

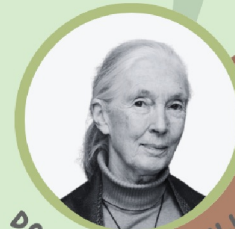
ISSUE 09

# SWEET

ENVIRONMENTAL SCIENCE



DIY BIOPLASTIC



DR. JANE GOODALL





RENEWABLE ENERGY



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## ABOUT

SWEET (Science with Exciting Experiments & Tips) is a zine that aims to spark curiosity and empower the next generation of girls in STEM through hands-on experiments, fun lessons, and games.

## SOLUTION

- Slower climate warming
- Using renewable energy →
- Healthier ecosystems
- Conserving water →
- Cleaner air and water
- Recycling materials →
- Rising CO<sub>2</sub> levels
- Burning fossil fuels →
- Loss of habitats
- Cutting down forests →

## OUR TEAM

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# EMBRACE OUR ENVIRONMENT

You tighten your backpack straps, your boots press into soft soil and the air smells fresh, like rain and leaves. You're an explorer, about to step into the greatest adventure of all: Planet Earth. But before you take your first step, you pause.

The **environment** is everything around you: the air you breathe, the water you drink, the soil beneath your feet, the animals, the plants, even the tiny invisible microbes living in a single spoonful of dirt. It's a giant, connected system where everything affects everything else. Today, you're going to explore it.

## THE FOREST

You step into a forest, golden sunlight filtering through layers of green leaves. Birds call to each other overhead, and the ground feels alive beneath your boots.



Forests are like the lungs of our planet. Through **photosynthesis**, trees absorb **carbon dioxide** and release **oxygen**. They store carbon in their trunks, branches, and roots, helping slow climate change.

As you walk deeper, you notice a patch of trees cut down. The soil feels dry. The air is warmer. When forests disappear, we lose oxygen producers, wildlife habitats, and one of our strongest defenses against climate change.

Modern **wind turbines** are engineering marvels. Some are even taller than skyscrapers, with blades longer than a football field! Entire wind farms now power cities and rural communities alike.

Wind energy produces electricity without burning fuel or polluting the air. It's clean, efficient, and increasingly affordable. However, it isn't constant everywhere. Engineers must carefully choose windy locations and develop better storage systems for when the air is still.

## HARNESSING HYDROPOWER

From ancient waterwheels to modern dams, water has powered human civilization for centuries. **Hydropower** works by harnessing the energy of flowing water. When water moves downward due to gravity, it spins turbines connected to generators, creating electricity.

Today, scientists and engineers are developing smaller, less invasive hydropower systems to balance energy production with environmental protection.

## HANDLING HYDROGEN

**Hydrogen** atoms are energy carriers. Using electricity, water can be split into hydrogen and oxygen through a process called **electrolysis**. The hydrogen can then be stored and later used in fuel cells to produce electricity. The only byproduct is water.

Hydrogen has a lot of potential for powering heavy transportation, industry, long-term energy storage, and more. As we speak, scientists are working to make it more efficient and affordable.

## WHY IT ALL MATTERS

At its heart, renewable energy is about redesigning how we power civilization. However, the transition won't happen overnight: it requires new infrastructure, better batteries, smarter electrical grids, and thoughtful planning. But the science is clear: we have the tools. The question is how quickly we choose to use them.

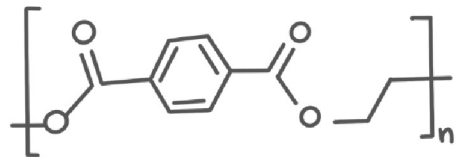
# DIY Bioplastic

By Chloe Drieu & Melody Alduy-Berman

We use plastic every single day: water bottles, food wrappers, toys, phones, pens, and even parts of our clothes are made from it. But have you ever wondered what plastic actually is, where it comes from, and why so many scientists are worried about it?

Most modern plastic is made from crude oil and natural gas. These fossil fuels are taken from deep underground and processed into chemicals that can be linked together to form **polymers**.

