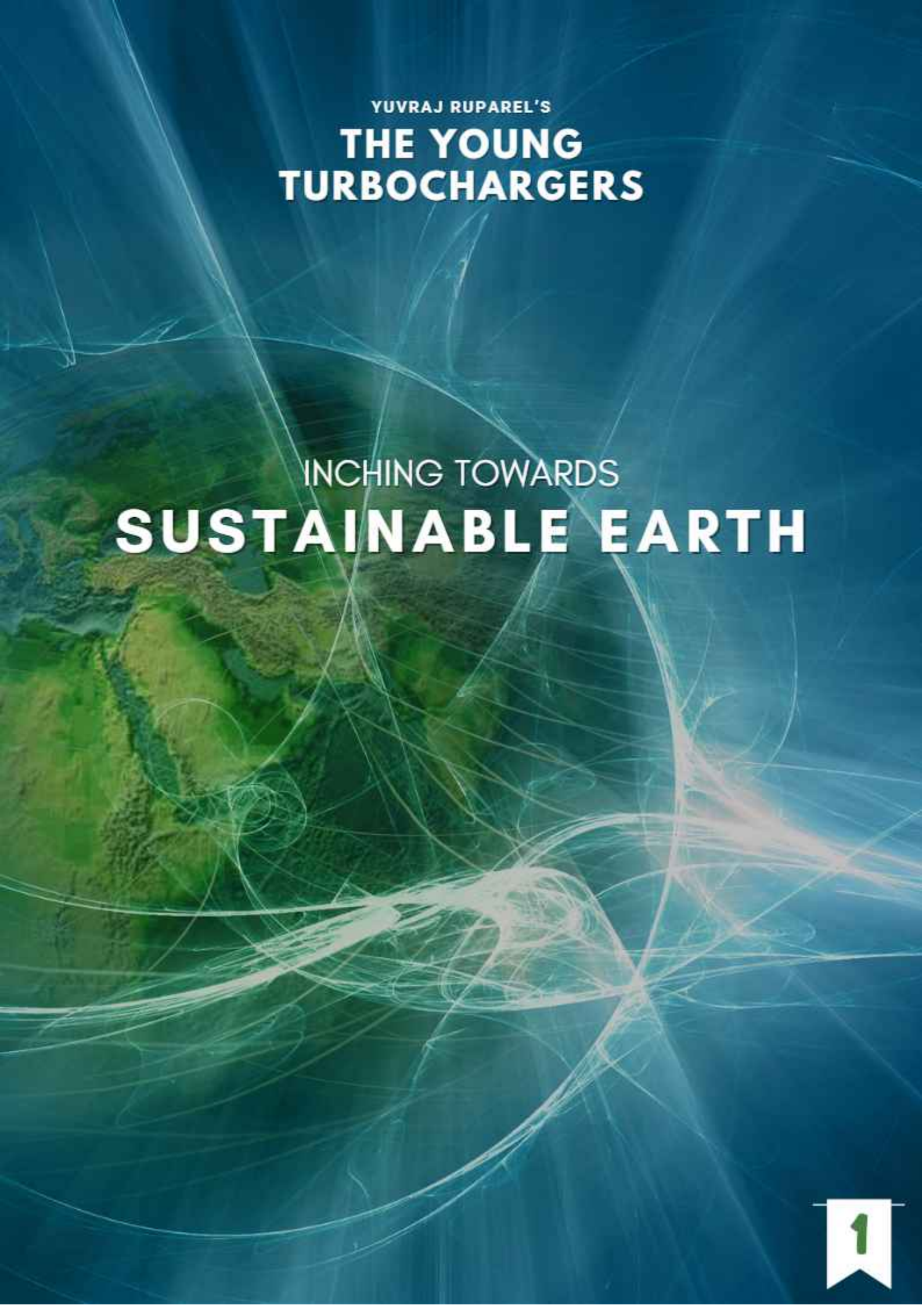
YUVRAJ RUPAREL'S

THE YOUNG TURBOCHARGERS

INCHING TOWARDS SUSTAINABLE EARTH



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TEAM PREFACE

The Young Turbochargers, a group of six curious teenagers, participated in the **F1 In Schools World Finals Competition.** We started our journey on the 24th of March 2022. Each of us reside in Mumbai, India and were from different schools. The Young Turbochargers represented India at the 2023 World Finals and aspired to wave the colors of blue and tangerine on the top of the podium.

