THE GREEN SCHOOL

A Tata Steel Foundation-TERI Initiative

LEARNING MODULE FOR STUDENTS

Advancing a Step Towards Sustainable Behaviour

(WATER AND WASTE)

This publication is part of The Green School, A Tata Steel Foundation and TERI Initiative.

Disclaimer

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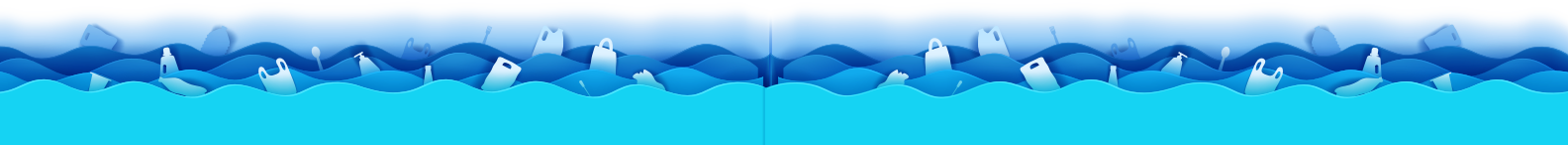
TABLE OF CONTENTS

About The Green School 5
The Green School Phase VI 5
About The Handbook 5
Setting Up EMC And Its Role 6
Themes 6
Introduction 9
Climate Change And Sustainable Development Goals (SDGs) 10
Water And Waste Interlinkage With Climate Change And SDGs 11
Water Conservation 12
Concept And Need 12
The Existing State Of Water Management In Jharkhand And Odisha. 14
Activities: Water Conservation 16
Preparatory School (Class 3 To 5) (Ages 8-11) 17
Activity 1: Fancy Water Bottles 17
Middle School (Class 6 To 8) (Ages 11-14) 19
Activity 2: Drip Irrigation 19
Activity 3: Reusing Water 20
Activity 4: Reduce Your Shower Time 21
Secondary School (Class 9 To 12) (Ages 14-18) 23
Activity 5: Brackish Water Experiment 23
Activity 6: Irrigation Simulation 24
Activity 7: Wall Painting For Water Conservation 25
Activity 8: The Water Cycle 26
Waste Management 28
Concept And Need 28
Process Of Waste Management In India 29
The Existing State Of Waste Management In Jharkhand And Odisha. 32
Activities: Waste Management 35
Preparatory School (Class 3 To 5) (Ages 8-11) 35
Activity 1: Recycled Bags 36
Activity 2: Crafty-Homemade Shagun Envelopes 37
Middle School (Class 6 To 8) (Ages 11-14) 39
Activity 3: Diy Dustbin Delight 39
Activity 4: Planters For My Eco-Art Garden 40
Activity 5: Waste Audit 41
Secondary School (Class 9 To 12) (Ages 14-18) 43
Activity 6: Flannel/Quilt Wallpaper 43
Activity 7: Paper Recycling Activity 44
Activity 8: Manure Magic With Waste And Earthworms 45
Activity 9: My Upcycled Denim Bag/Pouch 46



ABOUT THE HANDBOOK

The global temperature has already risen 1.1°C above the pre-industrial level, with glaciers melting and the sea level rising.[1] The greenhouse gas emissions from human activities are driving climate change and continue to rise. They are now at their highest levels in history. Without action, the world's average surface temperature is projected to rise over the 21st century and is likely to surpass 3 degrees Celsius this century—with some areas of the world expected to warm even more.[2] However, we can only win this race if we take the initiative at the individual, institutional, and communal levels.

One such initiative that enables students and teachers to engage in sustainable action by "doing their part" is through this handbook. This handbook will assist teachers and students in understanding the SDGs by concentrating on water conservation, waste management, forest & biodiversity conservation, and energy conservation. It will address these issues and provide the necessary information for discovering activity-based solutions. It acts as a manual for students, teachers, and schools that explains the idea of an Environment Impact Review (EIR) and walks them through the steps necessary to close any sustainability gaps in their current school system.

The most effective strategy for helping students learn and grasp non-trivial concepts more quickly is activity-based instruction, which is why it includes an explanation of the idea of a handbook that can be used at home or at school to close the sustainability gaps. The handbook will enrich readers with facts and activities that can be taken up at individual, household, and school levels. Additionally, it'll provide suggestions on how to fill in the gaps in current sustainability through various activities on the four themes. Students will be motivated to take up these activities at individual level in addition to the summer activities as shared on making the schoolbag sustainable. After this, EMC students along with other members of the school can plan a campaign either at school or community level to address the four themes.

1 https://www.nature.com/articles/d41586-021-02179-1

2 https://www.niti.gov.in/goal-13-take-urgent-action-combat-climate-change-and-its-impacts

Setting up EMC and its Role

The Environment Management Committee (EMC) is a group of like-minded informed students who have been green buddies and teachers coordinating different environment-related activities in the schools. The EMCs would carry out activities with their school, early school, local community institutions, gram panchayat, their community, etc. So, the experienced schools will help develop EMC in the early schools. This will help EMC aim towards establishing their schools as environmentally sustainable and develop a behavioural change among the school fraternity and community members through the initiation of guided actionable activities, to reduce environmental impacts as an individual, through the school community, and as citizens of the world. The primary purpose of creating the EMC is to develop an action team in the schools that would plan as well as carry out activities related to the environmental

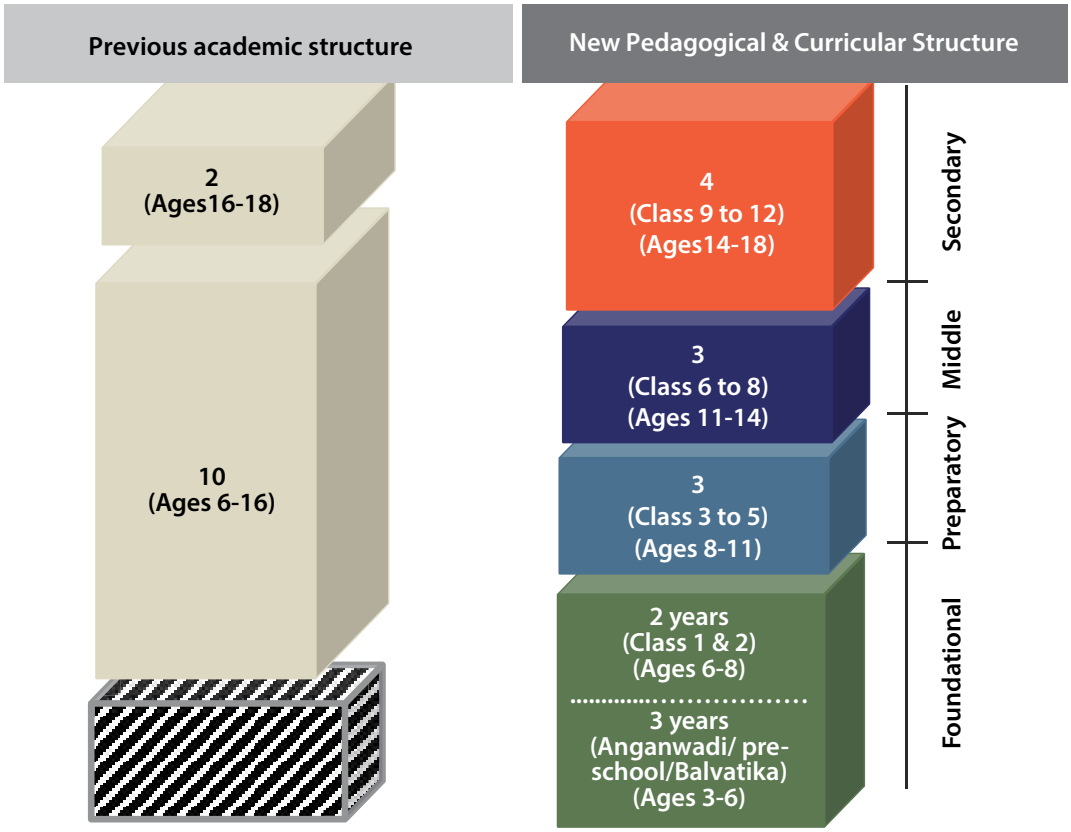
sustainability of the school. This will create a chain of knowledge as experienced school students and teachers will be able to expand their learnings to early schools and impart the knowledge gained over the years throughout the various activities from Phase I to Phase IV of the project. For an in-depth understanding of the process of formulating EMC and its role, refer to the 'Environment Management Committee Guidelines' a publication part of The Green School, A Tata Steel Foundation and TERI Initiative.

Themes

The Green School Initiative Phase VI is broadly categorized into two themes, i.e., Water & Waste in first half, and Forest & Biodiversity and Energy in second half, for the experienced and early schools to share the understanding of the curriculum by looking into their studies and school calendar.

The handbook contains activities in three parts, aimed for preparatory, middle, and secondary school students.

INDIA'S NATIONAL EDUCATION POLICY, THE 5+3+3+4 MODEL

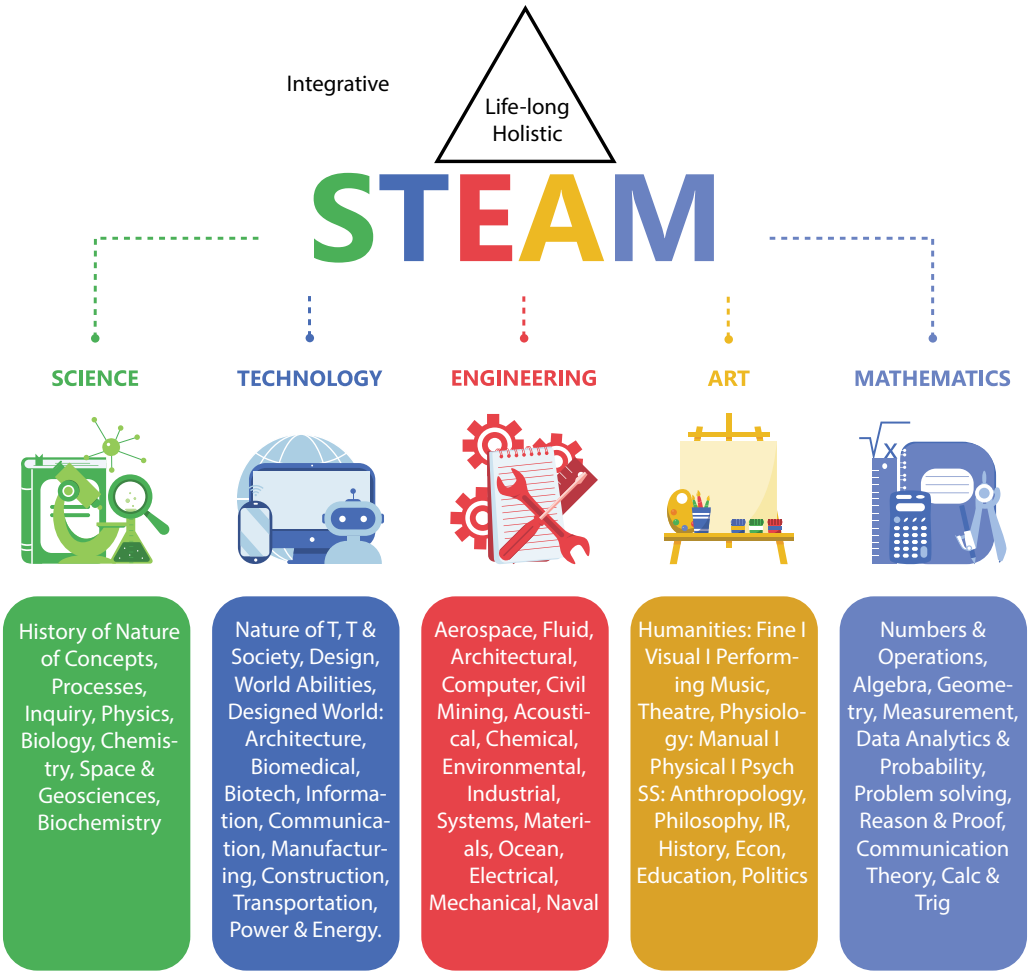


Source- Times of India, 2020.

