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Education for Environmental Awareness

Learning Curve is a publication on education from the Azim Premji University for teachers, teacher educators, school heads, educational functionaries, parents and NGOs on contextual and thematic issues that have enduring relevance and value for them. It provides a platform for the expression of varied opinions, perspectives and stories of innovation; and, encourages new, informed positions and thought-provoking points of view. The approach is a balance between academic- and a practitioner-oriented magazine.

FROM THE EDITOR

The writing is on the wall. If we, as human beings and as a living species, do not take the warnings we are every day being given by everything around us, then we are doomed.

Does this sound harsh? No one wants to be a pessimist, but events around us point to this dire eventuality.

The newspapers are full of it – the planet earth is becoming warmer every year, unseasonal rains are flooding the plains the rivers they feed flow through, whole areas are getting submerged as lake beds are becoming residential colonies, some places are becoming deserts while the Arctic ice-cap is melting at an alarming rate. Glaciers are melting as well; monsoons are getting delayed but lasting longer when they do arrive.

Then again, birds and other animals, both land and aquatic, are being sighted less and less while the planet's green cover is getting depleted at an alarming rate. Environmentalists across the world are sounding alarm bells on every front, hoping that in some way the message will get through. We are being told about the evils of petrol-and diesel-belching cars and flying as a mode of travel is frowned upon though its speed and efficiency makes it popular.

We are also told that, with every degree of rise in world temperatures, we can expect far-reaching changes and as forests are cut down and human-animal interactions increase as a result, we can expect more and more pathogen transmissions. Having just experienced the virulence of COVID-19 and its disastrous consequences, we need no better proof.

So, who can we turn to to make the changes required? How can we attempt to restore some of the lost balance? How can we make sure that this planet does not become extinct by the next millennium? Because that is the place we are in now - we have to stop short and take stock – of how to reclaim what is possible and how to preserve what is left from the collective carelessness of the human race. Because, if we have the will, it can be done.

We turn to the next generation – the younger people, who are now in school, especially in the primary classes – and their teachers. This issue of the Learning Curve is dedicated to the very significant task of informing and educating in order to retrieve lost ground. Teachers and students are considering and reflecting and stopping for a moment before they actually act. Every single article in this issue demonstrates the strength of the classroom exchange as teachers tell of their experiences and findings. Some of the writers have discovered to their surprise and joy that their young students know so much about the environment they live in, the leaves, the fruit of trees, and the soil. One article speaks about the discoveries made about the water table through practical tasks that teachers and students have together undertaken. Two articles have detailed the nature walks that they have taken with their younger children and the discoveries they have made together, while another describes the pleasures of being in a school in a beautiful mountain location, where it is possible to look at nature with fresh eyes every day. It is for us, as the species that causes the greatest imbalances, to educate our children to be aware of the consequences of their every choice and this education must start as soon as they reach the school gates the very first time.

Feedback is welcome and may be sent to the email id given below.

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The editors regret an error on page 4 of Issue 12, Working with Worksheets. The numbers in Figure 1, column 2, should have been 3x2 and not 3x3.

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Bridging the Gap between Environmental Research and Action

Seema Mundoli and Harini Nagendra

Earth, our only home, is in peril. Unless each one of us steps up and does our bit we are looking at a future in which the quality of our lives will be severely compromised. The report released by the Intergovernmental Panel on Climate Change (IPCC) earlier this year, in March, lays special emphasis on the interdependence between human societies, biodiversity, ecosystems, and climate in today's world. The report categorically states that while we have enough scientific data to back the pervasive impact human beings have had on the planet, it is now more than ever critical to act immediately to address the ongoing climate crisis. As a species, we humans have wrought irreversible and widespread damage to biodiversity and ecosystems with cascading impacts on our health and well-being. The IPCC report draws special attention to the extreme vulnerability of cities in the coming decades, especially those located in climate-vulnerable areas. Faced with this gloomy future, a question we all need to ask is: How can we, as individuals or communities, contribute to addressing the climate change and sustainability challenges we face?

For our part, as researchers, we are, of course, looking at knowledge creation in the areas of climate change and sustainability and, more importantly, we are committed to contributing to knowledge that is context specific. For example, most academic understanding of urban sustainability, and its many challenges, comes from research centred around countries in the Global North (United States of America, Canada, countries in Europe, Asian countries like Japan, South Korea and Singapore, and the island countries of Australia and New Zealand). However, it is in the Global South (regions of Africa, Latin America, Asia and Oceania) where rapid and large-scale urbanisation, with its many implications for environmental sustainability and social equity, is underway. Thus, to address the complexity of urbanisation in the Global South, we require contextualised local knowledge. This is especially true in the case of India which is both urbanising rapidly and facing climate change-related challenges. According to the Global Climate Risk Index (2021), India ranked seventh in the ten most affected countries in 2019, first in terms of the number of fatalities, having faced a series of extreme weather incidents leading to devastating floods across the country.