Our team consisted of young teenagers who were thirsty for knowledge and were extremely interested in **STEM (Science, Technology, Engineering Mathematics)** as well as **Formula 1**. Hence, this competition was a complete must-do for us. Our members were:

The Team: Lakshya Hirawat (Team Manager, Graphic Designer), Aryaman Kejriwal (Team Manager, Design Engineer), Nathan Doshi (Sponsorship Manager, Manufacturing Engineer), Raghav Sharma (Sponsorship Manager, Graphic Designer), Yuvraj Ruparel (Design Engineer, Manufacturing Engineer) and Rajvir Sehgal (Resource Manager, Graphic Designer).

While being very different and unique from each other, we all shared one common goal; being crowned as the **2023 WORLD CHAMPIONS**.

MEET OUR TEAM

Lakshya Hirawat
Team Manager
Graphic Designer

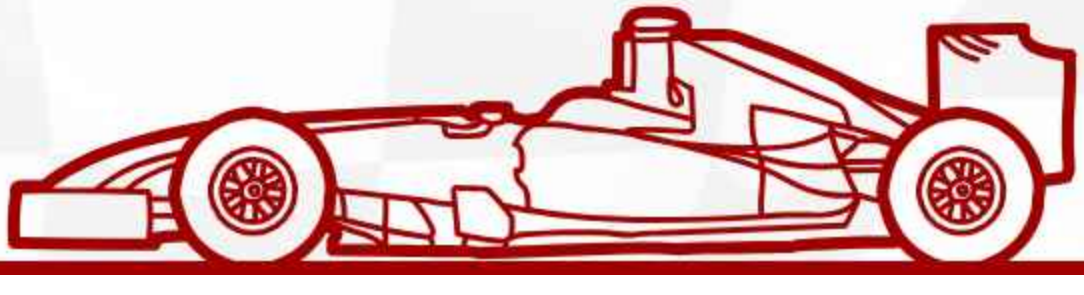
Aryaman Kejriwal
Team Manager
Design Engineer

Nathan Doshi
Sponsorship Manager
Manufacturing Engineer

Raghav Sharma
Graphic Designer
Sponsorship Manager

Yuvraj Ruparel
Design Engineer
Manufacturing Engineer

Rajvir Sehgal
Graphic Designer
Resource Manager



F1 IN SCHOOLS

"F1 In Schools is a worldwide STEM competition where teams from various countries vie for the title of 'World Champions' at the World Finals. Each team, comprising 3-6 members, mimics the structure of an actual F1 team with assigned roles. Using CAM or CAD software, teams design cars based on the official F1 model block, showcasing their STEM skills.

In addition to car design, teams must create two portfolios detailing their journey and car design: The Project Management & Enterprise Portfolio and The Design & Engineering Portfolio. Teams must also adhere to a set of regulations to ensure their car is race legal.

The competition encompasses both Technical and Competition Regulations, fostering the enhancement of design skills and teamwork abilities within each member."

F1™ in Schools

THE ACHIEVEMENTS

Our team's accomplishments in our F1 In Schools journey fill us with immense pride. The Young Turbochargers encountered substantial obstacles during both the India Regional Qualifiers and the India National Finals. Facing off against 55 competing teams in the Regionals presented a formidable challenge, yet The Young Turbochargers triumphed, clinching two esteemed accolades: The Best Newcomer Award and The Best Project Management & Enterprise Portfolio Award, ultimately securing the title of CHAMPIONS of the India Regional Qualifiers.

The journey continued into the India National Finals 2022, where despite initially feeling confident following our prior victory, apprehension gripped us. With only the top 3 teams out of 50 advancing to the World Finals 2023, the pressure mounted. Nevertheless, our apprehensions failed to deter us as the National Finals drew near.

During the National Finals, The Young Turbochargers not only claimed three awards but also garnered nominations for seven others. We were bestowed with the People's Choice Award, The Best National Collaboration Award, and The Best Scrutineering Award. Despite aspiring to rank among the top 3, our team attained 3rd place (2nd Runner's Up) at the Nationals, solidifying our position in the World Finals 2023.