India's National Education Policy's "5+3+3+4" model is a modern restructuring of the country's education system, emphasizing flexibility and holistic development. It divides the educational journey into four stages: Foundational (ages 3 to 8), Preparatory (ages 8 to 11), Middle (ages 11 to 14), and Secondary (ages 14 to 18). **The model promotes experiential learning, multi disciplinarity, and reducing rigid subject boundaries, allowing students to explore a broader range of subjects and develop essential skills.** It aims to prepare students for higher education, vocational training, or the job market while fostering creativity, critical thinking, and a strong foundation in fundamental knowledge and skills.

What is STEAM?

STEAM stands for Science, Technology, Engineering, Art, and Mathematics. It is an educational approach that integrates five disciplines into a cohesive learning framework. The goal of STEAM education is to encourage students to think critically, solve problems creatively, and apply their knowledge and skills in a multidisciplinary way.



How can integrating STEAM to India's National Education Policy's 5+3+3+4 model be useful?

Integrating STEAM (Science, Technology, Engineering, Art, and Mathematics) into India's National Education Policy's 5+3+3+4 model can be useful for several reasons:

1. Holistic Learning: STEAM encourages a holistic approach to education by integrating multiple disciplines, promoting a well-rounded education that includes both scientific and artistic elements.
2. Skill Development: STEAM education equips students with a diverse set of skills, including critical thinking, problem-solving, creativity, and technical proficiency, which are highly valuable in today's rapidly evolving world.
3. Innovation and Entrepreneurship: STEAM fosters innovation and entrepreneurial thinking, aligning with the NEP's goal of nurturing a culture of creativity and problem-solving, which is essential for economic growth and development.
4. Cross-Disciplinary Learning: STEAM encourages cross-disciplinary learning, enabling students to see connections between subjects and apply knowledge in diverse contexts, which aligns with the NEP's aim of reducing rigid subject boundaries and promoting flexibility in education.

This handbook was specifically designed for the Preparatory, Middle, and Senior school standard.

CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT GOALS (SDGs)

Climate Change

Climate change refers to the long-term alteration of the Earth's global climate, primarily caused by human activities releasing greenhouse gases into the atmosphere, which trap heat and lead to a warming of the planet. The consequences include rising temperatures, extreme weather events, sea-level rise, and ecological disruptions, affecting various aspects of life, from agriculture and water resources to human health and ecosystems. Addressing climate change necessitates urgent and collaborative efforts to reduce greenhouse gas emissions, transition to clean energy sources, and enhance climate resilience, aiming to secure a sustainable future for the planet.

SDGs

The Sustainable Development Goals (SDGs) are a set of 17 global objectives established by the United Nations to address pressing global challenges and achieve a more sustainable and equitable world by 2030. These goals encompass various interconnected areas, including poverty eradication, quality education, gender equality, clean water and sanitation, affordable and clean energy, climate action, and more. The SDGs aim to integrate economic, social, and

environmental dimensions of development, encouraging collective action among nations, businesses, and communities to tackle poverty, inequality, climate change, and other critical issues a thriving planet for present and future generations.

Climate change and SDGs are inherently interconnected and interdependent. Climate change poses one of the most significant challenges to achieving sustainable development worldwide. Addressing climate change is essential for achieving sustainable development because the impacts of climate change undermine progress towards all the SDGs. The SDGs provide a roadmap for integrating climate action into broader development efforts, fostering a holistic approach to solving the world's most pressing challenges.

Water and Waste Interlinkage with Climate Change and SDGs

Water interlinkage with climate change and the SDGs refers to the critical relationship between water resources and the global efforts to address climate change and achieve sustainable development targets. Climate change impacts, such as extreme weather events and rising temperatures, directly affect water availability, quality, distribution, and amplify water-related challenges. These challenges intersect with several SDGs, including Goal 6 (Clean Water and Sanitation), Goal 13 (Climate Action), Goal 14 (Life Below Water), and Goal 15 (Life on Land). Effective water management is essential for climate adaptation and mitigation strategies, as well as for achieving the broader SDGs related to poverty alleviation, food security, health, and ecosystem conservation. To create a sustainable future, integrated approaches that acknowledge this intricate connection between water, climate change, and SDGs are crucial.

Waste interlinkage with climate change and the SDGs refers to the complex relationship between waste generation, management, and its impact on global efforts to address climate change and achieve sustainable development objectives. Improper waste disposal and the release of greenhouse gases from decomposing organic waste contribute significantly to climate change by increasing emissions of methane and carbon dioxide. These emissions further exacerbate global warming, affecting various ecosystems, weather patterns, and human health. Additionally, waste management is closely related to multiple SDGs, including Goal 11 (Sustainable Cities and Communities), Goal 12 (Responsible Consumption and Production), Goal 13 (Climate Action), Goal 14 (Life Below Water), and Goal 15 (Life on Land). Implementing sustainable waste management practices, such as recycling, waste reduction, and energy recovery, plays a crucial role in mitigating climate change and advancing progress towards the SDGs, fostering a more sustainable future.

WATER

Introduction

Water is an essential and finite resource sustaining all life on Earth. It plays a critical role in maintaining a balanced and thriving planet by supporting our ecosystems and industries. However, water scarcity has become an alarming global issue. Population growth, industrialization, and climate change are putting immense pressure on our water sources, leading to its depletion and contamination. Conserving water is not just an environmental imperative; it is a necessity for ensuring a sustainable future. By adopting water-saving practices such as fixing leaks, using water-efficient appliances, and practising responsible agricultural irrigation, we can alleviate the strain on water supplies and safeguard this resource.

The need to conserve water goes beyond addressing current challenges; it is also about preserving ecosystems and biodiversity. Many aquatic habitats, including rivers, lakes, and wetlands, are facing threats due to excessive water extraction and pollution. These ecosystems are home to a vast array of plant and animal species. By conserving water, we can protect endangered species, and ensure the overall health of the environment. Embracing water conservation as a way of life is not just an individual responsibility but a collective effort that governments, industries, and communities must undertake to secure a sustainable future.

Similarly, waste is a growing problem posing significant environmental and social challenges. Each day, massive amounts of waste are generated worldwide, ranging from plastic packaging and electronic waste to food scraps and household items. Improper disposal and management of waste lead to pollution, soil degradation, and greenhouse gas emissions, again exacerbating climate change and negatively impacting ecosystems. Additionally, waste accumulation in landfills and oceans not only degrades the natural beauty of our planet but also poses a threat to wildlife, who often mistake plastic debris for food. To mitigate these effects, it is crucial that we prioritize waste prevention and adopt a circular economy approach, emphasizing reducing, reusing, and recycling materials. By doing so, we can minimize the environmental footprint of waste, and conserve resources.

Beyond environmental concerns, waste prevention is also crucial for achieving social and economic well-being. In many regions, waste management systems struggle to cope with the sheer volume of discarded materials, leading to health hazards. By focusing on waste prevention, we can create a cleaner and healthier living environment for all, reducing public health risks and the strain on healthcare systems. Ultimately, waste prevention will not only help address environmental issues but also promote social equity and economic prosperity.

WATER CONSERVATION

Concept and Need

- India has 18% of the world's population but only 4% of its water resources, making it among the most water-stressed in the world. Many Indians face high to extreme water stress, according to a recent report by the government's policy think tank, the NITI Aayog. Water conservation is an important part of the solution, and we must act accordingly. This idea can be realized by employing the best conservation measures to facilitate efficient water use. Evaluations of available water resources, their effective use, early identification, and early preventative interventions.

- Reducing water use, monitoring and controlling water flow on-site, and using it as much as practical are all ways the school can achieve this.
- Students not only have the chance to witness the process of water conservation and saving in action, but they can also actively participate in the data collection on the savings made by adding extra equipment that uses less water than traditional ones.
- A mechanism for facilitating collaborative activities for early schools that aims at enhancing situational knowledge related to Water Conservation best practices have been explained in the attached annexure.

What Can We Do?

» Try to reuse water at home.
  - You can reuse water used for washing food items, watering plants, or scrubbing one's car.
  - We can use the wastewater from reverse osmosis water purifiers for various non-potable purposes.

» Use of minimum water for daily activities.

» Recycling products can help too (since manufacturing requires lots of water).

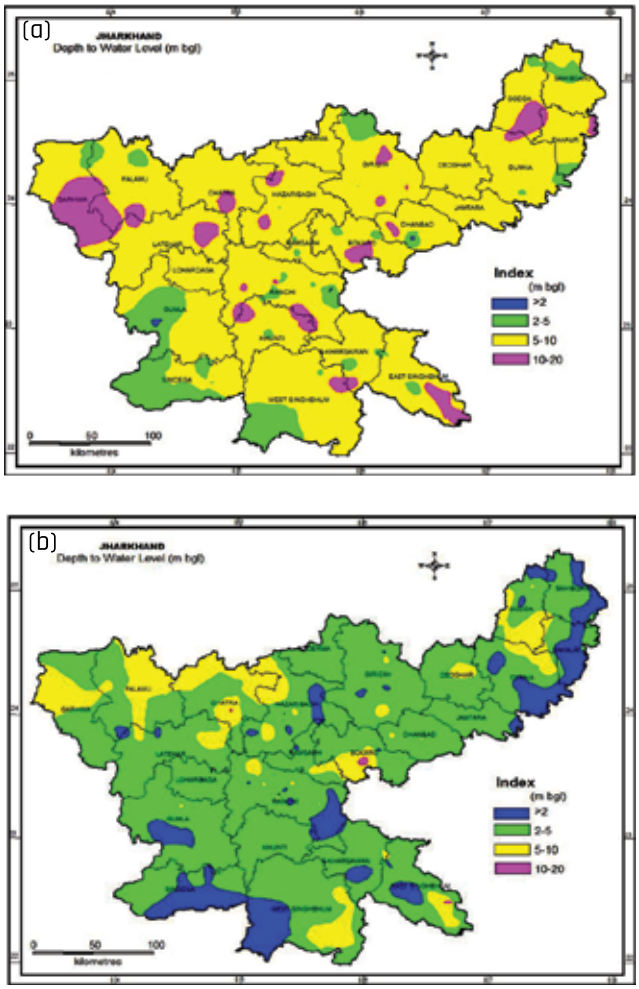
To identify the ways of reducing, reusing, and recycling water–a water audit can be used to analyse both your qualitative and quantitative

According to a UNICEF report (2021), one in every five children worldwide does not have access to enough water to meet their basic needs. And, by 2040, one in four kids will reside in places with significant water stress.

water use. Water audit determines the loss of water due to leakages and unauthorized withdrawals. A water audit can be conducted to understand how people use water at school and how water-efficient their behaviours are or to identify the areas and causes of water wastage and see how efficient your school's water devices are, to identify measures for the efficient use of water resources, or to document the current water conservation system. The expected outcome from the audit can be as follows: Indulging students in an extracurricular activity to develop an understanding of the concept of water and its management or to comply with all applicable national, local, or other laws and regulations.

