumption of resources per vehicle. To this end, the share of secondary materials will increase significantly, wherever quality and availability allow. This applies to raw materials such as steel, plastic or aluminum.

HYUNDAI

Hyundai - for the production of cockpits the brand uses plastics derived from biomass.

Iron ore and coal are mainly in powder form - when the wind blows, it will disperse and negatively affect the local environment. To create a green steel plant, Hyundai Steel has for the first time in the world implemented a "closed raw material processing plant" in which iron and coal are not in contact with the environment throughout the entire process - including transport.

Have you ever wondered what to do with used coffee grounds. Only 0.2% of grains are used for drinking, and the rest, i.e. as much as 99.8%, is wasted.

Hyundai decided to change this and initiated a project to recycle coffee leftovers. Car manufacturers cannot use 100% biodegradable plastic, because their cars would self-biodegrade under the influence of, for example, light. That's why Hyundai adds 10 to 25% of natural polymers to bioplastics. A quarter of the plastics in the Hyundai Ioniq's cabin come from cellulose fibers. They are obtained from...wood.

Coffee grounds are also used by another car manufacturer namely Ford.

Such a surprise: Hyundai also uses coffee waste to produce surfaces of sports facilities.

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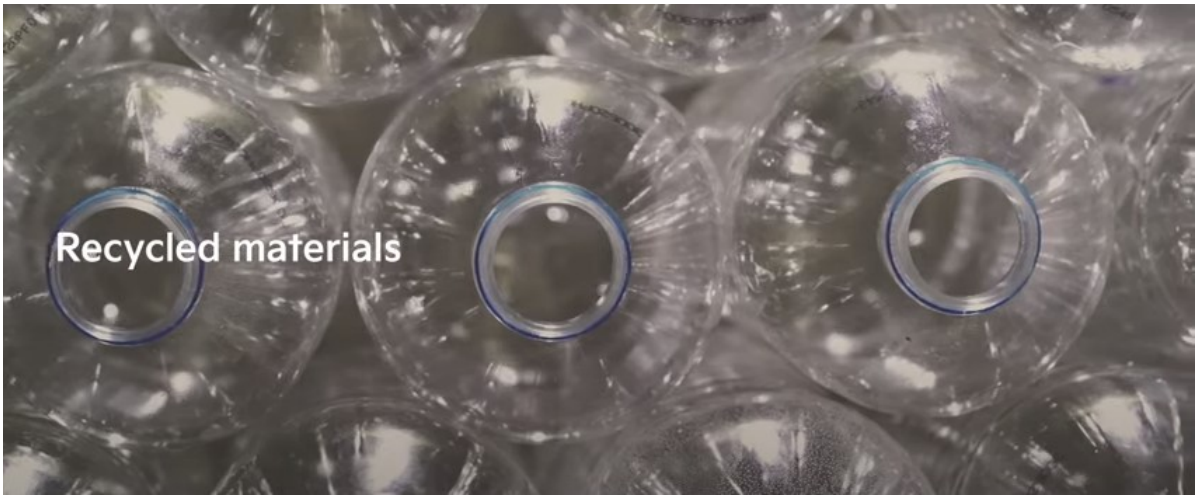
KIA

Kia - as much as 93.6% of industrial waste is recycled. That's over 171,000 tons per year



(200) The Kia Niro : Source of inspiration I Part 1. Sustainability through materials - YouTube

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Kia brand dealers will produce electricity. Almost all of the company's dealerships will be equipped with, among other things, a carport, which is a parking space with a photovoltaic solar panel.

The life cycle of Kia cars is subject to an environmentally friendly management system, from design and production to end-of-life disposal. Every major supplier operating for the Kia brand has achieved ISO 14001 environmental management certification.

The seats, headliner, door upholstery, floor and armrest of the Kia EV6 are made of eco-friendly, sustainably sourced materials, such as recycled PET bottles, vegetable yarn (bio PET) and natural wool yarn, eco leather. Eco-lacquer with plant extracts was used.

Almost four and a half thousand tons of raw materials are recycled annually.

By 2025 Kia plans to reduce greenhouse gas emissions by 15% compared to 2015. The reduction also applies to water consumption.

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In addition, Kia will introduce 11 new electric cars by 2027.

MAZDA

According to Mazda - by 2030 all cars are to be electrified.

Mazda is the first automaker to join the eFuel Alliance. The Alliance brings together industry organizations and stakeholders that support the objective of establishing and promoting CO2-neutral e-fuels and hydrogen as proven and reliable propulsion sources to reduce emissions in the transport sector.