We eagerly anticipate the forthcoming challenges and prospects awaiting us at the World Finals. Our objective is to proudly exhibit the saffron, white, and green hues of our nation atop the podium.

We invite you to extend your best wishes and lend your support as we embark on our most audacious undertaking yet: The Formula 1 In Schools World Finals 2025.

THE ACHIEVEMENTS

Explore the impressive array of prestigious awards earned during our F1 In Schools endeavor.

India Regional Qualifiers 2022:

National Finals India 2022:

INTRODUCTION TO SUSTAINABILITY

The concept of sustainability revolves around preserving something of significant value, particularly our planet Earth in our present context. Sustainability entails meeting present needs without compromising the ability of future generations to meet their own needs. This involves conserving finite resources like water and electricity to ensure they are available for future use without sacrificing the quality of life today. A sustainable society must prioritize social responsibility, environmental protection and maintaining a balance in between human and natural ecosystems. This requires avoiding the depletion of resources like fossil fuels that could harm future generations. Awareness about sustainable practices is crucial, as continued unsustainable resource usage could lead to severe consequences in the future. Embracing renewable energy sources like solar and wind power is essential for building a sustainable future.

The United Nations also released the Sustainable Development Goals which consist of today's biggest problems we are facing as well as what we must do to preserve our planet for future generations.

ELEMENTS OF SUSTAINABILITY

Sustainability comprises of four essential pillars: Environmental protection, Air quality, Water conservation and Clean power generation.

- Environmental Protection: Focuses on reducing carbon footprints, water usage, non-degradable packaging and wasteful processes.
- Air Quality: Regulates emissions from sources like fossil fuels to improve public health.
- Water Conservation: Controls pollutant discharges into water bodies to preserve marine life and support Sustainable Development Goals.
- Clean Power: Aims to reduce carbon pollution by promoting clean energy sources like solar and wind power.

The Venn Diagram includes environmental, economic, and social development as elements of Sustainability. While not directly contributing to Planet Sustainability, they are crucial in our daily lives.

SUSTAINABLE ENVIRONMENT ++

As mentioned earlier, sustainability is the process of preserving and maintaining our planet. The Earth includes air, water, soil and other living & non- living organisms that becomes the part of the environment.

For a longer survival on this planet, we must make our environment and our surroundings much more sustainable!

"How do we achieve this?"

We've learned many ways to keep our environment clean and healthy, but we often don't put them into practice. It's important to start doing these things from right now onwards, in order to protect the environment for the future.

Having a clean and healthy environment is really important for staying healthy. If the air we breathe is dirty because of pollution, it can make us sick. And it's not just air pollution, we also have to worry about noise and water pollution. What we eat and hear every day can affect how healthy we are.

That's why it's important to keep our environment clean. If the soil and ground are polluted, it can make the plants we grow unhealthy. Then, the food we eat won't be good for us. So, taking care of the environment isn't just about making things look nice; it's about keeping ourselves healthy too.

SUSTAINABLE ENVIRONMENT ++

Prioritizing a sustainable environment is crucial for supporting biodiversity and protecting our planet's habitats. This is essential for ecosystems and the diverse animal species, including humans, to thrive. In the 21st century, mental health has become a major concern, significantly affecting our well-being. A healthier, cleaner and more sustainable environment greatly improves mental health. For instance, green spaces near schools enhance children's cognitive development. Studies also indicate a link between exposure to nature and increased feelings of happiness, well-being, and purpose.

Furthermore, urgent issues like climate change and global warming are mainly caused by human activities. A sustainable environment is crucial for mitigating their impacts. The environmental consequences of these challenges underscore the need for decisive action towards a healthier future.

Creating a more sustainable environment is a vital solution to many of today's major challenges, including climate change, global warming, and human health. Preserving our environment benefits both current and future generations is utmost necessary. Simple actions like turning off lights and conserving water contribute to a cleaner environment. With the rising global awareness, companies and environmentalists lead campaigns and protests that help to promote sustainability worldwide. The image besides showcases notable sustainability campaigns and protests, featuring Swedish environmentalist Ms. Greta Thunberg.

