

Let's Upcycle!



Subjects

Earth Science

Topics

Gardening Product Design

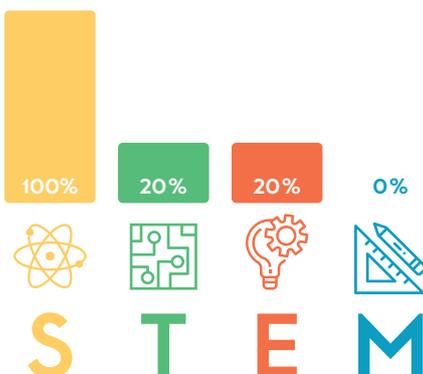
Key Words

Waste Segregation Carbon Emissions Landfills
 Plastic Recycling Codes Innovation Capillary Action
 Cohesion

Connection to SDG



STEM Chart



Time for Activity

45–60 minutes

Introduction

An invention that was intended to make our lives easier is now choking our planet. Plastic pollution is one of the most pressing environmental issues the world is facing today.

The throw- away culture that came with the use of plastic has had serious consequences. Our land, water bodies, animals, birds and even marine life are found to have plastic in their system. Harmful micro-plastics are everywhere on earth, from Mount Everest to Mariana Trench.

Many countries have pledged to take action to tackle the plastic menace by enforcing strict bans on the use of these materials and by putting in place effective recycling projects.

While these wonderful initiatives are being addressed by the various governments on a large scale, is there something we can do locally and in our homes with the resources we already have to reduce our plastic consumption?

Yes, there is a way we can also help- Upcycling! Extending the life of a waste material, by re-purposing it into something useful thereby adding value to it is called Upcycling.

This activity will open our eyes towards the endless possibilities of using simple scientific concepts to adapt waste into useful objects and question the need to buy newly manufactured plastic products.

Key Objectives

- 1 Through a hands-on activity, the children will learn how capillary action can help them make a self-watering planter and understand its water efficiency.
- 2 Children will have a better understanding of the plastic recycling codes in packaging that would help them segregate their waste better.
- 3 Children will understand that upcycling is one way to tackle the waste problem on their own and that it can be implemented easily at home.



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- 4 Children will understand that upcycling could be a path to an innovative entrepreneurial opportunity.

Materials for the cooking activity

- 1 Yarn or any absorbent fabric string (approx. 10 inches long)
- 2 A glass/ cup of water
- 3 1 Plastic bottle/ any PETE 1 bottle (from your recycle bin or collected from your neighbourhood bin)
- 4 A pair of scissors
- 5 A nail and hammer or any pointed tool
- 6 Potting soil
- 7 Plant cutting/Seeds/ Seedlings
- 8 Water

Guiding Questions

- 1 What caused the water to rise up the yarn? Can you think of an example where this process is seen in the natural world? (Plant roots absorbing water from the ground)
- 2 What is waste segregation? Is it necessary?
- 3 How much plastic waste is generated in our homes on a daily basis? Can all of them be recycled? (Introduce Plastic Recycling Codes)

- 4 Can the bottle we are using for our activity be recycled? How much energy goes into recycling it? (Discuss the steps in recycling PETE 1 and what items can be made from it. E.g. furniture, carpets, containers etc.)
- 5 Who does the recycling? Are there any limitations in this process?
- 6 Can we do something with the plastic waste in our homes? (Introduce Upcycling with an example like, using a yogurt pot to hold your stationery items, making handmade paper out of waste paper etc.).

Tasks/Procedure

- 1 Take the yarn and dip one end of the yarn into the cup of water. What do you see? The capillary action causes the water to rise upwards and make the yarn damp.
- 2 Now, let's use this principle to turn a PETE bottle into an upcycled self- watering planter.
- 3 Remove the labels from the bottle. Wash the bottle and its cap and dry them.
- 4 Using the scissors, carefully cut the bottle about 5 inches from the base and set it aside.
- 5 Using a nail and hammer or with any pointed tool, carefully punch a hole through the centre of the bottle cap. You may use a pen/marker to find the correct spot before punching.
- 6 Take the piece of yarn/fabric string and feed it through the hole. Make a knot on the inside to keep it in place.
- 7 Attach the cap to the bottle.

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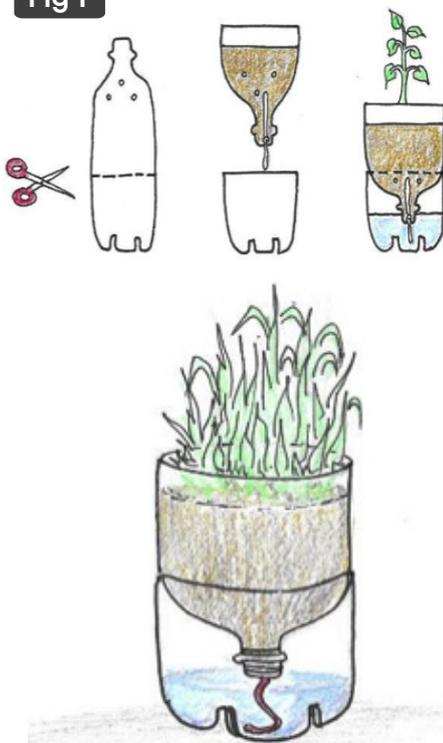
Safety

- 1 Advise children on being careful while using scissors.
- 2 Instruct children to take care while using the nail and hammer/pointed tool when punching the hole in the bottle cap.
- 3 Always wash hands after handling the soil.



- 8 If you choose to decorate your planter, you may do so now by painting it or sticking jute ropes around it or use any other eco-friendly material to liven it up.
- 9 Fill the bottom portion of the bottle with water and place the top portion upside down into it.
- 10 Now add some potting soil and plant/seeds into the upside down section. Water the soil now because it needs to be damp to start out.
- 11 Make sure the bottle base does not dry out. Top it with water only as needed.

Fig 1



Fostering Discussions

Does our small action have a deeper impact on the planet? (Extending the life of an item in turn reduces the plastic accumulating in landfills.)

Can we reduce buying new items if we upcycle more? (Discuss about the CO₂ emissions when an item is manufactured.)

Is there a scope for innovation? Can this be an entrepreneurial opportunity that can be developed?

Possible Extensions

What are some of the other things that can be upcycled? (Examples of upcycling in fashion, art and design industry)

Can the concept of capillary action and cohesion be used to design a vertical garden for your school/ community using PETE bottles? Can we develop a capillary irrigation system that uses only adequate amount of water thereby helping in water conservation?

Resource link for the facilitator:

Understanding how plants absorb water:
<https://davidson.weizmann.ac.il/en/online/askexpert/chemistry/what-capillary-action-and-how-it-affected-gravity-ariel-michal>

Authors/Source

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