Technologies and production lines are already being designed in such a way that it is possible to gradually increase the share of electric drive components.

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In Mazda's European logistics centre: 86 charging stations powered by 3696 solar panels has been installed on the roof of the office building.

From 2022 Mazda will begin investing in decarbonizing its factories. To begin with, it will install solar panels at the Hiroshima plant, which will supply electricity to electric car charging stations.

Algae fuel in a beaker - Algae fuel - Wikipedia

Mazda is also involved in research projects promoting the widespread use of renewable liquid fuels (biofuels derived from microalgae and e-fuels). Algae fuels can be obtained on land unsuitable for agriculture, with minimal impact on freshwater resources.

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MERCEDES

According to Mercedes - the global supply chain will become CO2-neutral by 2039.

Mercedes-Benz AG's own plants, including its global battery production. The company aims that by 2030, plug-in hybrids or 100% electric vehicles will be more than 50% of its sales.

By 2039 Mercedes-Benz will focus on materials and components whose production and processing lead to particularly high CO2 emissions. These include battery cells, steel and aluminum. These components are responsible for around 80% of carbon dioxide emissions in the supply chain of all-electric vehicles.

NISSAN

As a result of the planned expansion of the solar farm, the amount of renewable energy generated by Nissan's Sunderland production facilities will almost triple. The project will provide the power for all production of Nissan Leafs destined for the European market, in line with the brand's plans to move towards a carbon-free future.

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Nissan Leaf users prevented the emission of as much as 2.5 million tons of carbon dioxide per year. Soon, all the energy needed to produce the Nissan Leaf for Europe will come from the brand's own renewable sources.

Nissan has set a goal of carbon neutrality in the company's operations and in the life cycle of its cars by 2050. As part of the measures taken, all new Nissan cars will be offered in versions with an electric motor by the early 30s.

In selected countries, Nissan is actively working with the energy sector to support the decarbonisation of power grids.

OPEL

The Opel engineering centre in Rüsselsheim will become the research and development laboratory for the new standards for tomorrow's charging stations.

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They will create an intelligent charging systems. The developed technologies are to enable collision-free functioning (as we know: electricity-hungry) networks of car chargers and other energy consumers.

The Opel Corsa uses around 30% of natural or recycled materials (throughout the car).

The Corsa's 41 polymer parts, airbag partitions, fenders, bumpers and tire repair kit, are manufactured using recycled polypropylene.

RENAULT

Renault - in 2030 wants to use recycling the most of all brands in the world.

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Up to 120,000 cars a year, including electric ones, will be regenerated and recovered. Nearly 80% of strategically important recycled materials will be used in battery production.

Renault is a leader in the European market for electric vehicles and has more than 10 years of experience in this field. It has sold nearly 400,000 electric cars.

Renault aims to be the greenest brand in Europe in 2030. 90% of its sales will be electrified cars. In addition to its electrification commitments Renault aims to achieve carbon neutrality in Europe by 2040 and globally by 2050.

In terms of production, the Group aims to reduce global plant emissions by 50% by 2030 (compared to 2019). To achieve this goal, the company will invest 20 million EUR in industrial installations.

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SKODA

Skoda - since the beginning of 2020 processes all waste from the car production process.

At Skoda Auto, 650,000 m3 of water was recovered last year, which is over 45% of the amount of this raw material consumed by the brand during the year.

Water consumption in the production of one vehicle fell from 2.76 to 1.74 m3, i.e. by almost 37%.

Since 2016, the producer has not disposed of municipal waste by throwing it into landfills, but subjected it to incineration processes. In 2018, the company started to process other waste in the same way. At the beginning of 2020, Skoda completely stopped landfilling industrial waste.

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EffiShunter locomotives work on the railway siding at the Skoda factories. Their engines meet stringent exhaust emission standards and emit half as much CO2 as older models.

In 2020, the component factory in Vrchlabí was converted to consume energy from renewable sources. As a result, the production of carbon dioxide has been reduced from 45,000 to 3,000 tones per year, and ultimately to zero.

On the roofs of the Skoda Parts Center at the brand's headquarters in Mladá Boleslav, almost 6,000 solar panels will be built, with a total capacity of 2300 kWp. Electricity production will amount to over 2200 MWh per year.

VOLKSWAGEN

Volkswagen - plans to spend by 2025. 14 billion Euros to invest in decarbonization.