Future scenario

Over the next few decades, Indian cities will be home to more than 50 percent of the population of the country. Cities will also expand spatially, impacting green cover and water bodies that are critical for determining the quality of life of urban residents. Given this imperative, our academic research in recent years has focused on the impacts of India's urbanisation on urban ecosystems. We have tried to highlight the role of nature in Indian cities in addressing sustainability and climate change issues. In our research, we have used the frameworks of social-ecological systems and urban commons to examine how ecosystems, be it lakes, wetlands, avenue trees, wooded groves, cemeteries and so on, have historically been used, and continue to be used, managed, and conserved by local communities for livelihoods and subsistence. We have also highlighted the importance of these urban commons, which provide nature-based solutions to address urban floods, reduce air pollution, improve physical and mental health, ameliorate urban heat-island effects that cause cities to heat up, and combat drought and water scarcity. We often think of cities as devoid of biodiversity—only comprising built infrastructure for human use. The discipline of urban ecology, which studies biodiversity in an urban environment, is still in its nascent stage in India. To address this knowledge gap, we have studied different kinds of biodiversity from insects to birds to trees, in a variety of urban spaces, such as home gardens, parks, cemeteries, and even slums, to understand how nature thrives in cities. These studies also highlight why nature is important for cities and their residents.

By looking at cities as interlinked social-ecological systems, we also focussed attention on issues of environmental justice and equity in relation to access to nature. The right to nature in the cities is especially critical for the urban poor, impacting their livelihoods and subsistence, whereas the urban rich depend on nature largely for recreational uses. A street vendor, who can access a spot of shade under a tree, can keep perishable goods, such as vegetables and fruits fresh; a grazer who can reach a lake gets water and fodder for her cattle; and a slum dweller, who has access to a drumstick tree, is able to add an important source of nutrition to food. Our research on these aspects of environmental justice has helped us highlight how technocratic urban planning approaches, such as smart cities, compromise the sustainability of cities from the ecological and equity angle. We have also documented the urban foraging practices of women in cities, especially in urban slums. These women, struggling to make ends meet in the city, possess incredible knowledge about green leafy vegetables growing wild in unused plots, pavements, parks and so on – knowledge which we have collated in a booklet to share with other urban residents.

Over the years, our research has been disseminated through diverse popular outlets, such as newspapers both print and online, blogs such as *The Nature of Cities*, and very importantly, vernacular media, including Kannada, Hindi and Odia. Through focused talks and webinars, we further engage with different audiences across various cities, that include government officials, school children, undergraduate and post-graduate students, advocacy groups and NGOs. In this, we have found that environmental history and heritage can be used as effective communication hooks that help many city residents to engage with sustainability. City residents are often unaware of local histories, of the long evolution and heritage aspects of urban ecosystems, such as a lake, or a wooded grove, in their neighbourhood. But once they know about the historical significance, coupled with continuing ecological, social and cultural linkages, they are more enthused in advocating for their protection.

Photographic documentation is another very effective approach to communication. Photo exhibitions of environmental urban research, including that done by university students and visiting scholars, have helped to present the untold stories of communities living around the margins of Bengaluru's lakes. Significantly, the presence of residents from the lakes, individuals who were themselves the subjects of the photographs displayed at the venue, is very important because they help the residents of the city to understand the idea of nature from the perspective of low-income groups who are often systematically excluded, and almost never consulted in city planning.

At Azim Premji University, our students have been an important part of our research in different stages—from the conception of ideas to outreach. For example, in the MA Development programme, we have converted our research on urban commons into a case study for teaching and taken students to our field sites in and around Bengaluru for mapping land use with the help of GIS tools and biodiversity assessments. Undergraduate students are introduced to examining sustainability challenges from an interdisciplinary perspective, using field-work not only to gain understanding but also to act for change. For example, students undertake a tree census and carbon-mapping assignment where they identify and select species of trees, conduct research to summarise the social, ecological, economic, and cultural uses of these species, measure tree girth and height, understand the effect of trees in reducing temperatures, and calculate the carbon sequestered by these trees. In doing so, they learn spatial mapping and GIS, and also connect the climate mitigation measures they learn about in class with skill development for future action research.

Students at the university are partners in our research, contributing their ideas, creativity and perspectives. One example is the illustrated story 'Where have all our *Gunda thopes* gone?' Based on scientific publications, field notes, and photographs, undergraduate students, along with a researcher at the university, wrote a multi-lingual illustrated story based on the foundation of our research. The story features the transformation of a wooded grove, locally known as a *gunda thope*, into a landscaped park. While the characters are fictionalised, the setting of the story, the descriptions, and the

transformation of the wooded grove are events from a peri-urban field site, visited as part of our long-term research on urban commons. This bilingual illustrated booklet has been printed and distributed in rural libraries across the state of Karnataka—in villages and peri-urban settings where urban commons still exist and have the potential to be protected by the community. The story draws attention to the impact of urbanisation on the city's green cover and ends with the hope that adults and children will reflect on what the loss of these urban commons means for the city and act to protect and restore wooded groves.