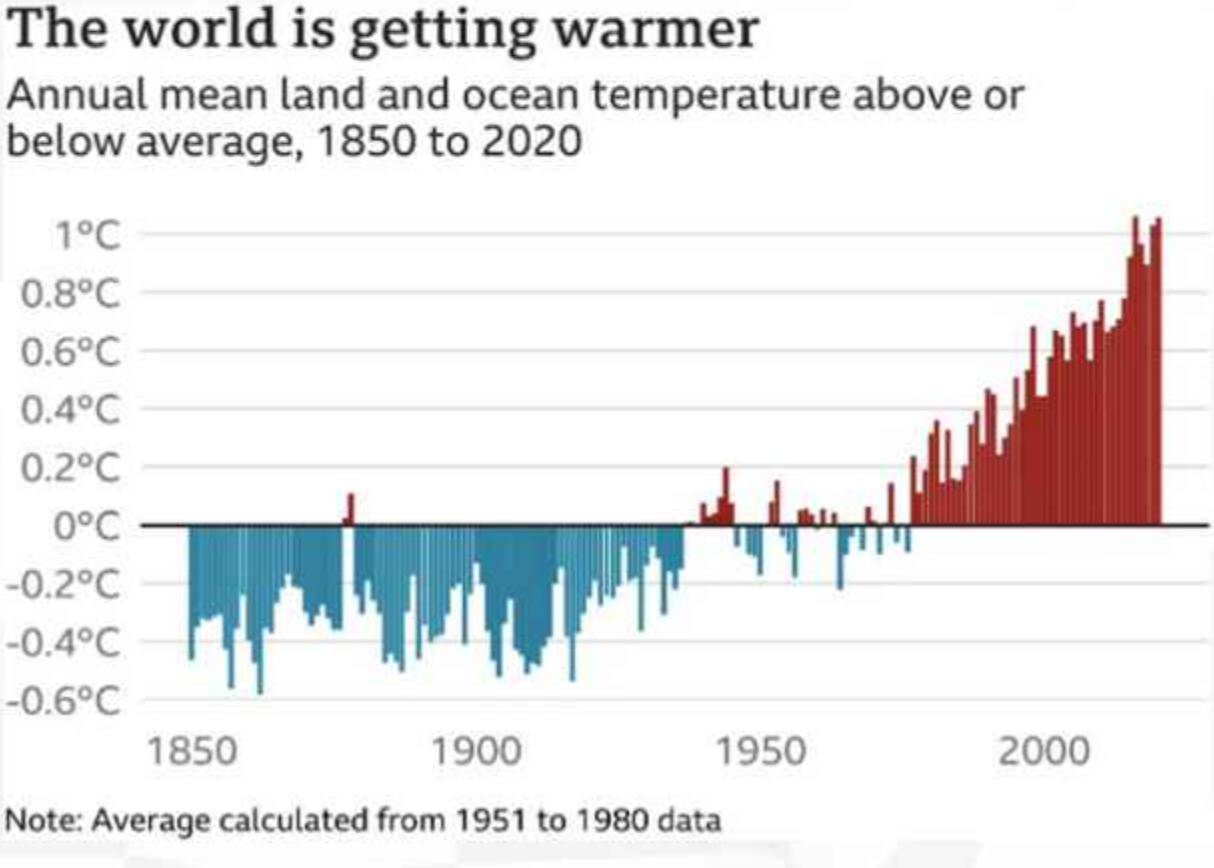
A SUSTAINABLE FUTURE

Imagining the future is common, often envisioning flying cars and advanced AI. Yet, amidst such fantasies, it's crucial to prioritize sustainability. This entails ensuring future generations can meet their needs without compromising resources. Achieving this involves reducing reliance on non-renewable resources.

A sustainable future guarantees universal access to clean water and sanitation, countering current shortages affecting a fifth of the global population.

Innovations like LifeStraw offer hope, purifying water affordably. With such advancements, safe water access could be ubiquitous within 50 to 100 years, alleviating future scarcity concerns.

Climate change, intensifying yearly, demands urgent action. Rising global temperatures underscore the need for concerted efforts to mitigate its impacts. Increased awareness will spur individuals and governments to act, potentially stabilizing Earth's conditions for generations to come.



IMPORTANT MOVES

We often hear about raising awareness for the environment, but let's talk about the concrete measures we can take to preserve it. Starting with the **3Rs**:

Reduce: Cutting down waste not only benefits the environment but also public health by reducing toxins in the air and water. Items like lithium batteries can harm wildlife and the atmosphere if not disposed off properly.