Respecting the Paris Agreement, VW takes responsibility for the need to reduce CO2 emissions and aims to achieve carbon neutrality by 2050.

Volkswagen is supporting the large-scale expansion of wind farms and solar power plants in Europe.

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The ID.3 and ID.4 leave the Zwickau plant as CO2-neutral.

By 2030, the electricity supplying all factories in Europe and the Americas will come from renewable sources.

We can still wait for the car manufacturers to implement their plans.

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EXEMPLARY LESSON PLAN

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LESSON: CAR POLLUTION AND ITS IMPACT ON ENVIRONMENT

Objective: To educate children about car pollution, its causes, effects, and ways to reduce it.

Materials:

- Pictures or illustrations of cars and alternative modes of transportation
- Pen and paper for each child
- Colorful markers or pencils
- Cardboard boxes
- Plastic bottles
- Plastic tubes
- Scissors,
- Bottle tops
- Wooden sticks
- Glue
- Balloons
- Adhesive tape,
- Coloured paper

1. **Introduction**:

a) Begin the lesson by asking the children if they know what car pollution is and if they have heard about it before.

b) Explain that car pollution refers to the harmful emissions released by vehicles that can negatively impact the environment and human health.

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(200) Air Pollution 101 | National Geographic - YouTube

2. Causes of Car Pollution:

Discuss the main causes of car pollution:

a) Exhaust emissions: Explain that cars emit gases such as carbon dioxide (CO_2), nitrogen oxides (NOx), and particulate matter (PM) when they burn fuel.

b) Fuel consumption: Explain that burning gasoline or diesel fuel in cars contributes to air pollution.

3. Effects of Car Pollution:

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https://www.youtube.com/watch?v=CdbBwIgq4rs

Discuss the effects of car pollution:

a) Air pollution: Explain that car emissions contribute to the formation of smog, which can cause respiratory problems and worsen existing health conditions.

b) Climate change: Explain that the gases released by cars, especially CO_2, contribute to the greenhouse effect, leading to global warming and climate change.

c) Environmental impact: Explain that car pollution can harm plants and animals, contaminate water sources, and contribute to the deterioration of ecosystems.

4. Eco-friendly Cars

4.1. Introduction to Eco-friendly Cars:

a) Explain the importance of taking care of the environment and reducing pollution.

b) Introduce the concept of eco-friendly or electric cars and their benefits.

4.2. Energy Sources:

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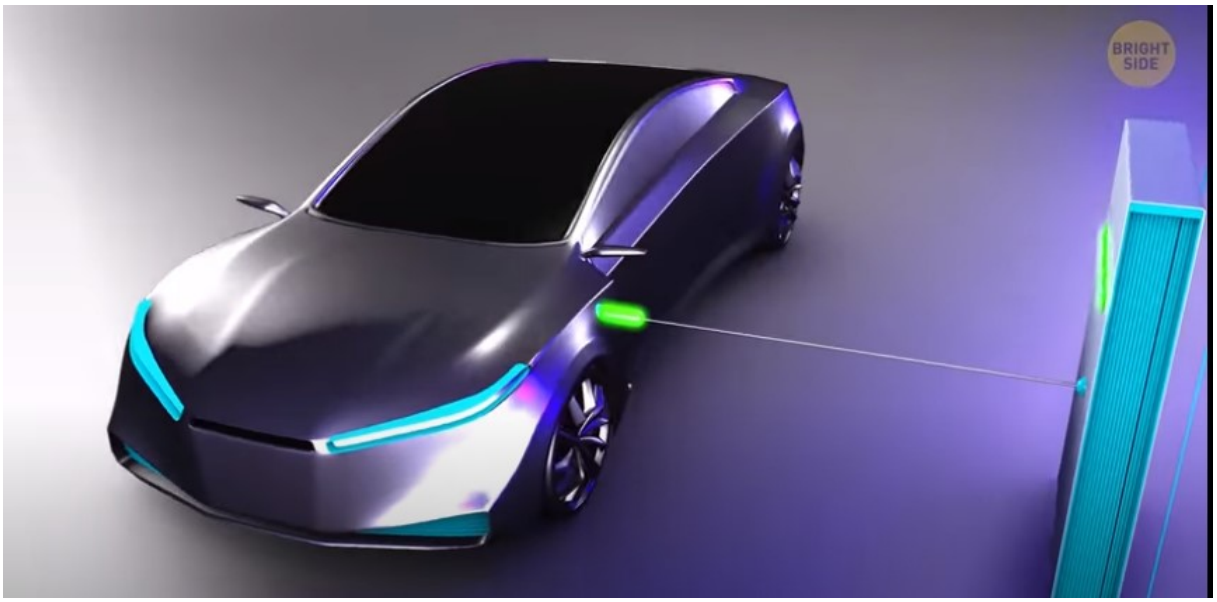
a) Explain the different energy sources used in eco-friendly cars, such as electricity, solar power, or hydrogen fuel cells.

b) Discuss the advantages and disadvantages of each energy source.