A polymer is a material made of very long chains of repeating molecules. Picture this: a giant string made of thousands of tiny beads connected together. In most plastics, those “beads” are carbon atoms linked into extremely long, strong chains.



Some of the most common types of plastic are **polyethylene** (chemical formula on the left), used in plastic bags and bottles, and polypropylene, used in bottle caps and containers.

## PITFALLS OF PLASTIC

Yes, plastic is useful, but it comes at a serious cost. Plastics are made of long carbon chains, so they are chemically stable and do not easily break down. Nature doesn't have many microorganisms capable of digesting these synthetic polymers. As a result, plastic can take hundreds of years to decompose.

# Footprints & Fallout

Every step we take leaves a mark. In this activity, you'll explore how everyday human actions create effects across the environment.

On the left side of the page, you'll find a list of **actions**: choices people make, often without thinking twice. On the right, a list of **effects**: the changes those actions trigger in the world around us. **Draw lines to connect each action to its most likely effect.**

## ACTIONS

- Cutting down forests •
- Burning fossil fuels •
- Recycling materials •
- Conserving water •
- Using renewable energy •

## EFFECTS

- Loss of habitats
- Rising CO<sub>2</sub> levels
- Cleaner air and water
- Slower climate warming
- Healthier ecosystems

*solutions page 13*

Some connections may feel obvious, but others may surprise you. One action can lead to more than one outcome, which reminds us that the environment is an extremely connected system, where small decisions can create lasting change.

Looking at the lines you've drawn, which action left the biggest footprint? Which effect felt the most serious?

Because in the end, the planet remembers every step we take.

## LEGACY

Jane Goodall was a pioneer in environmental conservation. Her studies on chimpanzees behavior completely transformed the way scientists approach their understanding towards animals and the natural world. Over the years, Goodall received numerous awards like the United Nations Messenger of Peace and the title of Dame Commander of the Order of the British Empire



*You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make.*

Goodall's work has left an everlasting impression on scientists, environmentalists, and young people to protect and conserve the planet and its inhabitants. Her story reminds us that curiosity and empathy are key to create meaningful change in the world.



Instead of fully breaking down, plastics often turn into **microplastics**, which are tiny fragments that end up in oceans, soil, air, food, water, even our bodies.

While plastic itself isn't automatically "poison," its long-lasting nature and chemical additives can create environmental and health challenges over time. One exciting solution is creating **bioplastics**: plastics made from renewable biological materials instead of fossil fuels.

## LET'S MAKE BIOPLASTIC!

### MATERIALS

- 4 tablespoons of water
- 1 tablespoon of cornstarch
- 1 teaspoon of vinegar
- 1 teaspoon of glycerin (available at most pharmacies)
- A cooking pan
- A baking tray
- A whisk or spoon
- A spatula

Bioplastic is a **biodegradable**, plastic-like material made from natural ingredients such as starch.

⚠️ Ask a trusted adult for help, the mixture gets very hot!

1. Add the water, cornstarch, vinegar, and glycerin into the cooking pan.
2. Heat over medium heat while whisking continuously. Don't stop stirring!
3. After a few minutes, the mixture will thicken. You may need to switch to a wooden spoon.
4. Continue stirring until the mixture becomes thick, sticky, and glossy white.
5. With an adult's help, pour and spread the hot mixture evenly onto a baking tray using a spatula.
6. Let it dry for 24 hours.

Once dry, you'll have your very own sheet of eco-friendly bioplastic!



THANK YOU!



Dear Readers,

Welcome to the ninth issue of SWEET!

This issue is especially close to my heart because it focuses on something I care deeply about: protecting our planet. With the help of environmental science, we can better understand the challenges our world faces, like climate change, pollution, habitat loss, and more. Let's discover ways to make a positive impact!

It's so important to learn, explore, and practice sustainability. Together, we can protect the environment and inspire change for a healthier planet.

Happy exploring,

Chloe

Women in STEM

# Dr. Jane Goodall

1934-2025

By Aleena Wong

Dr. Jane Goodall is a world-famous primatologist, anthropologist, and conservationist best known for her 65-year study on Chimpanzees in Gombe, Tanzania. She didn't just observe these amazing animals, she lived among them, immersing herself in their world. This helped her understand their social behaviors and to realize how similar they are to humans. Even outside her research, Goodall used her platform and knowledge to inspire action: she founded a youth program called Roots & Shoots, encouraging everyone to help animals and the planet.