For conducting a water audit for your school, you can refer to–**A Handbook on Environment Impact Review for schools © The Energy and Resources Institute, 2023. This publication is part of The Green School, A Tata Steel Foundation and The Energy and Resources Institute initiative.**

THE EXISTING STATE OF WATER MANAGEMENT IN JHARKHAND AND ODISHA

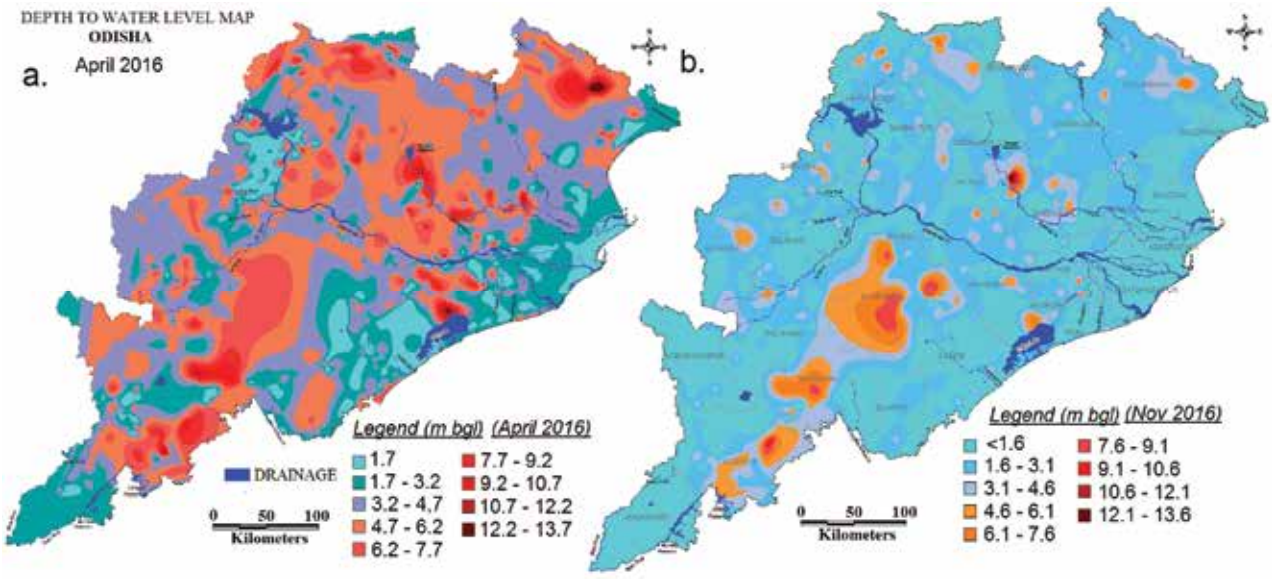


Groundwater level in monsoon (a) and groundwater level in summer (b)
(Source: Pramanik et al. 2021, A Study on Groundwater Quality Based on Major Ion Chemistry of Jharkhand State in India: A Review)

Jharkhand urgently needs to develop its limited water resources, given its water scarcity status. The effective management of available water resources is crucial, with the State Water Resources Department leading these efforts. The state has 29.74 lakh hectares of agricultural land, with the potential to irrigate 24.25 lakh hectares. This involves creating 12.765 lakh hectares of irrigation potential through Major and Medium Irrigation Projects and an additional 11.485 lakh hectares through Minor Irrigation Schemes.
The department's objectives include expanding irrigation coverage, improving network efficiency, fostering participatory irrigation management, prioritizing cost-effective minor and lift irrigation projects, addressing groundwater depletion, facilitating industrial water supply, and exploring inter-river basin water transfers (Department of Water Resources, Government of Jharkhand).

Groundwater is vital in Jharkhand, serving as the primary drinking water source for both urban and rural areas while supporting agriculture and industry. It is renewable and a key part of the hydrological cycle, depending on factors like rainfall and recharge. However, overexploitation and contamination, including industrial waste, have harmed its quantity and quality. Despite receiving 1100–1442 mm of rainfall annually, the state faces drought issues because around 80% of surface water and 74% of groundwater flow out. Groundwater levels in towns, including Ranchi, have been declining, causing wells and tube wells to dry up in the summer. Urgent artificial recharge methods are needed to meet urban groundwater demands (Department of Water Resources, Government of Jharkhand).

Odisha heavily relies on the monsoon for



(a) and (b) The pre-and post-monsoon depth to water levels for the year 2016 in the State of Odisha.
(Source: Sahu et al. 2019, Ground Water based irrigation in the state of Odisha: The Way Forward)

its water resources, with the southwestern monsoon initiating rainfall in the state. Approximately 78% of the total annual rainfall occurs between June and September, while the remaining 22% falls from October to May. Furthermore, the distribution of rainfall across the state varies, ranging from about 1200 mm in the southern coastal plain to approximately 1700 mm in the northern plateau. On average, Odisha receives about 1452 mm of annual rainfall, equivalent to roughly 230.76 billion cubic metres (BCM) of water. Of this total, some is lost through evaporation and transpiration, some contributes to increasing groundwater storage, and the rest becomes surface run-off. The state's water resources primarily consist of groundwater reserves and surface run-off. (Department of Water Resources, Government of Odisha).

Excessive depletion of groundwater is now manifesting as a significant issue in Odisha. The continuous extraction of groundwater beyond sustainable levels, coupled with inadequate water management practices, has resulted in a decline in groundwater levels throughout the state. A recent study published by the Switch ON Foundation on World Water Day underscores the alarming state of groundwater depletion in Odisha. The report underscores that this depletion is diminishing the availability of water, particularly in areas heavily reliant on underground reserves as their primary freshwater source. This situation is intensifying competition for limited resources and exacerbating water scarcity in regions already grappling with arid conditions.

ACTIVITIES: WATER CONSERVATION

General Objectives

- To help students **understand the significance** of water conservation.
- To **promote and adapt sustainable lifestyle initiatives** at the household and school level.
- To provide **training and capacity building** in various water conservation activities.

The following handbook comprises of 8 hands-on water activities for school children from Kindergarten to 12th grade. It aims to provide a comprehensive educational experience. Its objectives include fostering an understanding of water's fundamental properties and environmental importance, promoting practical, age-appropriate learning through engaging activities and experiments, instilling a sense of water safety and responsibility, encouraging interdisciplinary learning, nurturing critical thinking, and problem-solving skills, inspiring environmental advocacy—all while making the learning process enjoyable and encouraging ongoing engagement with water-related topics within the school, home, and community contexts.

While each activity has been intentionally designed to require minimal materials, making them suitable for implementation in most schools, it is recommended that schools consider adopting as many activities as possible, provided they can meet any material and location-related constraints.

Disclaimer: For the implementation on the following activities, further waste generation is discouraged. It is recommended that sustainable, recyclable, or reusable materials are sourced.

PREPARATORY SCHOOL (CLASSES 3 TO 5) (AGES 8–11)

Activity 1: Fancy Water Bottles

Pre-activity assessment

1. *What is the primary environmental concern associated with single-use plastic water bottles?*
2. *Name at least two materials commonly used to create sustainable and reusable water bottles.*
3. *How do sustainable water bottles contribute to reducing plastic waste?*

Procedure and Message in Poem Form

Crafting barrels for a watery spring
Droplets fall, and pitter-patter they sing
Listen up, kids, Gather around the scene.
Collect materials and let your imagination careen.
Harvesting water is a practice so keen.
Sustaining life is our planet's dream.

Activity description: The purpose of our activity is to engage kids in water conservation activities at the household level. This activity will enable kids to make a large water container or else they can reuse the empty plastic container which is not in use at their house. This activity encourages students to promote sustainable practices at the household level.

Material required: Old water containers, paint, waterproof colours, acrylic colours, painter's tape, and other decorative items.

Procedure

Step 1: Collect your material in one place, clean your barrel and wipe your barrel with a dry cloth.

Step 2: Cover your barrel with newspaper or any decorative sheet, brainstorm your decorative designs and decide the design you want for your barrel.

Step 3: Decorate or paint the barrel as per your idea by using acrylic paint, colour paints, and other decorative items.

Step 4: Finalize your design.

Post-activity assessment

1. Describe the materials you used to create your sustainable water bottle and explain why they are considered eco-friendly.
2. How did the activity help you understand the process of making a sustainable water bottle and its potential impact on reducing plastic waste?
3. What design features did you incorporate into your water bottle to make it more sustainable and functional?

Share Your Feedback

Don't forget to share on your social media handles and let others know about your sustainable initiatives. Also, do tag us! Let's together make a sustainable future with our small sustainable initiatives. Let's create a difference and celebrate our victory together.

MIDDLE SCHOOL (CLASSES 6 TO 8) (AGES 11–14)

Activity 2: Drip Irrigation

Pre-activity assessment

1. *What is drip irrigation, and how does it differ from traditional watering methods?*
2. *How does drip irrigation contribute to water conservation?*

Procedure and Message in Poem Form

A DIY drip is what we need.
The water supply chain for treating seed
Find a bottle and prick its cap
Appreciate your efforts by giving yourself a clap
Toothpick in hand, step three unfolds,
Insert with care as story molds
Final step the stage is set
Our DIY drip is ready without any debt
DIY drip is a method smart,
Saving water and Nurturing plants with a caring heart

Activity description: The purpose of creating a DIY irrigation system is to conserve water by transferring it directly to the roots of plants, minimizing evaporation and excessive usage of water. By using household materials, we can make them more cost-effective and sustainable. It is a very efficient way to water plants.

Material required: Old plastic bottles, a sharp tool for creating holes, toothpicks, scissors, and your plant.

Procedure

Step 1: Clean your plastic bottle and tightly screw its cap.

Step 2: Create a hole in the bottle cap by using a sharp tool.

Step 3: Insert your toothpick into the hole with the help of a toothpick and adjust them according to the length. The toothpick will control the water flow of your drip.

Step 4: Finalize your drip irrigation product, place it firmly upside down next to the plant into the soil, and observe the irrigation process.

Post-activity assessment

1. Describe the materials and steps you used to create your DIY drip irrigation system. How did you ensure water was delivered efficiently to the plants?
2. How did the activity enhance your understanding of the benefits of drip irrigation and its potential impact on water conservation?
3. How do you think adopting a drip irrigation system could positively affect water usage in larger-scale agricultural or gardening practices?