Connecting with children

Climate change and sustainability can be very dismal topics for children. Thus, we do not want our narratives to be only about loss. We especially wanted children, who will bear the brunt of climate change, to appreciate nature and have fun with trees. Illustrated books are a great way to help rebuild connections with nature, especially in these times when children are increasingly drawn to gadgets. We worked with Pratham Books to bring out *So Many Leaves* aimed at young children. Beautifully illustrated by Barkha Lohia, the book has been translated into eight languages using a creative-commons approach, where translators contribute to the languages that they can on a voluntary basis. Currently, the book is available on the free, open-access *Story Weaver* platform in Hindi, Kannada, Marathi, Odia, Urdu – as well as Italian, French and Bahasa-Indonesia! The book describes common leaves that we find around us in different shapes, colours, sizes and textures, and draws attention to the many uses of the leaves in our lives. By reading about leaves and doing the fun activities mentioned in the book, we hope that children interested in nature are encouraged to touch, smell and engage with leaves. For any child to become a warrior for nature, it is important for them to not just read about, but also experience and appreciate nature, not in a distant forest, but in their immediate neighbourhood.

Citizen participation

In addition to education, action research is critical for change. For example, developmental projects in Bengaluru have led to the large-scale felling of trees. Several citizen groups and advocacy organisations that approach the court for environmental protection seek empirical data that could strengthen their efforts. By conducting rapid environmental impact assessments along with citizen groups, we collate information on the number of trees impacted, ecosystems affected, carbon sequestration services that are compromised, and threatened biodiversity. Such action research has been especially effective, as in the *#steelflyoverbeda* campaign in Bengaluru.

What we are trying to do in terms of creating environmental awareness is the proverbial drop in the ocean. But what is heartening is that we are not alone. There are many ongoing efforts with wide participation from different sections of society. Scientific data collection is no longer the bastion of scientists. When limited to the scientific community, data that can provide important information for environmental policies and decision-making, also remains restricted. This is where citizen science initiatives have stepped in to bridge the gap, with the public collaborating with scientists and institutions to collect ecological data in a systematic manner. This enables the collection of data at a scale that was not possible earlier. For example, one of the most popular citizen science projects, *eBird India*, a portal for bird count in India, has more than 10 million data points that help scientists study the distribution, abundance and population of Indian birds, as well as to study the impact of urbanisation and climate change. *SeasonWatch*, another remarkable project of the Nature Conservation Foundation that monitors the phenological patterns of trees, such as flowering and fruiting, has collated invaluable information about the impact of the earth's changing climate on seasons and plant responses. The contribution of citizen science projects has been wide-ranging, providing new information about species, like tigers, addressing poaching, collating information on roadkill, providing insights about snake bites, and even contributing to the discovery of new species of spiders and frogs. Citizen science is perceived as a game changer when it comes to both, the collection of data and making it available to anyone.

There is also a diverse range of citizen movements across the country involved in protecting the environment—from reviving a lake, to protecting a forest and saving a species. Over the last few years, we have been speaking to many of these environmental warriors to understand their motivations for protecting the environment. Some

have been passionate about the environment from childhood, others as adults who became concerned about a specific environmental issue in their neighbourhood. For parents, many of these environmental issues were linked to the future of their children. The work these individuals and communities have been involved in has led to changes in the ground, reviving hope that they will spread wider into other areas.

When environmental issues such as these become a topic of concern and discourse in homes, communities and classrooms, children imbibe not just awareness of these issues but also learn that governments cannot ignore the voice of citizens. This is an important lesson for their lives.

Working with children to bring about change

Schools play a critical role in creating awareness about the importance of protecting the environment and provide the perfect setting to enable children to become environmental warriors of the future. Working with teachers, students can visit the green, blue and open spaces in their neighbourhood, be it a ward in a city or a village. They can work with natural elements, like mud, leaves, and stones to create models of, say, a lake in their village or a park in the city that they have visited. Children can observe and draw the biodiversity in these natural spaces, such as birds, ants, spiders, butterflies, bats, and other small mammals. They can carefully observe the interactions of these creatures with the environment. Students can adopt a tree and observe the changes happening across seasons, such as that of flowering, fruiting and leaf fall. These observations can even be uploaded by the teachers on citizen science portals, such as *SeasonWatch*, thereby, contributing to knowledge creation.