Reuse: Giving items a second life, lessens the demand for new resources like wood and oil. Reusing materials or donating old clothes are simple yet effective ways to reduce waste.

Recycle: Recycling helps repurpose waste, reducing pollution and creating new products. Look for recycling bins to dispose of items that can be made into something useful.

Education plays a vital role too. By informing others about environmental issues, we can inspire lifestyle changes. Alarming facts like irreversible climate change by 2030 and the risk of extinction for over a million species can motivate action.

Lastly, choosing eco-friendly products can make a difference. Opt for fuel-efficient vehicles and energy-saving appliances labelled with Energy Star. Consider clean energy sources like solar or wind power for your household devices. These steps, however small, collectively contribute to a healthier planet.

CONTRIBUTE TO THE PLANET

Learn how you can contribute to a sustainable planet with these simple actions for a greener, healthier future.

Spread Awareness as a Student: If you're a student, educate others about climate change and global warming. Use posters, flyers, webinars, and your creativity to highlight important measures. Check out some examples below.

Corporate Campaigns for Sustainability:

Return, Reuse & Repeat: The Body Shop partnered with TerraCycle to install recycling bins in stores globally. Customers return empty bottles for discount vouchers, promoted through the viral hashtag #BringBackOurBottles.

Image of The Body Shop's packaging for the campaign.

Image of Lacoste shirts with endangered animals.

The Disappearance of the Crocodile: Lacoste, in collaboration with the International Union for Conservation of Nature (IUCN), replaced its crocodile logo with 10 threatened species on its shirts, matching the number of shirts to the number of individuals left in the wild.

THE SPORT EFFECT

Sports play a significant role in today's sustainability efforts, with varying impacts on the planet.

While sports like hiking, swimming and running, foster a connection with nature, others harm the environment. Let's examine a few examples:

Skydiving and Air Sports: These thrilling activities require jets that consume a lot of fuel, leading to a high carbon footprint per jump. Competitive events increase this environmental impact due to frequent flight travels.

Golf: Despite its green look, golf courses often involve deforestation and wildlife displacement. They also use up to 2.08 billion gallons of water daily and depend on harmful pesticides and herbicides, which pollute nearby ecosystems.

Motorsport and the Environment: Motorsport significantly harms the environment. NASCAR vehicles, for instance, burn 6,000 gallons of fuel each weekend, earning the label "A Waste of Gas" from the U.S. government. Similarly, Formula 1 & Drag Racing release large amounts of fuel and emit around 120,000 pounds of CO_2 per race weekend, contributing to substantial carbon emissions. However, Formula 1 and Drag Racing are moving towards more eco-friendly practices. We hope NASCAR will also adopt environmentally friendly changes. Read the next chapter to learn more.

NEXT TIME YOU ENJOY THESE SPORTS, CONSIDER THEIR ENVIRONMENTAL IMPACT!

ACTIVITY- KEY TAKEAWAYS

What is your favorite sport? Research its impact on sustainability. Does it contribute to a greener environment or have negative effects? Use your research skills and write in the space provided below.

SUSTAINABILITY IN MOTORSPORT

Motorsport, despite its large carbon footprint, is moving towards a more eco-friendly future. Formula E is leading with its sustainable approach, and Formula 1 plans to achieve net-zero carbon by 2030 with its advanced technology. MotoGP is also working on using greener fuels.

Notable sustainability efforts include:

1. Formula 1 and Sustainable Aviation Fuel (SAF):
Mercedes AMG PETRONAS is adopting SAF for air travel, aiming to cut their carbon footprint by 50%. SAF, made from waste and renewable sources, could reduce emissions by 65%.

2. Aston Martin Racing and Aramco Partnership:
Their goal is to use sustainable fuels by 2025 and reach net-zero carbon by 2030. They are developing efficient hybrid engines and low-carbon synthetic fuels, promoting sustainability in and beyond racing.

THESE INITIATIVES SHOW MOTORSPORTS' DEDICATION TO A GREENER PLANET!

A BRIGHTER FUTURE

Sports are moving towards a sustainable future, with motorsports leading the way due to their high environmental impact from fuel use. F1 has been managing the Net Zero Carbon project since 2019, producing 256,000 tonnes of carbon emissions in that season.

