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Preface

What is STEAM

A cross-disciplinary way of teaching and learning, STEAM combines the first letters of the following subjects:

Science — Discovering how the world works through observation, experiments, and understanding natural laws.

Technology — Using innovative tools and machines to make life easier and better.

Engineering — Designing and building systems to solve problems.

Art — Expressing emotions and ideas through various forms, including what we see, hear, smell, or feel.

Mathematics — Understanding numbers, patterns, shapes, and changes, forming the foundation for scientific and technological development.

With STEAM, we learn by connecting ideas across different subjects. This helps us think in new ways, solve problems creatively, and apply what we learn to real life.

STEAM moves us beyond just memorizing facts. Instead, it helps us become flexible thinkers and future-ready problem-solvers. By exploring, experimenting, and doing hands-on projects, we learn to see the world differently and come up with new ideas.

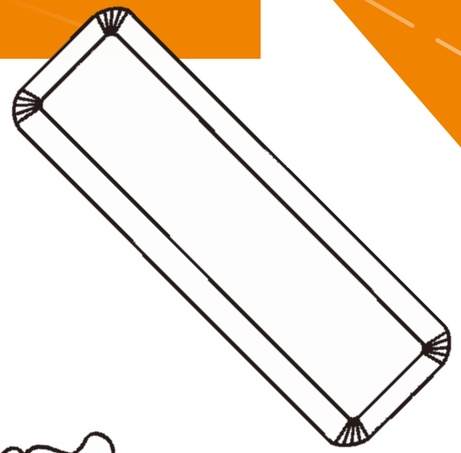
This book features four seemingly CRAZY — but 100% true — science stories! You'll also find fun STEAM facts, Science Showdowns, and DIY Science Experiments that you can try at home. It's the perfect book for curious children (and parents!) to learn and create together!

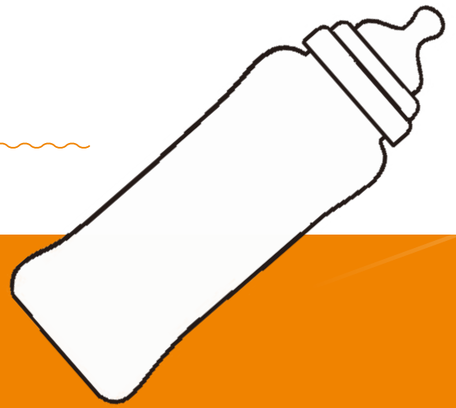
Story 1

Plastic Waste to EcoBricks

Topic Chemistry

Location HK, China





What is Chemistry?

Chemistry is a fascinating branch of science that studies how substances change and interact with each other. Chemists are like magicians! While magicians use spells and magic, chemists use experiments and observations to discover the properties and potential of different substances.

For example, chemistry can explain why oranges and lemons taste sour or why fire gives off light and heat. It also helps us create new materials, like plastic! Plastic is made by chemists through a process that involves oil and resin. Today, plastic is used in all sorts of ways in our everyday lives.

By learning chemistry, you can become a young magician, too! You can explore the secrets of substances and gain a deeper understanding of the amazing world around us!

Story Starts

What would you do with PLASTIC WASTE?

Plastic waste?!

Easy! Sort it and recycle it, right?

That's a great start! But did you know that not all types of plastics can be recycled?

There are many kinds of plastic waste. Some, like mixed plastics and composite plastics, are often considered non-recyclable. It is estimated that less than 10% of plastic waste is recycled. Yikes!

Plastic is an essential material in modern life. It is lightweight, durable, and resistant to corrosion.

However, plastic has some big drawbacks. Making and recycling plastic takes a lot of energy. Plastic takes a very long time to break down naturally.

When plastic accumulates in the environment, it can harm the ecosystem and pose a threat to wildlife.

What are the pros and cons of plastic?

P.S. If you want to learn the advantages and disadvantages of various types of plastics, let's refer to the science showdown on p.42!