Energy resources used in eco-friendly cars:

Electric cars

Electric cars are powered by rechargeable batteries. They work just like the batteries in toys, but much bigger! These batteries store electricity that makes the car move. When you charge the car using a special plug, it gets ready to hit the road with zero emissions. Isn't that amazing?



(201) Electric VS Gas Car | How Electric Cars Work - YouTube

Solar-powered cars

Have you ever seen a car with shiny panels on its roof? Those are solar-powered cars! They use the energy from the sun to generate electricity. When sunlight hits

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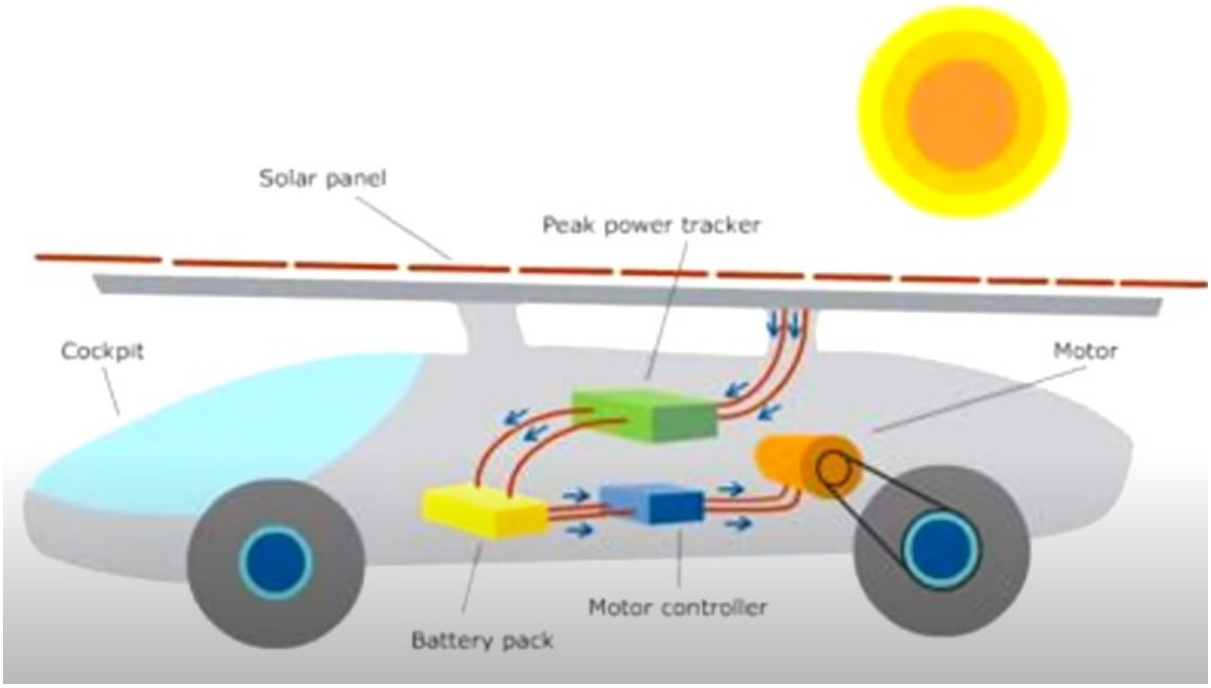
the solar panels, it gets converted into power, making the car move. It's like having a mini-sun on wheels.



(201) Working Principle of a Solar Car - Definition, Working, Parts, Uses and Examples - YouTube

Pedal-powered cars

Imagine using your own energy to power a car! Pedal-powered cars are super cool because you pedal with your legs to make them move. Just like riding a bicycle, your energy propels the car forward. It's not only fun but also great for staying active and helping the environment at the same time.