Share your Feedback

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Activity 3: Reusing Water

Pre-activity assessment:

1. *Name at least two common sources of water that can be reused in residential or commercial settings.*

Procedure: Introduce a bucket and label it "water for our garden" so that the kids can learn how to collect the water from their water bottles reusing it rather than wasting it. When children have partially filled water bottles at the end of lunch or the school day, instead of discarding it, they can pour it into the designated bucket. This collected water can then be used for various purposes such as watering plants, which not only saves water but also encourages an interest in gardening.

First, during group time, explain to kids why it is important to drink water, particularly on hot days. Now talk about the various uses of water,

such as irrigating plants, washing produce, and providing drinking water for animals. Water is essential for plant growth, facilitating nutrient transport, photosynthesis, and more. Washing produce ensures food safety by removing contaminants and preserving food quality, while providing animals with drinking water supports their hydration, digestion, and milk production. The teacher should then introduce the bucket as the "water for our garden" bucket while demonstrating to the kids what it was used for.

Or you can also:

Bottle Savers: Empty your water bottles in flowerbeds or plants rather than throwing the water. It's also a great way to get kids interested in gardening.

Glasses Galore: Identify and stick to one glass to drink water throughout the day. Water wastage through repeated washing of glasses is controlled.

Rainwater Harvesting: If applicable, educate students about rainwater harvesting. Collecting rainwater in barrels or tanks for use in watering plants, flushing toilets, or other non-potable purposes is an effective way to reuse water and reduce reliance on the municipal water supply.

Post-activity assessment:

1. Reflecting on the learning experience, what challenges or misconceptions did you encounter regarding water reuse, and how were they addressed?

Share your Feedback:

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SCIENCE MATHEMATICS

Activity 4: Reduce your Shower Time

Pre-activity assessment:

1. *Name at least two ways in which excessive shower time can impact water usage and energy consumption.*
2. *How can adjusting shower habits contribute to both environmental sustainability and personal savings?*

Activity description: Make students understand how much water they consume in showers and motivate them to see how much water they can potentially save. For instance, the average shower is said to last about eight minutes, with a water flow of 7.9 litres per minute. Thereby, every shower can consume more than 60.5 litres of water!

Material required: Timer, calculator

Procedure:

Step 1: Find a timer and calculate the duration of your showers.

Step 2: Estimate your water saving potential by using the worksheet below:

1. How long do you spend in each shower?	=_____ minutes
2. Multiply that by the average shower flow:	x 7.9 litres a minute = _____
3. Multiply your answer for #2 by the number of times you shower in a week	=_____ litres per week
4. Multiply your answer for #3 by 52 weeks	=_____ litres per year
5. Subtract one minute from your regular shower time.	=_____ minutes
6. Multiply that by the average shower flow:	x 7.9 litres a minute = _____
7. Multiply your answer for #6 by the number of times you shower every week:	=_____ litres per week
8. Multiply your answer for #7 by 52 weeks	=_____ litres per year
9. Subtract your answer for #4 from your answer for #8	=_____ litres saved per year!

Step 3: Try to reduce shower times by one minute or more, every minute makes a difference!

Post- activity assessment:

1. Describe the strategies or techniques you used during the activity to minimize your shower time. How did they help you become more conscious of your water use?
2. How did participating in the activity deepen your understanding of the link between individual actions, water conservation, and energy efficiency?

SHARE YOUR FEEDBACK:

Don't forget to share on your social media handles and let others know about your sustainable initiatives. Also, do tag us! Let's together make a sustainable future with our small sustainable initiatives. Let's create a difference and celebrate our victory together.

TIP: Utilize rainwater for car washing and floor cleaning so that the dependence on groundwater is reduced.

SECONDARY SCHOOL (CLASSES 9 TO 12) (AGES 14–18)

SCIENCE

Activity 5: Brackish Water Experiment

Pre-activity assessment

1. *How does varying salinity levels in brackish water environments impact aquatic life and ecosystems?*
2. *Name at least one challenge posed by brackish water environments in terms of water management.*

Activity description: The brackish water experiment aims to demonstrate the effects of varying salinity levels on aquatic environments, highlighting the importance of managing water quality in ecosystems where freshwater and saltwater mix. Through this experiment, students will gain insight into the challenges posed by brackish water and the need for effective water management strategies.

Material required: Two clear containers or aquariums, freshwater source, saltwater (marine) source, graduated measuring cups, thermometer, aquatic plants (e.g., waterweed, elodea), timer or clock

Procedure

Step 1: Fill two containers, one with freshwater and the other with saltwater.

Step 2: Use graduated measuring cups to measure and record the volume of water for each container. Record the volume and set it aside for later calculations. Also, measure and record the temperature of both containers using a thermometer.

Step 3: Place a few stems of aquatic plants stems (e.g., waterweed or elodea) in each container. These plants will serve as indicators of how the changing salinity affects aquatic life.

Step 4: Over a period of a few days, observe the growth of the aquatic plants in both containers. Take note of changes in size, colour, and overall health. Use a timer to observe the plants at regular intervals. Record any changes in growth and appearance.

Step 5: At the end of the observation period, compare the conditions of the freshwater and saltwater containers. Discuss differences in plant

growth, animal behaviour, and overall ecosystem health.

Step 6: Engage students in a discussion about the challenges posed by brackish water environments and their significance in real-world ecosystems. Explore strategies for managing and maintaining water quality in such environments. Discuss the broader implications of managing water quality.

Post-activity assessment

1. Describe the process of the brackish water experiment and the observed effects of changing salinity levels on aquatic plants.
2. How did participating in the experiment deepen your understanding of the challenges and complexities of managing brackish water environments?

Share your Feedback

Don't forget to share on your social media handles and let others know about your sustainable initiatives. Also, do tag us! Let's together make a sustainable future with our small sustainable initiatives. Let's create a difference and celebrate our victory together.

Activity 6: Irrigation Simulation

Pre-activity assessment:

1. *What is the purpose of an irrigation system in gardening or agriculture?*
2. *How does improper irrigation affect plant growth and water conservation?*

Activity description: The purpose of our activity is to demonstrate water supply to plants in agricultural settings through a model. This is a creative activity to understand the significance of irrigation in agriculture and how it is related to water conservation initiatives. Furthermore, this can be implemented in school gardens. Below is an example of drip irrigation in a real setting:

Material required: Natural rubber hose (length as per your garden size), hose connectors and clamps, hose nozzle or sprinkler, water source (faucet or water barrel), hose stakes or clips, scissors or cutting tool, measuring tape, sandpaper (optional).

Procedure:

Step 1: Measure the area you want to irrigate and plan where you'll place the hose. Consider the water source location and the placement of plants.

Step 2: Using scissors or a cutting tool, carefully cut the natural rubber hose to the desired length. Make clean, straight cuts to ensure proper water flow.
Step 3: Attach hose to faucet or water barrel. Lay hose along desired route, secure with stakes.
Step 4: Turn on the water source and check the water flow along the hose. Adjust the hose placement and stakes if needed to ensure even water distribution.
Step 5: If you want precise watering, attach a hose nozzle or sprinkler to the end of the hose. This will help control the water pattern and intensity.
Step 6: Once the water is flowing, inspect all connections for leaks. Tighten any clamps or connectors if necessary to prevent water wastage. Periodically inspect the hose, connectors, and nozzle for wear and tear. Replace any damaged parts to maintain efficient irrigation.

Post-activity assessment:

1. Reflecting on the activity, did you encounter any challenges or adjustments when attempting to optimize water distribution to the plants?
2. Explain how your perspective on the importance of precise irrigation techniques has evolved after conducting this hands-on experiment.
3. Can you identify other aspects of daily life where efficient resource management practices could lead to positive environmental outcomes?

Share your Feedback:

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Activity 7: Wall Painting for Water Conservation

Pre-activity assessment:

1. *Why is water conservation important for both the environment and human communities?*
2. *Name at least two water-wasting behaviours or practices commonly observed in daily life.*
3. *How can visual art, such as wall paintings, be used to raise awareness about water conservation?*

Activity description: Display your passion for saving the planet by promoting water conservation through a wall painting.

Guidelines you can follow:

- Children can paint small messages in front of water taps, basins, toilets as well as labs.
- Display the messages clearly. It should be thought-provoking and a brilliant piece of art.
- It should be the student's handwork. Students need to click a picture of their work and then share.
- It should not contain any third-party materials, which violates any copyrights.
- It should not contain any profanities and should not defame, misrepresent, or make disparaging/threatening remarks about any person (living or otherwise), company/ organization.
- This activity can be repeated after 6 months with new messages.

Post-activity assessment

1. How did engaging in the activity deepen your understanding of the role of visual art

Recycle Paper, Save Water

- By recycling one tonne of paper we save 17 trees, 7,000 gallons of water, and 463 gallons of oil
- Recycling paper saves up to 60% of water normally needed in paper manufacturing
- Forty per cent of water is saved in recycling steel
- Manufacturing products from recycled paper reduces water pollution by 35%
- Recycling a pound of paper, less than the weight of your average newspaper, saves about 3.5 gallons of water. Buying recycledpaper products saves water too, as it takes about six gallons of water to produce a dollar worth of paper.

in raising awareness and inspiring action for water conservation?

2. How do you think community-driven art projects like wall paintings can contribute to fostering a culture of water conservation and sustainable behaviour?

Share your Feedback

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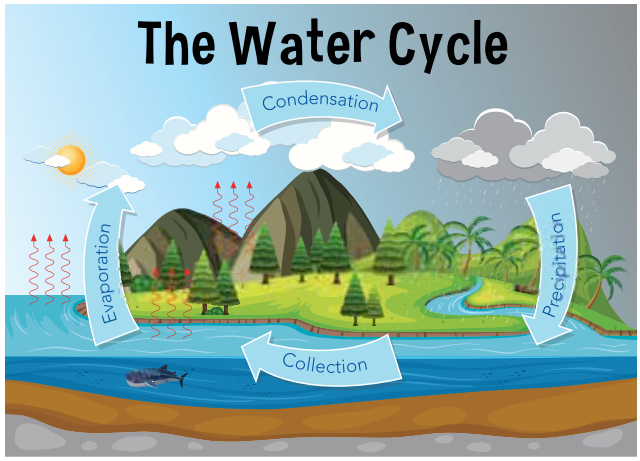
SCIENCE ENGINEERING

Activity 8: The Water Cycle

Pre-activity assessment:

1. *What is the water cycle, and how does it describe the movement of water on Earth?*
2. *Name at least two stages or processes involved in the water cycle.*
3. *Why is understanding the water cycle important for managing water resources effectively?*



Activity Description: Conduct a comprehensive water management experiment to explore the various stages of the water cycle, emphasizing the interconnectedness of natural processes and the importance of responsible water management practices. Understanding the water cycle is vital for effective water management as it elucidates the intricate processes governing water movement and distribution across the Earth. This knowledge empowers water managers to predict water availability, identify sources, mitigate scarcity, address flooding risks,

preserve ecosystems, and design infrastructure, all while fostering responsible water use and conservation.

Material required: Large clear container with a lid (representing Earth's atmosphere), small container with lid (representing the ocean), plastic wrap, water, heating source (lamp or heat lamp), ice cubes, measuring cup, thermometer, timer, notebook, and pen for observations.

Procedure:

Step 1: Fill the smaller container with water, representing the ocean. Close the lid to limit evaporation.