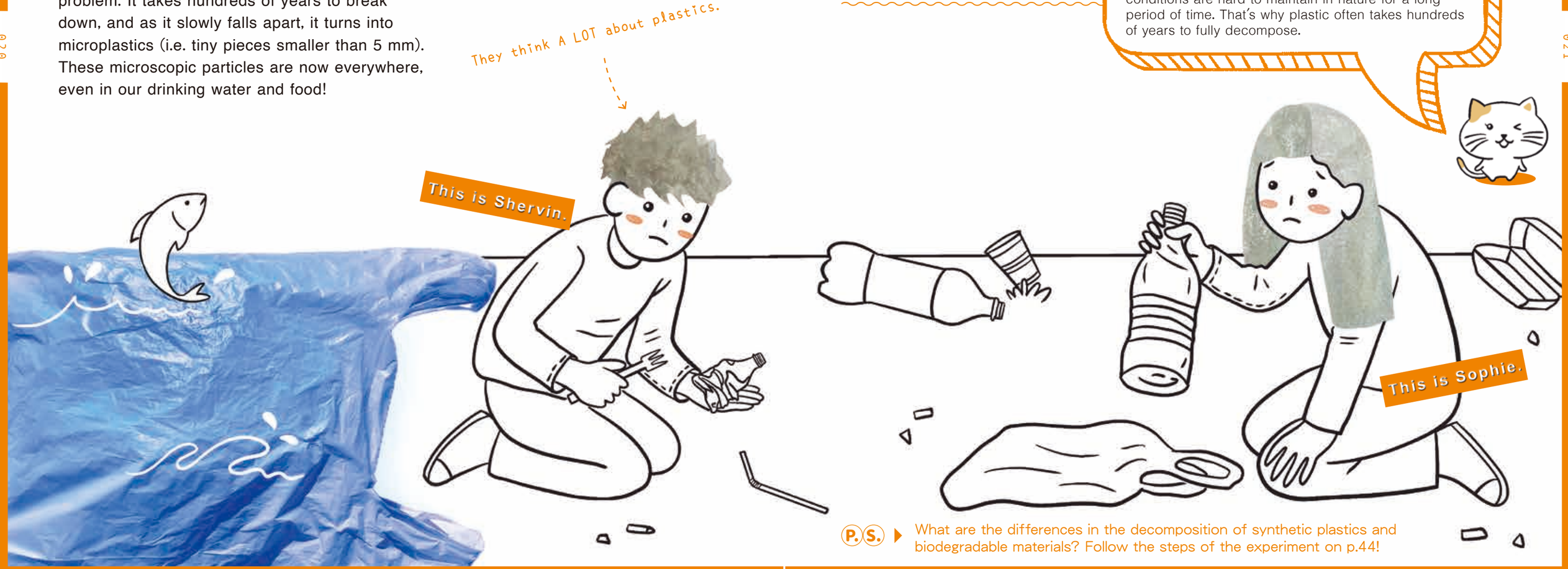
Faced with the growing plastic crisis, Shervin Sharghy and Sophie Chapman come up with a CRAZY idea!

They want to find a way to recycle ALL types of plastics and turn them into concrete.

Why? Because they both love this beautiful city — Hong Kong. They are determined to give back to society.

Plastic is everywhere in our lives. It's cheap, strong, lightweight, durable, and produced in huge quantities. It makes our lives more comfortable, convenient, and even safer.

However, plastic waste is a major environmental problem. It takes hundreds of years to break down, and as it slowly falls apart, it turns into microplastics (i.e. tiny pieces smaller than 5 mm). These microscopic particles are now everywhere, even in our drinking water and food!



Why does plastic take so long to break down?

Plastic is made of polymer chains: long, strong links of tiny building blocks made from elements like carbon, hydrogen, and oxygen. These chains are tightly packed together, making plastic very strong and stable. Unlike natural materials like paper or wood, which are made of plant fibers and break down easily with the help of microbes, plastic doesn't decompose that way.

Plastic usually needs strong sunlight, high temperature, or special pH conditions to slowly degrade. These conditions are hard to maintain in nature for a long period of time. That's why plastic often takes hundreds of years to fully decompose.

P.S. What are the differences in the decomposition of synthetic plastics and biodegradable materials? Follow the steps of the experiment on p.44!

Currently, non-recyclable plastics (like plastic bags, bubble wrap, and cling wrap) as well as recyclable plastics thrown into trash bins end up in landfills.

Some plastics can be recycled more than once through a process called mechanical recycling. This includes steps like collecting, washing, sorting, shredding, melting, and turning the plastic into small pellets that can be used again.

However, did you know that heating and melting plastic can release harmful chemicals into the air and cause pollution?