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(201) VeloMetro's pedal-powered Veemo vehicle aims to get people out of their cars - YouTube

(201) Testing Awesome Pedal Car - YouTube

Hydrogen fuel cell cars

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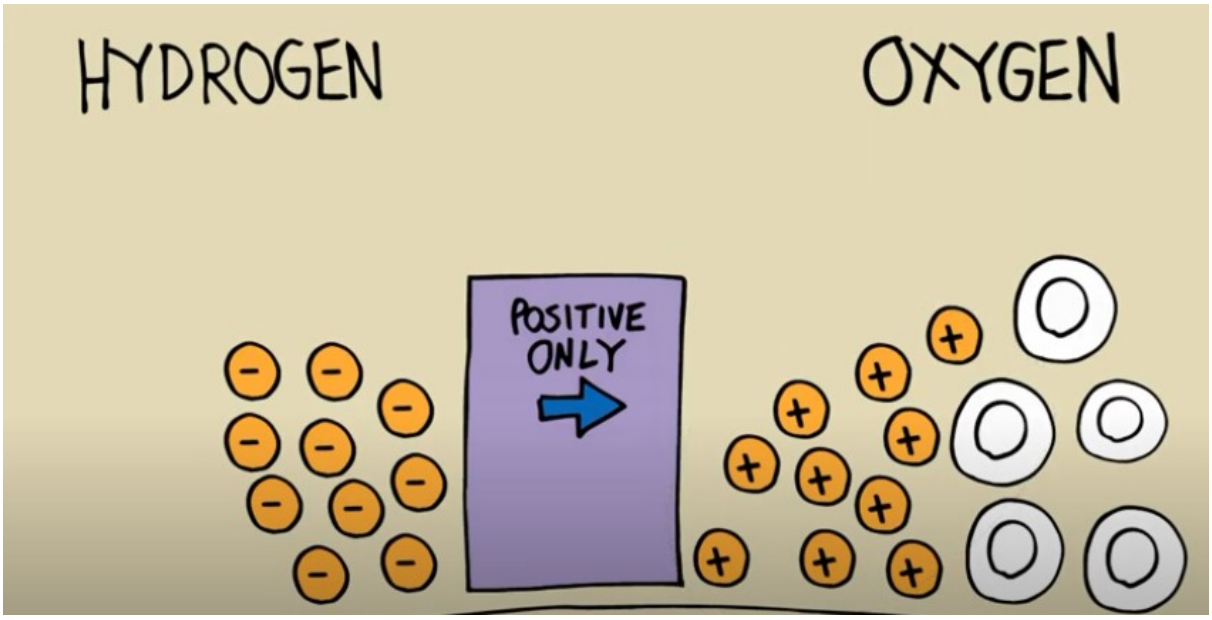
Hydrogen fuel cell cars are like something from the future. They use hydrogen gas to generate electricity. Hydrogen is a clean and abundant resource. When hydrogen combines with oxygen from the air inside a fuel cell, it creates electricity, which powers the car. The only byproduct is water vapor, making it super eco-friendly.



(201) How Does a Hydrogen Fuel Cell Work? | Simple Explanation - YouTube

4.3. Reduce, Reuse, Recycle:

a) Teach the child about the importance of reducing waste and reusing materials.

b) Explain how cars can be made using recycled materials or how their parts can be recycled after use.

4.4. Car Maintenance:

a) Emphasize the importance of regular car maintenance, such as tuning the engine, checking tire pressure, and changing air filters, to improve fuel efficiency.

b) Avoiding unnecessary idling: Explain that turning off the engine when parked or waiting can help reduce emissions

4.5. Driving Habits:

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a) Explain how driving habits can impact the environment.

b) Encourage the child to adopt eco-friendly driving habits such as driving at a steady speed, avoiding unnecessary idling, and carpooling whenever possible.

4.6. Introduce other methods to reduce car pollution:

a) Carpooling and public transportation: Explain the benefits of sharing rides with others and using public transportation to reduce the number of cars on the road.

b) Walking and biking: Discuss the advantages of walking or biking for short distances instead of using a car.

5. "Design an Eco-Friendly Car"

1. Divide the children into small groups and provide each group with paper, markers, colored pencils. They can draw, paint, or create a mixed media collage using the art supplies and any printed images or reference materials provided.

2. Instruct them to design their own eco-friendly car that produces minimal pollution.

3. Encourage them to think about the features and technologies they would incorporate to make the car environmentally friendly.

4. After the designs are complete, ask each group to present their car to the class, explaining the eco-friendly features they included.