Step 2: Fill the large container with water, representing Earth's atmosphere. Cover it with plastic wrap to create a closed system.

Step 3: Place the large container under a heating source (lamp or heat lamp). The heat will simulate the sun's energy and initiate evaporation. Condensation: As the water vapour rises and hits the cooler plastic wrap, it will condense and form droplets. These droplets simulate clouds forming in the atmosphere. Precipitation: Gently tap or disturb the plastic wrap to simulate the cooling of air and encourage the droplets to fall back into the container as precipitation (rain).

Step 4: Use a measuring cup to collect the "precipitation" that has condensed on the plastic wrap. Pour the collected water from the plastic wrap back into the small container to simulate water returning to the ocean.

Step 5: Place few ice cubes on top of the plastic wrap to represent mountains or colder areas. Observe how the ice causes condensation and forms "clouds" on the plastic wrap. As these droplets grow larger, they will eventually fall back into the container as "precipitation."

Step 6: Throughout the experiment, use a thermometer to monitor temperature changes. Take notes on the steps and observations. After the experiment, gather students to discuss the stages of the water cycle and how they contribute to water availability. Explore how human activities can impact the cycle and the importance of responsible water management. You can also relate the experiment's findings to real-world scenarios, such as droughts, floods, and water conservation efforts.

Post-activity assessment:

1. How did the activity help you understand the interconnectedness of different processes in the water cycle?
2. Reflecting on the activity, explain why the water cycle is a crucial concept for both environmental conservation and human water needs.

Share your Feedback:

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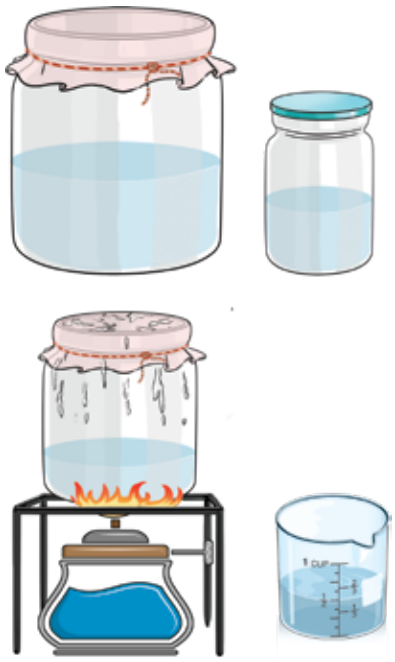
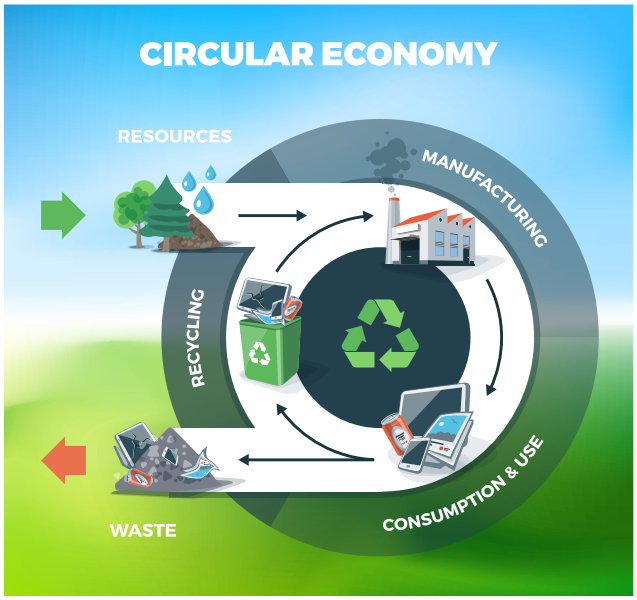


WASTE MANAGEMENT

Concept and Need

Indian civilization has prioritized resource preservation from the beginning. This has always been a fundamental part of the Indian psyche, and it can be seen in our customs, folktales, artwork, and culture, which permeate every element of people's daily life. The roots of sustainable development and environmental awareness can be linked to our tradition of regarding 'waste as a valuable resource,' wherein goods are repurposed and reutilized through the principles of a circular economy.

> "Circular economy presents a contrast to the conventional 'take-make-waste' model, aiming to eliminate waste, rejuvenate natural ecosystems, and prolong the utilization of materials and items. In this framework, resources aren't simply used and then discarded, which depletes their value. Instead, their value is preserved through practices such as reusing, repairing, remanufacturing, and recycling."

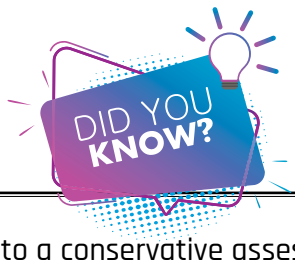


Nonetheless, the unparalleled surge in urbanization across India, coupled with the emergence of new mega-cities and population expansion, has led to an immense upswing in consumption and subsequently the production of waste. The country has observed a staggering six-fold surge in yearly material consumption from 1970 to 2015, soaring from 1.18 billion to 7 billion tonnes, and projections indicate a further increase to approximately 14.2 billion tonnes by 2030. Consequently, waste generation has witnessed a substantial uptick. The effective and eco-economically sound management of this waste presents numerous operational complexities and necessitates a substantial allocation of resources. Predictions foresee India's urban populace reaching 600 million by 2030 and a staggering 814 million by 2050. Correspondingly, the nation is anticipated to produce 165 million tonnes of waste by 2030 and a staggering 436 million tonnes by 2050. Consequently, the annual greenhouse gas emissions stemming from Municipal Solid Waste are projected to escalate to 41.09 million tonnes by 2030.

An urgent imperative arises for immediate action to be taken on individual, school, and community fronts. Against this backdrop, choices

concerning the production, transportation, utilization, and disposal of commodities such as food, plastic packaging, and construction materials can wield a significant influence on resource consumption, greenhouse gas emissions, ecological ramifications, and waste generation. The emission of greenhouse gases (GHGs) and other ecological consequences linked to goods emanates from the energy, land, and water expended in their creation, conveyance, consumption, and disposal. According to the Global Resources Outlook 2019 report by the United Nations Environment Programme's International Resource Panel, as much as half of global GHG emissions can be traced back to the extraction and processing of materials, fuels, and food. Adopting strategies such as reduction, reuse, recycling, and composting can mitigate the environmental footprint of goods.[1]

The initiative for implementing circular economy practices within municipal solid and liquid waste management gained substantial momentum at the national, state, and municipal levels through the initiation of Swachh Bharat Mission-Urban (SBM-U) in 2014. Anchored in the fundamental principles of 3Rs (reduce, reuse, recycle), the mission has effectively elevated urban India's capacity for handling solid waste treatment from a mere 18% in 2014 to the current 68%, encompassing recycling as well.



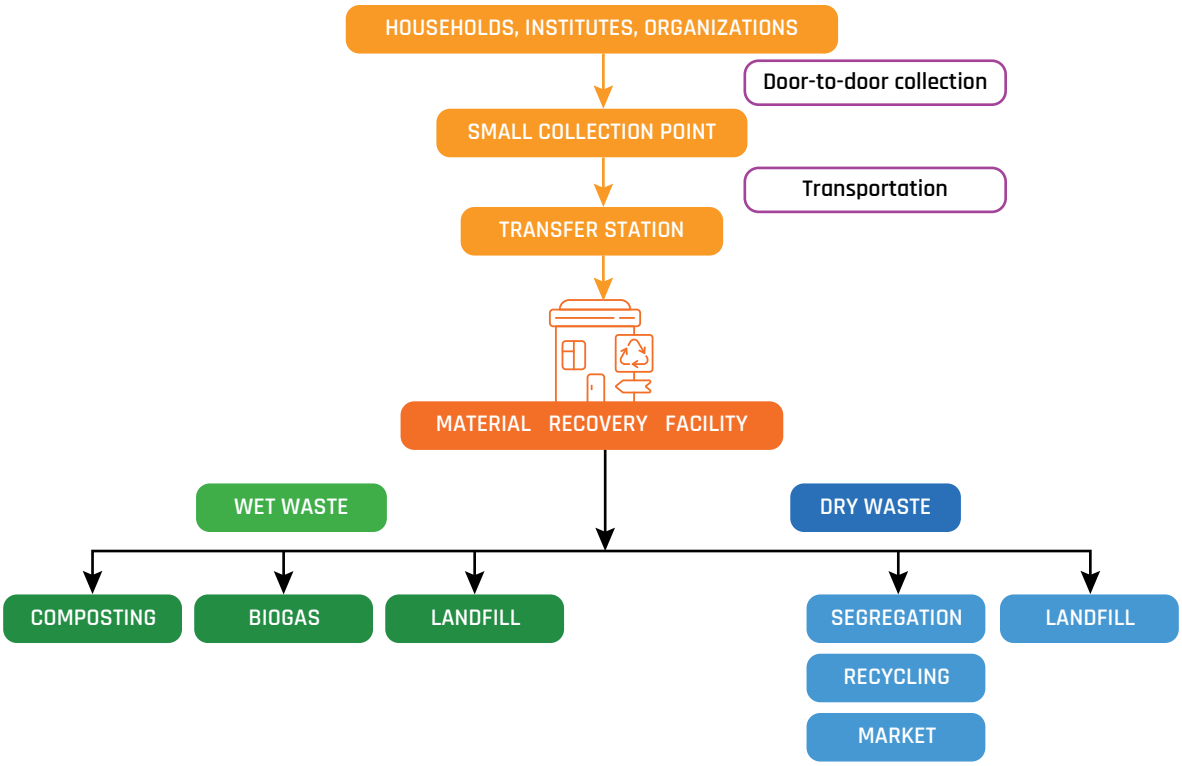
According to a conservative assessment of current research, a total of 2,141 species have so far been found to encounter plastic pollution in their natural environments.

> **.....it is our conviction that we have no right to snatch from our future generations their right to have a clean and beautiful earth. It is part of our thinking and for that reason we do not believe in exploitation of nature. We people do not have the right to take more than necessary from nature.**
>
> Prime Minister, Shri Narendra Modi
> St Petersburg International Economic Forum, 2017

Process of Waste Management in India

Authorized agencies or contractors are responsible for the collection of municipal solid waste directly from various sources, including households, institutions, and commercial establishments, through a door-to-door approach. This waste is subsequently transported to localized collection points referred to as decentralized dry waste centres or transfer stations under Urban Local Bodies (ULBs). At these transfer points, the waste is eventually routed to Material Recovery Facilities (MRFs). Within the MRFs, the incoming waste is sorted into distinct categories, separating it into dry and wet components.