To achieve sustainability, F1 is:

- Reducing single-use plastics and promoting reusable bottles and water stations.

- Encouraging reusing, recycling and repurposing race supplies. Circuits collaborate with local food banks to donate excess food, like the 1.5 Tonnes given to charities after the 2020 Australian Grand Prix cancellation.

- Offering greener travel options to events, exemplified by Zandvoort, where 25,000 fans biked and 40,000 used public transport or walked.

- Using only sustainable fuels from 2026, including e-fuels made from approved carbon capture, municipal waste, or non-food biomass, meeting the Renewable Energy Directive standards.

THE NEGATIVE EFFECTS

Science and sustainability are closely linked, as science can have both positive and negative impacts on the environment. While scientific advancements make life easier, they often harm the planet.

Technology, such as cellphones, laptops, and automobiles, though is essential to our lives and industries, it also causes environmental damage. For instance, science has produced nuclear, chemical and biological weapons that pose significant threats to our planet.

Understanding the connections between science, technology and the environment is crucial for sustainability. This chapter will explore examples of how science and technology negatively impact sustainability.

Heat Pollution from Technology:
Technological devices generate significant heat, warming the atmosphere. Automobiles, in particular, contribute greatly to heat pollution.

E-Waste:
Technological waste disrupts the environment. Factories produce substantial waste, often dumped in lakes, releasing toxic gases and contaminating water, leading to deadly diseases.

THE NEGATIVE EFFECTS

Depletion of Natural Resources:

The growing global population increases natural resource degradation. Technological advancements make resource extraction easier, leading to production declines.

Nuclear Energy:

Non-renewable energy sources like nuclear power produce radioactive waste harmful to human health and the environment. Nuclear plants near water bodies release toxins that contaminate water and harm marine life.

These examples show the environmental impacts of science and technology. However, environmental science has emerged to address these issues, aiming to build a sustainable future. Advances in various scientific fields are now focused on creating a greener future and preserving our planet.

"THE PROPER USE OF SCIENCE IS NOT TO CONQUER NATURE BUT TO LIVE IN IT"

- BARRY COMMONER

ACTIVITY- KEY TAKEAWAYS

Which electronic device do you spend most of your time on? Is it your laptop, mobile phone, PlayStation, or Xbox? Research its impact on our environment. Is it contributing to a greener future or not? Write your findings in the space provided below.

SCIENCE & SUSTAINABILITY

Science plays a vital role in environmental sustainability by fostering innovative solutions to complex issues like climate change, biodiversity loss, pollution and poverty reduction. It has enabled the discovery of clean energy sources and led to significant reductions in pollutants worldwide. For instance, modern cars are 99% cleaner than those from fifty years ago. Renewable resources can meet global energy demands over 3,000 times. Advances like solar panels provide cleaner water and power entire communities. Technology, such as digital presentations, reduces reliance on paper, curbing deforestation and aiding conservation efforts.

Every year, the urgency to address environmental issues and combat global warming escalates. Fossil fuels, our current mainstay, pose significant threats to our future. Sustainable energy emerges as a crucial solution, offering sources that never deplete and cause minimal harm to the environment. Wind, solar, and hydropower are prime examples, alongside geothermal energy tapped from the Earth's internal heat.

SUSTAINABLE ENERGY

Sustainable energy brings many benefits. It's good for the environment and for you too! Let's explore its advantages.

1. Better Health: Burning fossil fuels causes serious health problems like cancer and heart issues. Sustainable energy doesn't emit harmful pollutants, keeping us healthier.

2. Reduced Carbon Footprint: Switching to wind or solar energy cuts carbon emissions, helping fight global warming.

3. Long-term Savings: Though initial costs may seem high, sustainable energy is cheaper in the long run. Plus, you may qualify for tax breaks, saving you even more money.

4. Energy Security: Sustainable energy is reliable and doesn't run out. It reduces our dependence on costly imported fuels and helps preserve natural resources.

Looking ahead, it's crucial to address the current energy crisis. Human activities have already heated the Earth by 1.5 degrees, mainly due to fossil fuel use. Sustainable energy offers hope by reducing emissions and slowing down climate change. Choosing clean energy is a step towards a healthier planet for future generations.

THE FUTURE

Innovations are shaping a greener future with solutions to environmental challenges.