This part can be given more time or planned as a separate lesson.

6. Conclusion:

1. Summarize the main points discussed in the lesson about car pollution and its impact on the environment and human health.

2. Encourage the children to share what they have learned with their friends and family and to practice eco-friendly habits to reduce car pollution.

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QUIZ: CAR POLLUTION

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Instructions: Answer the following questions by selecting the correct option (A, B, C, or D).

1. What is car pollution?
   A. Pollution caused by factories
   B. Pollution caused by cars and other vehicles
   C. Pollution caused by burning coal
   D. Pollution caused by cutting down trees

2. Which of the following is a major contributor to car pollution?
   A. Electric cars
   B. Bicycle lanes
   C. Public transportation
   D. Exhaust emissions from gasoline and diesel engines

3. What harmful gases are released by car exhausts?
   A. Oxygen and nitrogen
   B. Carbon dioxide and methane
   C. Carbon monoxide and sulfur dioxide
   D. Hydrogen and helium

4. How does car pollution affect the environment?
   A. It improves air quality
   B. It reduces noise pollution
   C. It supports plant growth
   D. It contributes to air pollution and climate change

5. How does car pollution impact human health?
   A. It has no impact on human health
   B. It can cause respiratory problems and allergies

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C. It improves overall well-being
D. It strengthens the immune system

6. What can we do to reduce car pollution?
   A. Drive more frequently
   B. Avoid carpooling
   C. Use public transportation or walk/bike whenever possible
   D. Buy older, less fuel-efficient cars

7. Which type of car produces less pollution?
   A. Hybrid cars
   B. Large SUVs
   C. Sports cars
   D. Diesel trucks

8. How can car pollution be measured?
   A. By counting the number of cars on the road
   B. By analyzing the color of the car's paint
   C. By monitoring the level of carbon emissions
   D. By measuring the car's speed

Answers:
1. B. Pollution caused by cars and other vehicles
2. D. Exhaust emissions from gasoline and diesel engines
3. C. Carbon monoxide and sulfur dioxide
4. D. It contributes to air pollution and climate change
5. B. It can cause respiratory problems and allergies
6. C. Use public transportation or walk/bike whenever possible
7. A. Hybrid cars
8. C. By monitoring the level of carbon emissions

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Note: After the quiz, take the opportunity to discuss each question and its correct answer, providing additional explanations and examples as needed. Emphasize the importance of reducing car pollution by using more sustainable transportation options and adopting eco-friendly practices.

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ADDITIONAL VIDEOS AND GAMES

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(201) Recycled Materials Balloon Car STEM Project for Kids - YouTube

(201) Air car science project | Science exhibition project - YouTube

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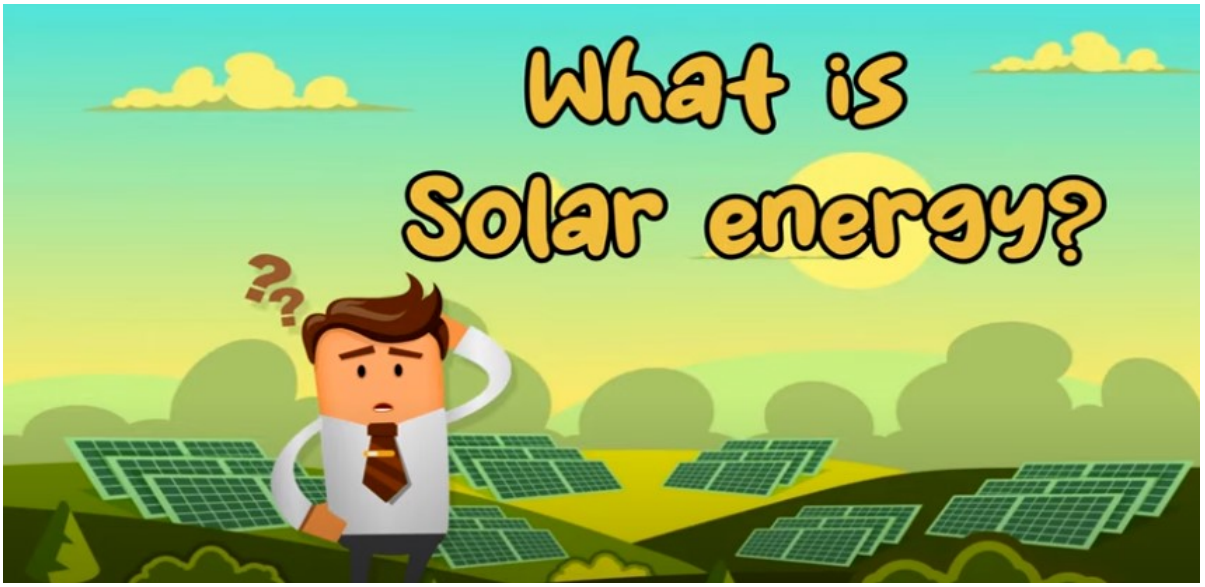
(201) Electric Car Song | Tesla Model X For Children | NEW Kids Music | Gecko's Real Vehicles | Save The Planet! - YouTube