1 https://www.epa.gov/smm/resources-waste-and-climate-change

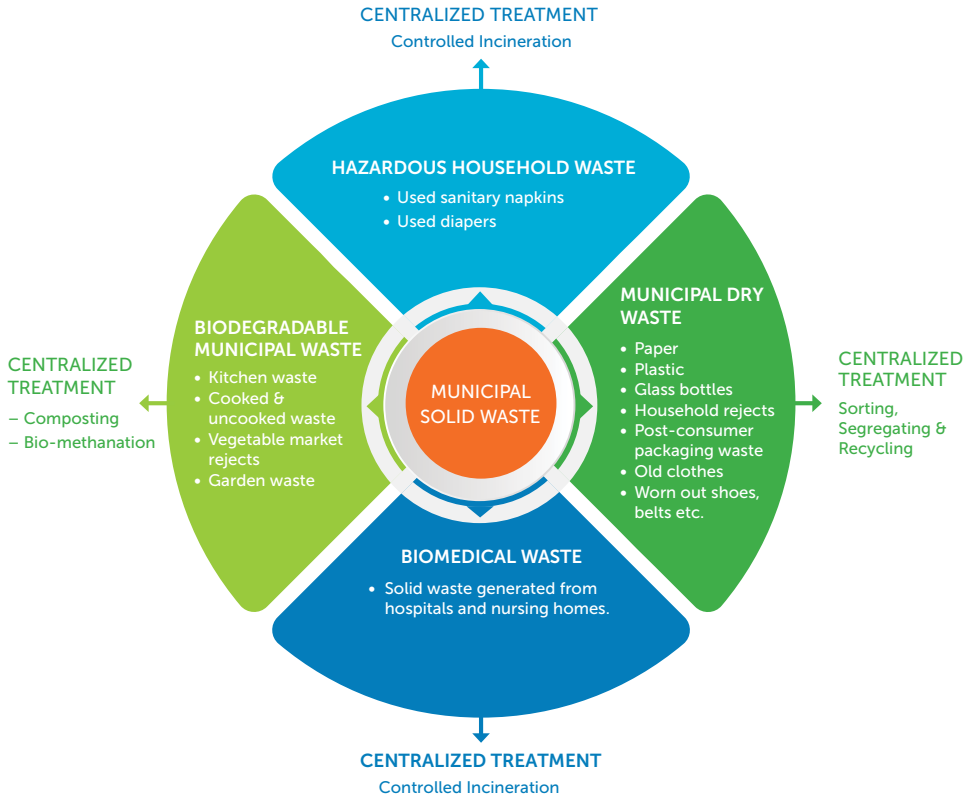


Kitchen waste constitutes the bulk of what we refer to as wet waste. This encompasses items such as vegetable peels, used tea leaves, fruits, and leftovers. Essentially, these materials fall within the category of biodegradable organic waste, which is also amenable to composting. The wet waste undergoes processing before

being directed towards composting and biogas production, with any remaining residue being disposed of in landfills.

On the other hand, dry waste undergoes a more intricate separation into various distinct groups. This category includes items such as paper, glass, plastic, cardboard, Styrofoam, rubber, and metals, along with packaging materials used for food. Recyclable components are channelled towards recycling procedures, while non-recyclable counterparts are managed in a manner appropriate for their end-of-life cycle. The entire process flow is illustrated in the accompanying diagram.

The 2016 Solid Waste Management Rules have bestowed significant accountability upon urban local bodies (ULBs) for the effective handling of municipal solid waste (MSW) within urban areas. This waste is sourced from various origins including residences, offices, public establishments, and entities. Subsequently, the waste is categorized into distinct classes, as depicted in the accompanying diagram, along with the corresponding processing methods.



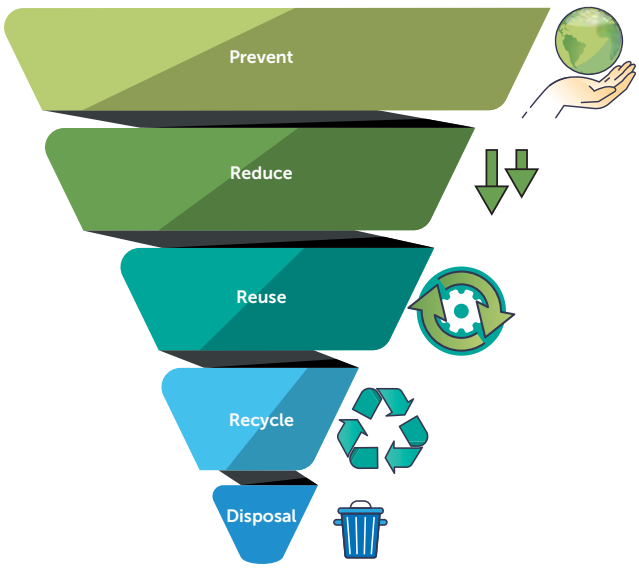
Characterization of Municipal Solid Waste.
Source: CPCB and NITI AAYOG – UNDP HANDBOOK ON SUSTAINABLE URBAN PLASTIC WASTE MANAGEMENT

For more comprehensive information about waste management, please consult the attached presentation in the annexes. Enhancing our management of solid waste can be achieved through the adoption of waste prevention and recycling practices, which are commonly known as waste recycling. Moreover, both waste reduction and recycling serve as impactful approaches to reduce greenhouse gas emissions. When combined, these strategies:

- **Minimize emissions resulting from energy usage.** Recycling contributes to energy conservation, as the production of goods from recycled materials often demands less energy compared to using raw materials. Furthermore, waste prevention proves to be an even more effective approach. When individuals engage in reusing items or when products are crafted with reduced materials, the energy needed for extracting, transporting, processing, and manufacturing raw materials is significantly diminished.
- **Reduce emissions from incinerators.** Reducing garbage generation and recycling diverts some materials from incinerators, lowering greenhouse gas emissions.
- **Minimize methane emissions originating from landfills.** Waste prevention and recycling efforts, which encompass composting, redirect organic materials away from landfills. As a result, the release of methane during the decomposition of these substances is diminished.
- **Enhance carbon storage within trees.** Forests play a significant role in extracting substantial quantities of carbon dioxide from the air, storing it within their wood through a process

known as carbon sequestration. By preventing waste and recycling paper products, we can preserve more trees within the forest, thus maintaining their capacity to absorb carbon dioxide from the atmosphere.

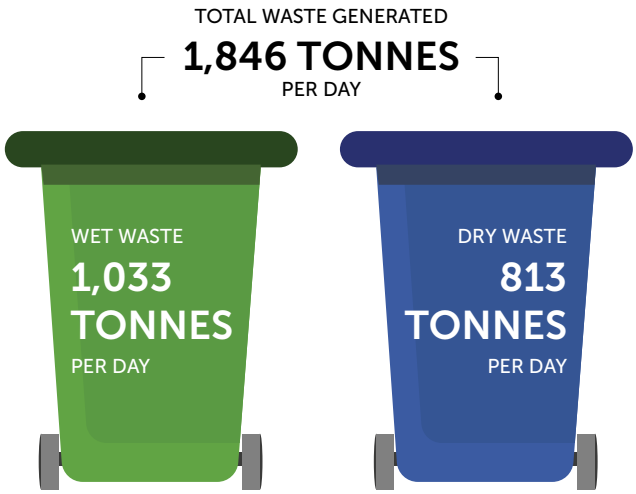
Environmental sustainability is becoming an increasingly important issue for the nation; hence, the role of educational institutions in environmental sustainability is becoming more prevalent. Inspired by the **National Education Policy (NEP) 2020,** which states that schools should adopt green curricula and distinct paedagogy that should promote **Holistic, Integrated, Enjoyable, and Engaging learning,** The Environment Impact Review (EIR) remains an essential tool for understanding the current environmental situation in the school. Environment Impact Review is one such hands-on learning activity that will not only motivate students to safeguard their environment but also encourage the development of their creative and analytical skills by generating thought-provoking questions leading to the development of a sense of responsibility. EIR will guide towards the comprehensive environment pathway and help identify the corrective measures like hands-on activities by the students and teachers that can be taken at the school and community level. Refer to **'A Handbook on Environment Impact Review for Schools', a publication part of The Green School, A Tata Steel Foundation and The Energy and Resources Institute initiative.**



THE EXISTING STATE OF WASTE MANAGEMENT IN JHARKHAND AND ODISHA.

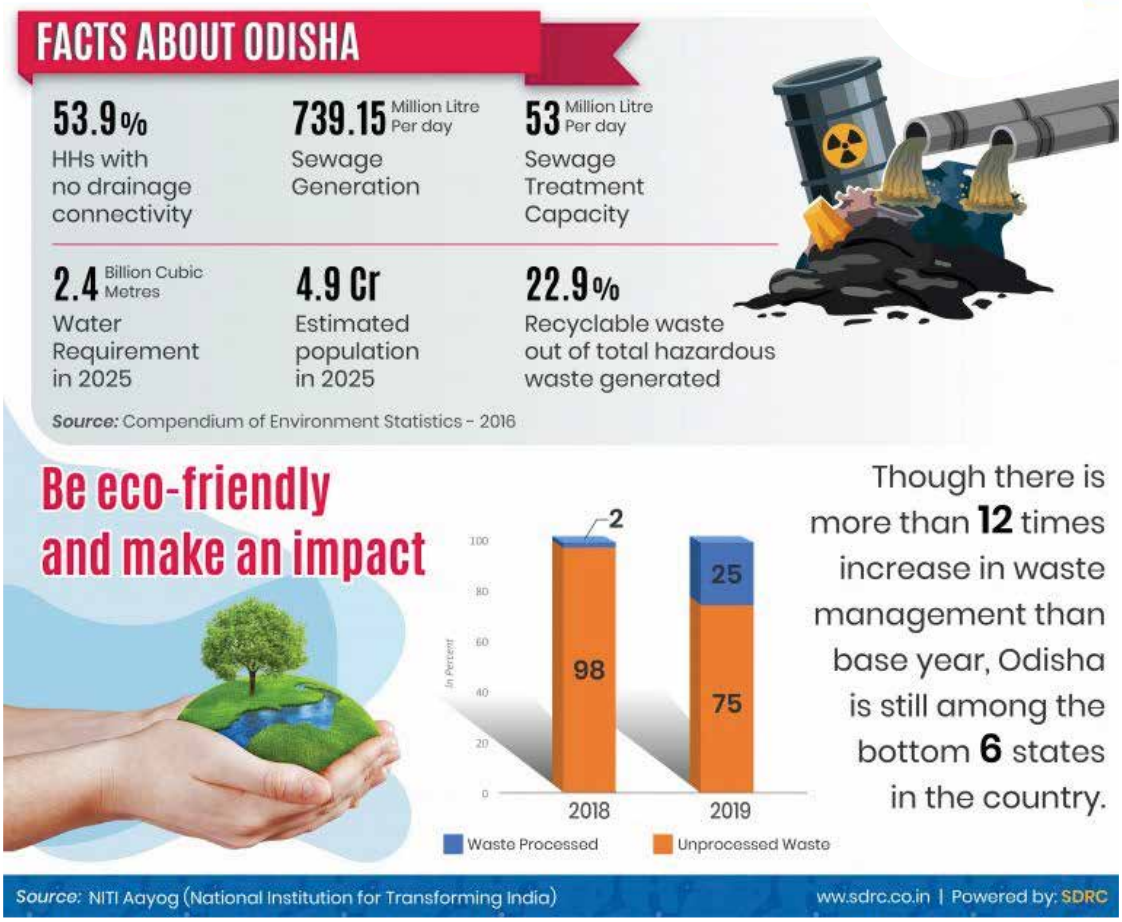
The largest dump site in Jharkhand houses a staggering 19 lakh metric tonnes of waste and poses grave health and environmental threats while contaminating the soil and water bodies over several years. This predicament

WASTE GENERATION IN JHARKHAND



stems from the absence of a proper solid waste management facility in the state capital. The sprawling 41-acre dump site, known as the Jhiri dumpyard, witnesses the daily deposit of more than 500 tonnes of garbage, making it a significant source of water and soil pollution. Experts have voiced concerns that this landfill may have toxic repercussions on the local population, potentially leading to respiratory problems and lung damage. The landfill generates various harmful elements like carbon monoxide and hydrogen sulphide when mixed with precipitation, posing severe health and environmental challenges for nearby residents. To address this crisis, two 150-tonne biogas plants are currently under construction, aimed at converting waste into biogas, with completion expected by September. Additionally, efforts are underway to process legacy waste and clear the landfill, emphasizing the importance of waste segregation for effective waste-to-energy conversion. The situation underscores the urgent need for comprehensive waste management strategies in the region (K. Tiwary, 2023, Times of India, What a mess! Ranchi reeks of apathy as 19 lakh tonnes of waste swamp Jhiri).