AirCarbon: Sustainable Plastics

AirCarbon, by Newlight Technologies, turns carbon emissions into versatile, eco-friendly plastics. It is cost-effective and it breaks away from petroleum sources. Moreover, its carbon-negative nature helps combat climate change by reducing greenhouse gas emissions during production.

Groasis Waterboxx: Desert Agriculture Revolution

The Groasis Waterboxx, created by Pieter Hoff, uses recycled paper to efficiently cultivate crops in deserts, reducing water usage by 90%. Its design also protects seedlings from harsh environments, ensuring higher survival rates and greater crop yields in arid regions.

The Veganbottle: Biodegradable Packaging

LYSPACKAGING's Veganbottle is a fully biodegradable alternative to plastic bottles, made from sugar cane extracts. Its production is energy and water efficient. Additionally, its biodegradable nature, reduces pollution and plastic waste in the landfills and oceans, contributing to a cleaner environment.

FACTS & QUOTES

Learning further about sustainability through this book, take a look at the intriguing facts on sustainability and quotes that might inspire and motivate you to create a better planet to live in.

Facts

The USA only makes up 5% of the world's population, but it throws our enough plastic waste to encircle the Earth five times!

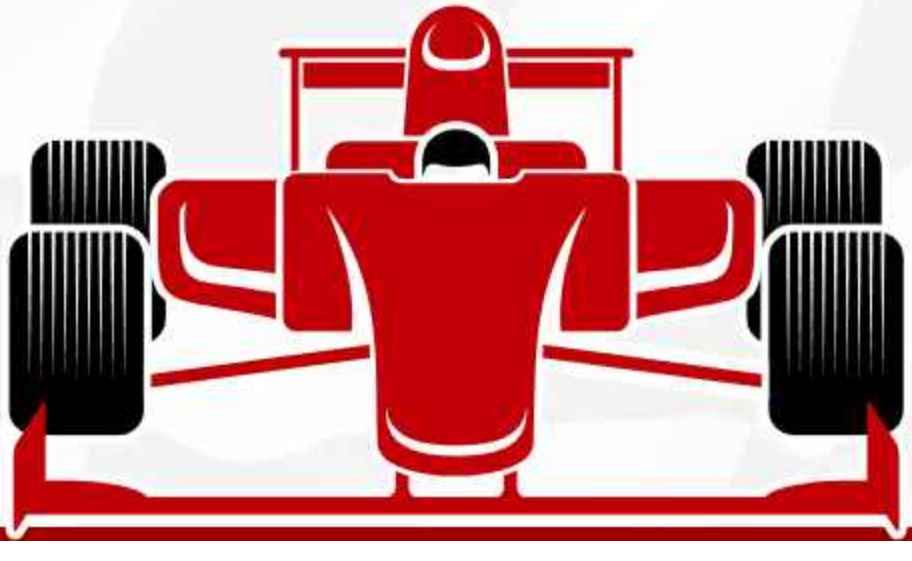
Did you know, a modern glass bottle takes up 4,000 or more years to decompose!

The U.S. is the #1 trash-producing country in the world at 1,609 pounds per person per year. This means that 5% of the world's people generate 40% of the world's waste. We toss out two billion plastic razors, a million and a half tons of paper towels, and 12 billion disposable diapers annually!

In the last 170 years, we added 2.4 trillion tons of Carbon Dioxide into our atmosphere. Half of this was added in the last 35 to 50 years!

The five warmest years on record have occurred in the last decade!

Scientists predict that if the increase in greenhouse gas emissions continues unabated, temperatures will rise by as much as 10 degrees Fahrenheit by the end of this century (which is a lot!!)



FACTS & QUOTES

Quotes

"Sustainability is no longer about doing less harm. It's about doing more good."
-Jochen Zeitz

"Sustainability has to be a way of life to be a way of business."
-Anand Mahindra

"The Earth is what we all have in common. We must protect it."
-Wendell Berry

"We never know the worth of water until the well is dry."
-Thomas Fuller

"The greatest threat to our planet is the belief that someone else will protect it."
-Robert Swan

"Sustainability is treating ourselves and our environment as if we are to live on this planet forever."
-Arron Wood

"Sustainability is about ecology, economy and equity."
-Ralph Bicknese