(201) Solar Energy | Science for Kids - YouTube

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Save The Earth Facts Game Quiz Online (ecosystemforkids.com)

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(201) Could solar-powered cars be the future of electric vehicles? - YouTube

(200) Air pollution in cities - YouTube

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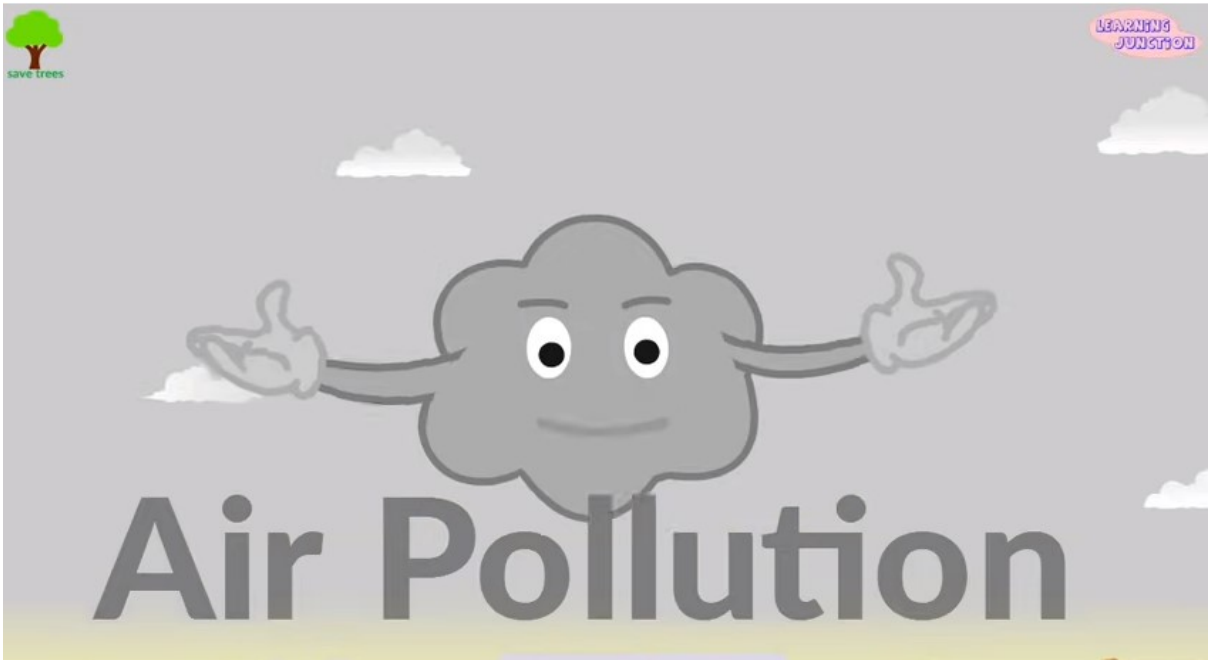

Air Pollution | Video for Kids | Causes, Effects & Solution - Bing video

(200) How is lithium produced? Chile's Salar de Atacama holds the recipe - YouTube