Odisha was grappling with a substantial daily waste management challenge, generating 1,935 tonnes of waste daily, of which 54.2% was organic. This situation resulted from poor waste segregation, irregular collection, inefficient transportation, and a lack of proper treatment facilities. In response, the Odisha government decided in May 2019 to adopt decentralized waste management systems, empowered by relevant clauses in The Solid Waste Management Rules, 2016. This shift led to the cancellation of tenders not aligned with decentralization, and the formulation of standard operating procedures (SOPs) for micro-composting centres (MCCs) and material recovery facilities (MRFs). These SOPs focused on optimizing land use, promoting traditional and cost-effective technologies like tub-composting, engaging women self-help groups, assessing vehicles, and conducting waste management education campaigns. (Parida, 2021, Down To Earth, In



Odisha, a paradigm shift towards decentralised waste management.)

However, a new CAG audit report has highlighted continuing failures of waste management in Odisha. First and foremost, there is an absence of a state policy for Integrated Solid Waste Management, as required by the Solid Waste Management Rules, 2016, resulting in inadequate planning and actions. Landfills continue to lack proper infrastructure and remain in unsuitable areas, posing serious environmental and health risks. Additionally, the establishment of MCCs and MRFs has been slow, hindering the efficient management of solid waste. The absence of waste generation surveys by Urban Local Bodies (ULBs) has led to unreliable planning and a lack of waste minimization strategies. Finally, the failure to form local area-specific committees and a shortage of manpower have hindered effective waste management at the district and ULB levels. These issues underscore the urgent need for comprehensive reforms and improved waste management practices in Odisha (Upadhyaya, 2023, CitizensMatter, CAG audit of urban waste management in Odisha finds not a single sanitary landfill).

ACTIVITIES: WASTE MANAGEMENT

OBJECTIVE

- To inculcate sustainable mindset in children by making them actively participate in waste management and reusing activities.
- To acquaint children with the importance of reducing, reusing, and recycling.
- To make children ambassadors of sustainable waste management initiatives.

The following handbook comprises of 10 hands-on waste activities for school children from Kindergarten to 12th grade. They aim to foster waste awareness, teach environmental consciousness and sustainability, provide practical, age-appropriate waste-related activities, encourage interdisciplinary learning, encourage waste reduction strategies and community involvement, nurture critical thinking and problem-solving skills, promoting environmental advocacy and career awareness, and facilitating documentation and sharing of students' waste reduction efforts–all while making the learning process enjoyable and encouraging ongoing engagement with waste-related topics within the school, home, and community contexts.

While each activity has been intentionally designed to require minimal materials, making them suitable for implementation in most schools, it is recommended that schools consider adopting as many activities as possible, provided they can meet any material and location-related constraints.

Disclaimer: For the implementation on the following activities, further waste generation is discouraged. It is recommended that sustainable, recyclable, or reusable materials are sourced.

PREPARATORY SCHOOL (CLASSES 3 TO 5) (AGES 8–11)

Activity 1: Recycled Bags

Pre-activity assessment:

1. *Why is reducing plastic waste important for environmental conservation?*
2. *Name at least two environmental challenges associated with single-use plastic bags.*

Activity description: Collect old newspapers from the community and turn them into paper bags

Items needed:

Old newspapers, adhesives, scissors, old cardboard pieces, laces

Procedure:

Step 1: Flatten newspaper sheets and fold one in half vertically. Fold the sides towards the centre crease, creating a diamond shape at the bottom.

Step 2: Apply glue to the folded sides' outer edges and press them to secure. Fold the bottom flaps inward to form the bag's base.

Step 3: Fold down the top edge to create the bag's opening. Punch two holes on each side, below the top edge.

Step 4: Cut two pieces of string or ribbon for handles. Thread each handle through the holes and tie knots inside to secure.

Step 5: Use markers, stickers, or paint to decorate the bag as desired.

Step 6: Let the bag dry completely before use, ensuring the glue sets properly.

And now your folded bag is complete!

Post-activity assessment:

1. Describe the process and materials you used to create your DIY recycled bag. How did you repurpose materials to make the bag more sustainable?
2. Explain how your perspective on the role of individual actions in reducing plastic waste has evolved after participating in this hands-on activity.
3. Can you identify other everyday items or practices that could be transformed through creative upcycling and waste reduction efforts?

Share your Feedback:

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Activity 2: Crafty-Homemade Shagun Envelopes

Pre-activity assessment:

1. *Why is reducing paper waste important for environmental sustainability?*
2. *Why is it essential to promote creative and sustainable alternatives in daily practices?*

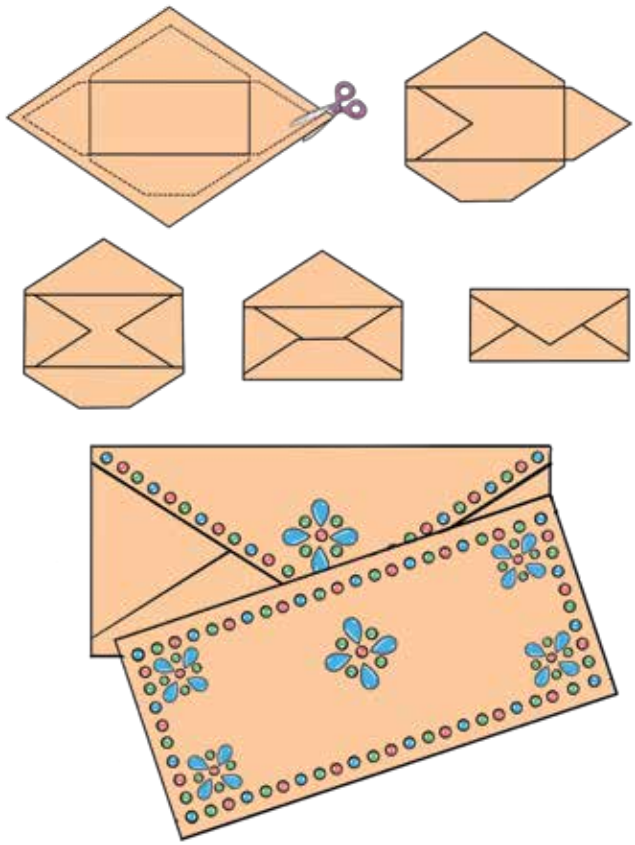
Procedure and Message in Poem Form

"Gather Waste, just take a ride,
Make Shagun envelopes and smile with pride.
Get a piece of paper and give it cuts.
Square only, no ifs or buts.
It's time to fold the paper with care
Be careful; we dare.
Fold and glue and designs take shape
A homemade shagun envelope is made.
With each creation, nature does a happy dance
Crafting love and care, giving waste a chance.
Upcycling paper into an envelope is a joy to see
Reduce, reuse, and recycle is what our planet plea."

Activity description: In this activity, children will join hands with their mothers in transforming old greeting cards into unique and eco-friendly envelopes, perfect for gifting money on special occasions. Waste materials will be utilized to create customized shagun envelopes at home.

"Spread happiness and love with your homemade shagun envelopes while embracing sustainability."

Material required: Old greeting cards or any other wastepaper, scissors; glue or adhesive tape; ribbons, ribbons/beads/buttons, etc.



Procedure:

Collect old greeting cards, scrapbook paper, and no-longer-needed materials.

Make an envelope out of the paper collected.

Step 1: Cut the paper into a square.

Step 2: Fold the paper in five steps to make an envelope and use glue to secure the foldings.

Step 3: Be creative and embellish the envelope with the waste material available.

Step 4: Your envelope is ready!

Step 5: This season, use homemade shagun envelopes to gift money and spread the message of sustainability.

Post-activity assessment:

1. Describe the process and materials you used to create your DIY handmade envelopes. How did you repurpose materials to make the envelopes more sustainable?
2. Explain how your perspective on the role of individual actions in reducing paper waste has evolved after participating in this hands-on activity.
3. Can you identify other everyday items or practices that could be transformed through creative upcycling and waste reduction efforts?

Sharing your Feedback

Students who craft handmade envelopes are requested to send a picture of their creation on our Facebook portal. Don't forget to tag us! Let's celebrate the art and love you've put into crafting the envelopes. Keep spreading the message of sustainability through your art. Together, we are making a positive difference.

MIDDLE SCHOOL (CLASSES 6 TO 8) (AGES 11–14)

Activity 3: DIY Dustbin Delight

Pre-activity assessment:

1. *Why is proper waste disposal important for environmental conservation?*
2. *Why is it essential to raise awareness about responsible waste disposal practices?*

In your room of learning and play
Let a dustbin duo, find their way.
Roll your eyes and find the tins
And be all set to make the bins
Use the scissors with utmost care
Make a little hole to put waste in there.
Paint them blue and green to make them bright
Wet and dry, you boldly write.
When you care, the earth will smile
Adopt a greener, brighter future style.

Procedure and Message in Poem Form

Activity description: Be a changemaker by using waste materials and segregating waste materials by making your own mini dustbins so that your waste is segregated from the start. Use it yourself and gift it to your elder siblings and parents.

Material: Empty tissue box/cardboard box – for dry dustbin. A clean paint tin with the top removed/plastic yogurt tub – for the wet dustbin

Procedure:

Step 1: Pick a small container suitable for a dustbin.

Step 2: Use scissors to cut a small opening on the lid or side of the container.

Step 3: Paint your dustbins blue and green and decorate them with any waste items available.

Step 4: Label them as wet and dry waste.

Step 5: Find the perfect spot in your classroom, playroom, or study table.

Post-activity assessment:

1. How did engaging in the activity deepen your understanding of the importance of proper waste disposal and the potential of creative reuse to address waste-related challenges?

2. Explain how your perspective on the role of individual actions in waste reduction and responsible waste disposal has evolved after participating in this hands-on activity.

Share your Feedback

Students who will make DIY Dustbin Delight are requested to send a picture of their creation to our Facebook portal. Don't forget to tag us! Let's celebrate the art and love you've put into making dustbins for your wet and dry waste. Keep spreading the message of sustainability through your art. Together, we are making a positive difference.