From a young age, she has had an interest in animals and dreamed of studying them in Africa. Her passion was fulfilled once she met Dr. Louis Leakey who hired her as secretary at the National Museum in Nairobi.



## HER STORY

Jane Goodall grew up in London, England. After school, she traveled to Nairobi, Kenya, where Leakey encouraged her to study primates. She returned to England to earn her PhD in ethology, the study of animal behavior, from the University of Cambridge.



In 1960, Goodall began her famous study of chimpanzees at the Gombe Stream National Park in Tanzania. Through close observation and careful notes, she discovered that chimpanzees create and use tools, form relationships, and experience emotions, which had previously been thought to be only human traits. Her work changed the way scientists see animals and highlighted just how connected humans and animals truly are.

She didn't stop at research, though. Goodall dedicated her life to protecting wildlife and teaching young people about conservation. In 1977, she founded the Jane Goodall Institute to protect chimpanzees and their habitat, and later founded the Roots & Shoots program to get young people involved in environmental advocacy. Her compassion, curiosity, and commitment to wildlife have inspired generations to care for the world around them, making her one of the most influential environmentalists.

# Renewable Energy

For over a century, much of our energy has come from **fossil fuels** (coal, oil, natural gas) formed from ancient plants and organisms buried millions of years ago. When we burn them, they release carbon dioxide and other **greenhouse gases** that trap heat in our atmosphere.

What if we could power our world without overheating it? That's where **renewable energy** comes in. Renewable energy naturally replenishes Earth's heat. Unlike fossil fuels, they generate energy with little to no greenhouse gas emissions. Let's explore a few ways how!

## SEIZING SUNLIGHT

Every hour, the Sun sends more energy to Earth than humanity uses in an entire year.



**Solar panels** convert sunlight directly into electricity. When sunlight hits the panel, it energizes electrons inside the material. Those moving electrons create an electric current, and just like that, light becomes power.

Solar energy now powers homes, schools, calculators, satellites, and even entire neighborhoods. The challenge is that the Sun doesn't shine at night, and cloudy days reduce output. Still, as long as the Sun shines (which it will for billions more years), solar energy remains one of our most abundant resources.

## WIELDING WINDPOWER

Wind begins with the Sun. Because Earth's surface heats unevenly, warm air rises and cool air sinks. That movement creates wind. When wind spins the blades of a turbine, it turns a generator inside, producing electricity.

## THE ARTIC

The air suddenly turns sharp and cold. Snow crunches beneath your boots. You've arrived in the Arctic: a world of ice, glaciers, and polar winds



At first, it seems empty, but beneath the ice live fish and plankton, forming the base of a fragile food web. On the ice, a mother polar bear carefully guides her cubs across the frozen surface.

The ice reflects sunlight back into space, helping keep Earth cool. This is called the **albedo effect**. But as global temperatures rise, Arctic ice melts. Dark ocean water absorbs more heat, sea levels rise, and animals lose the ice they depend on to survive. The Arctic may *feel* far away, but what happens here affects the entire planet.

## THE SKY

Suddenly, you're soaring upward into the sky. It looks empty, but it's filled with gases forming our **atmosphere**.

The atmosphere acts like a blanket, trapping just enough heat to keep Earth livable. This natural greenhouse effect makes life possible. But burning **fossil fuels** releases extra greenhouse gases, thickening that blanket and overheating the planet. The result is rising temperatures, stronger storms, melting ice, and rising seas.

## THE POWER OF YOU

As you return to the ground, you realize something important: you aren't separate from the environment, you're part of it.

You can **reduce waste**, **reuse** and **recycle**, **conserve water**, support **renewable energy**, and **speak up** for change. Even small actions can create powerful effects, just like roots underground, ocean currents, and wind in the sky.

Now, close your eyes. Where will you explore first, and what kind of explorer will you be?