(200) How Ford Makes Car Parts From Used McDonald's Coffee Beans - YouTube

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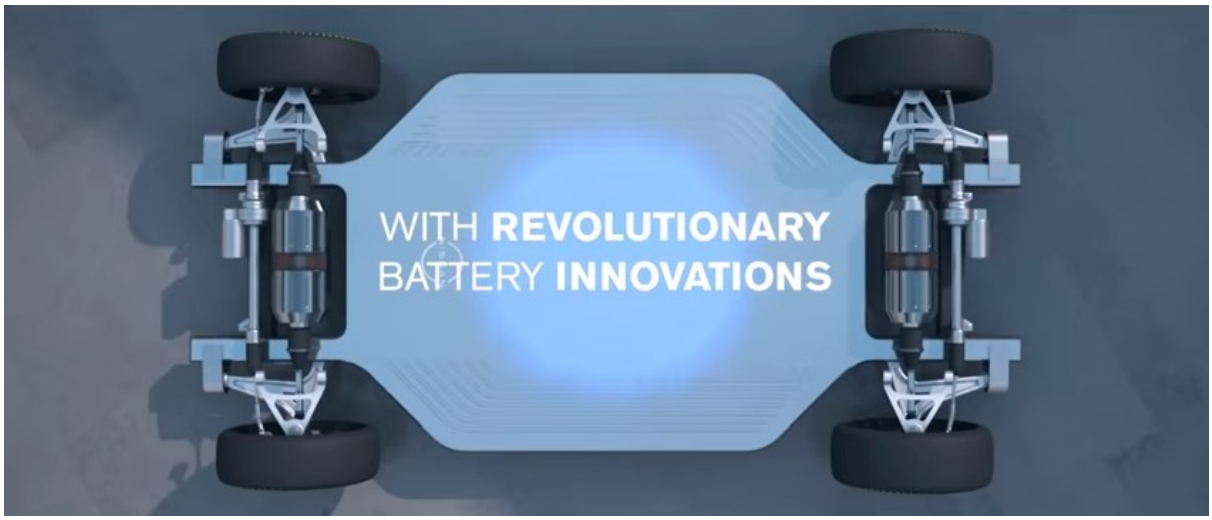
(200) Land. Sea. Air. - YouTube



(200) Nissan Ambition 2030: redefining the future of mobility - YouTube

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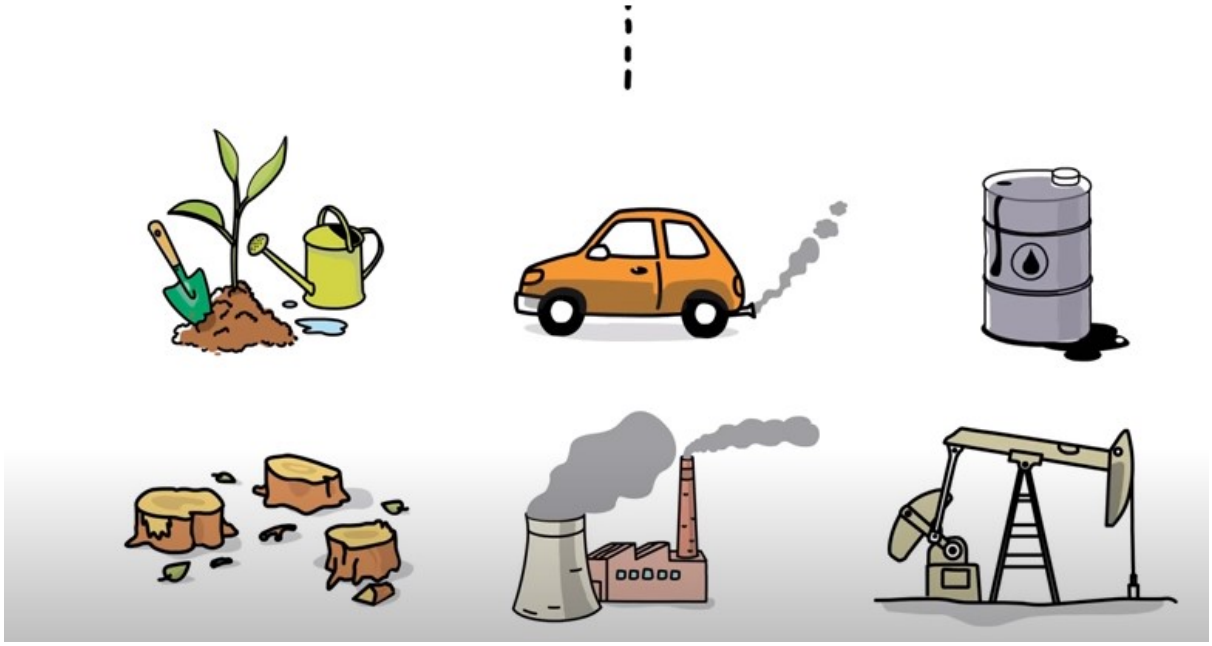
(200) The Renault-Nissan Alliance & sustainable manufacturing - YouTube



(200) Explaining Carbon Neutrality | Sustainability - YouTube

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