Activity 4: Planters for my Eco-Art Garden

Pre-activity assessment:

1. *Why is recycling plastic important for environmental conservation?*
2. *Name at least two environmental challenges associated with plastic waste.*

Procedure and Message in Poem Form

Plastic bottles, empty and clean,
Cut them and shape them like a dream
With bottle caps and shells, we'll play,
To make a beautiful garden to display.
Soil and seeds, our secret treasure,
Water them well, a little measure.
Watch seeds bloom; like magic, they will appear.
Your creative eco-garden is ready to cheer.

~ Pragati Gulati

Activity description:

In this hands-on eco-Art activity, the young artist will transform waste bottles into magnificent planters.

Material:

Plastic bottles, scissors, glue, and waste material

Procedure:

Step 1: Gather clean and empty plastic bottles or yogurt containers.

Step 2: Carefully cut the containers into different shapes.

Step 3: Decorate the containers with bottle caps, shells, etc., to give them a different texture.

Step 4: Water and care for the plant and watch them grow.

Post-activity assessment:

1. Describe the process and materials you used to repurpose plastic containers into planters. How did you transform plastic waste into functional gardening items?
2. How do you think promoting the use of DIY plastic planters aligns with broader efforts to reduce plastic waste and promote sustainable gardening practices?

Share your Feedback:

Students who will make an Eco-art garden are requested to send a picture of their creation to our Facebook portal. Don't forget to tag us! Let's celebrate the art and love you've put into making a garden out of waste. Keep spreading the message of sustainability through your art. Together, we are making a positive difference.

SCIENCE ENGINEERING MATHEMATICS

Activity 5: Waste Audit

Pre-activity assessment:

1. *What is a waste audit, and why is it important for schools or institutions?*
2. *Name at least three types of waste commonly generated in a school environment.*

Activity description:

A school waste audit is important because it raises environmental awareness, reduces waste, and encourages responsible behaviour among students and staff. It provides valuable data

for setting waste reduction goals, saving costs, and complying with regulations while serving as an educational tool to reinforce sustainability principles and demonstrate leadership in environmental stewardship.

Material required:

Gloves, weighing scale, trash bags or bins, sorting tables, data sheets or notebooks, writing instruments, labels for waste categories (recycling, compost, landfill).

Procedure:

Step 1: Form a waste audit team comprising students, teachers, and staff. Select the location within the school (e.g., cafeteria, classrooms) where the waste audit will take place. Gather the necessary materials, including gloves, weighing scales, trash bags, and data sheets.

Step 2: On the chosen day, divide the waste collection area into sections, and assign teams of students to each section. Separate the collected waste into categories: recycling, compost, and landfill. Use labelled bins or trash bags for each category.

Step 3: Lay out sorting tables for each waste category (recycling, compost, landfill). Have students sort and place items into the appropriate categories. Weigh each category separately using the weighing scale, recording the weights in data sheets or notebooks.

Step 4: Calculate the percentage of waste in each category based on the weights collected. Create graphs or charts to visualize the waste composition and present the data effectively. Discuss the findings with the students, analysing what percentage of the waste could have been diverted from the landfill through recycling or composting.

Step 5: Based on the waste audit results, encourage students to brainstorm and propose recommendations for improving waste management and reducing waste. Develop an action plan that outlines specific steps, responsible parties, and timelines for implementing these recommendations.

Post-activity assessment:

1. Describe the process and methods used during the waste audit. How did your team collect, categorize, and analyse waste materials in your school?
2. How did engaging in the activity deepen your understanding of waste generation, recycling, and the environmental impact of waste in your school?

Share your Feedback:

Don't forget to share on your social media handles and let others know about your sustainable initiatives. Also, do tag us! Let's together make a sustainable future with our small sustainable initiatives. Let's create a difference and celebrate our victory together.

(This activity was proposed by Mr Adi Satya Prakash, a TGS initiative teacher from DAV Model School, CFRI, Jharia.)

SECONDARY SCHOOL (CLASSES 9 TO 12) (AGES 14–18)

Activity 6: Flannel/Quilt Wallpaper

Pre-activity assessment:

1. *How can repurposing materials contribute to waste reduction and sustainability?*
2. *Why is it important to incorporate hands-on creative projects into educational settings?*

Activity description:

The flannel or quilt wallpaper making activity presents a captivating and multi-dimensional project. It involves crafting a personalized wall exhibit using discarded items such as wooden boards, spare fabric, and bed sheets, among other materials. Within this imaginative undertaking, students are provided with the chance to create their own storyboards, resulting in a dynamic and versatile educational tool that can enhance their learning journey. Not only do the flannel walls by repurposing materials, divert them from becoming waste in landfills but they are also a great accessory to your personal space.

Material:

Cardboard or foam board, flannel fabric, scissors, glue, felt sheets, markers, storybooks, printouts, or drawings for inspiration, Velcro, or sticky backing (optional).

Procedure:

Step 1: Cut the cardboard or foam board to your desired size for the flannel wall. A typical size is around 2x3 feet, but you can adjust based on your available space and needs. Lay out the flannel fabric on a flat surface. Trim the fabric, leaving an extra 2–3 inches on each side of the wall.

Step 2: Lift one side of the fabric and apply glue or adhesive to the wall. Carefully press the fabric onto the board, smoothing out any wrinkles or bubbles as you go. Repeat this process for all sides, pulling the fabric taut but not too tight.

Step 3: Decide on the themes or stories you want to use the flannel board for (e.g., storytelling, math, science). Draw or trace shapes and characters on felt sheets, then cut them out. You can also use printed images as templates. Colour and decorate the felt pieces using markers or fabric paint.

Step 4: To make the pieces removable, attach Velcro hook-and-loop fasteners to the back of the felt pieces and the flannel board. Match the Velcro pieces so that the felt pieces can be easily stuck and removed.

Step 5: Place the flannel board vertically on a sturdy surface. Use your felt pieces to create

scenes, stories, or educational displays on the board. As you narrate or teach, move the felt pieces around to illustrate your points.

Post-activity assessment:

1. Describe the materials and techniques you used to create your flannel wall. How did you repurpose materials to make your wall visually engaging?

Share your Feedback:

Don't forget to share on your social media handles and let others know about your sustainable initiatives. Also, do tag us! Let's together make a sustainable future with our small sustainable initiatives. Let's create a difference and celebrate our victory together.

Activity 7: Paper recycling activity

Activity description:

Making paper can be a reasonably easy process. You can make handmade paper eco-friendly with just a few simple supplies and this simple activity.

Material:

Paper scraps, water, muslin cloth-2, paper recycling kit

Procedure:

Step 1: Cut and grind your paper into small pieces.

Step 2: Soak your paper overnight. Experiment with different colour combinations. Remember, no plastic, only paper.

Step 3: Use a wooden recycling kit. It consists of three parts: a mould, a mesh, and a deckle.

Step 4: Put muslin cloth over the mesh.

Step 5: Cover it with the deckle/frame.

Step 6: Stir your pulp over it. Give the slurry a quick shake right and left to make it uniform. Let the water drain to a drip. Now remove the deckle.

Step 7: Put another muslin cloth over the pulp with no force applied. Now use the mould and put it over the cloth.

Step 8: Press it hard, make sure the edges are pressed well. Carefully hold the below portion and slide the mould gently, to remove the muslin cloth.

Your Paper is ready!!!!!!!

SHARE YOUR FEEDBACK:

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Activity 8: Manure Magic with Waste and Earthworms

Pre-activity assessment:

1. *Name at least two materials commonly used to make homemade compost or manure.*
2. *How can making your own manure contribute to waste reduction and sustainable gardening?*
3. *Why is it essential to raise awareness about the benefits of using homemade compost in gardening?*

Activity description: Children in the following activity will prepare their own manure by turning organic waste into compost. In this activity, earthworms will be used to make manure, giving a deeper understanding of waste management and sustainability and the crucial role of earthworms in improving soil health.

Material: An old paint bucket with a lid or big containers; kitchen scraps; a bunch of earthworms; old newspapers; and one tablespoon of regular soil.

Procedure:

Step 1: Gather materials like a bucket with a lid, newspapers, and kitchen scrap.

Step 2: Line the bottom of the bin with a thick layer of shredded newspaper and one tablespoon of soil to create bedding for the earthworms.

Step 3: Add red worms to the bedding. Ensure the bedding is moist. Let the earthworms settle into their new home.

Step 4: Add kitchen scrap to the earthworm bin regularly.

Step 5: In 3-8 weeks, you will find a noticeable amount of compost.

Post-activity assessment:

1. Describe the process and materials you used to create your own manure. How did you transform organic waste into nutrient-rich soil amendment?
2. Explain how your perspective on the role of individual actions in waste reduction and promoting healthy soil has evolved after participating in this hands-on activity.

SHARE YOUR FEEDBACK:

Students who will make a vermi-composting bin are requested to send a picture of their creation to our Facebook portal. Don't forget to tag us! Let's celebrate the work of worms and the love you've put into turning organic waste into fertilizer. Keep spreading the message of sustainability through your creations. Together, we are making a positive difference.

Activity 9: My Upcycled Denim Bag/pouch

Pre-activity assessment:

1. *Name at least two benefits of upcycling compared to discarding old clothes.*
2. *Why is it essential to raise awareness about creative reuse and sustainable fashion practices?*

Activity description: This activity will embrace the inner designer in children by creating trendy bags and pouches from old jeans. The objective of this activity is to promote upcycling and waste reduction while inspiring creativity. Through this activity, children will learn the value of the sustainable impact of upcycling on the environment.

Material:

Old jeans, scissors, decorative waste materials, patches, fabric cut from old clothes, fabric adhesive, a needle, and thread.

Procedure:

Step 1: Find old, discarded jeans.

Step 2: Cut jeans and glue one end of the jeans together using fabric glue or a glue gun. You can also secure it with thread and a needle.

Step 3: Cut the jeans piece to make a bag holder as per your requirements and glue using fabric glue/glue gun or sew it.

Step 4: Decorate it using patches. Cut shapes from the left jeans part, attach them, and decorate.

Step 5: Make a seal for your bag using Velcro strips.

Step 6: Use it to keep your stationery and essentials.

Note: The size of the bag can vary depending on the available jeans; you can also join parts of the jeans to make a bigger bag as per your requirement.

Post-activity assessment:

1. Describe the process and materials you used to upcycle your old clothes into new items. How did you transform clothing waste into functional or decorative pieces?
2. How did engaging in the activity deepen your understanding of the potential of upcycling to address waste-related challenges and promote sustainable fashion?

Share your Feedback:

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ABOUT THE GREEN SCHOOL

The Green School initiative launched in April 2017 by Tata Steel Foundation and TERI, aims to create awareness about environment conservation in the school network through curriculum linkages, action projects, and capacity-building activities on four broad environmental themes; Energy, Water, Forest & Biodiversity, and Waste, interlinking it with climate change and Sustainable Development Goals (SDGs).

THE GREEN SCHOOL PHASE VI

Phase VI aims to educate and empower young minds (age 12–14 years) on water, energy, forest & biodiversity, and waste management (interlinking with climate change) to undertake awareness and action projects at school/community levels to develop solutions to create a sustainable environment. The students will be motivated to volunteer to take up students' social responsibility (Green Champions) by engaging with early schools in the nearby vicinity and schools that were not able to be part of the project due to the pandemic to mobilize their peers by building their capacities and engaging them in replicating the learnings of the project.

The Green School Team

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