Every neighbourhood has a history, and every space can have a story. Children can record these by talking to their parents and others in the village or neighbourhood. A good storyteller among their grandparents can get the children interested instantly. There could be interesting plays or skits that young children could perform around these stories. Understanding how these natural spaces are used by their parents and others in the local community could be another way of connecting with the environment. Creating a historical timeline with oral narratives, biodiversity observation and mapping will provide invaluable micro-level information about the environment complementing what students are learning in class. At the same time, this creates a repository of local knowledge and builds lasting concern for the environment among children.

A final word

Even as we are all faced with an uncertain future there is much each of us can do. We can learn about our local ecological histories that will help us and others to establish a connect with the place. We can contribute to scientific data by being a part of citizen science projects. When there are developmental projects that threaten nature, we can use our skills and contribute to meaningful action research. When the environment is threatened, and there are others fighting to save it, sometimes all we need to do is the bare minimum – to show up and stand with them. And where this awareness to contribute and care for the environment can begin is with teachers and children in our schools.

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Environmental Education | An Evolving Domain

Chandrika Muralidhar

The beginnings

The UNESCO-UNEP Congress on Environmental Education and Training (1987) agreed that 'Environmental Education should simultaneously attempt to create awareness, transmit information, teach knowledge, develop habits and skills, promote values, provide criteria and standards and present guidelines for problem-solving and decision-making.' Environmental Education (EE) can be a process which helps to develop the skills and attitudes needed to understand the relationships between human beings and their cultures and the biophysical world. All programmes of EE, therefore, need to include the acquisition of knowledge and understanding and the development of skills. Additionally, they should also encourage curiosity, foster awareness and lead to an informed concern that eventually leads to positive action.

The North American Association for Environmental Education defines EE as 'a process that helps individuals, communities, and organisations learn more about the environment, develop skills to investigate their environment and to make informed decisions about how they can help take care of it. It has the power to transform lives and society. It informs and inspires. It motivates action. EE is a key tool in creating healthier and more civically engaged communities.'

Aims of Environmental Education

The objective of EE is to develop environmental literacy for all. It is a lifelong journey that begins at home and extends outward to communities, encouraging learners to make connections with their immediate surroundings. The awareness, knowledge and skills needed for local contexts provide a basis for understanding and addressing larger and broader issues. EE fosters skills and habits that people can use to understand environmental concerns throughout their lives. It cultivates the ability to recognise uncertainty, envision alternative scenarios, and adapt to changing conditions. EE facilitates the development of an active learning community where learners share ideas and expertise, listen, consider, collaborate, and participate in the continued inquiry. With a focus on building learners' capacity to work both individually and cooperatively to improve environmental quality, social equity, and economic prosperity, EE supports efforts to address the Sustainable Development Goals (SDG).

> An Environmentally Literate Person is someone who, both individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the well-being of other individuals, societies, and the global environment; and participates in civic life. Those who are environmentally literate possess, to varying degrees, the knowledge and understanding of a wide range of environmental concepts, problems, and issues; a set of cognitive and affective dispositions; a set of cognitive skills and abilities; and the appropriate behavioural strategies to apply such knowledge and understanding in order to make sound and effective decisions in a range of environmental contexts.[i]

Environmental Education and sustainable development

> Environmental Education would benefit from being included in the perspective of education for the development of responsible societies, as inspired by the Treaty on Environmental Education for Sustainable Societies and Global Responsibility (Earth Council, 1992), thus, surpassing the somehow limited framework of sustainable development.

Studies conducted by Pande L (2002) and Hollweg (2007) have expressed the need for a new curriculum to effectively teach the necessary concepts and skills development in EE and sustainable development. Both opine that the

existing materials are often too broad in scope and difficult for students to relate to or understand, such as worldwide deforestation. Collaboration between teachers, ecologists, and community members is needed to develop a curriculum which Pande worked on, one that is geared toward promoting an increased student understanding of ideas through practical-skills development, idea exploration, and how these concepts relate to and interact with the village (community). According to Hollweg, the final consideration of the curriculum focuses on successful teacher development by using the curriculum as a way of practical and effective training.

Inclusion of EE in the Indian school curriculum

In 1986, the Government of India decreed the importance of including EE in schools throughout the country. This decree was in response to an increased awareness of unsustainable practices throughout the country, particularly in agriculture. Realising that rural populations were unable to produce enough food to meet their yearly needs due to increased population growth coupled with a decrease in the land's carrying capacity, education and government officials introduced EE themes into the national curriculum (Pande, L, 2001). The government hoped to use EE programmes in schools and communities as a conduit to increase awareness about the environment and give citizens the knowledge and skills to respond to environmental issues (Ibid.).

Policy documents over the years have emphasised the protection of the environment and the creation of environmental awareness. The Mudaliar Commission Report (1952-53) made a passing mention of including the study of the natural environment, but it was not until the Chattopadhyay Committee Report (1983) that multiple references to environmental concerns were made. The report identified teachers' needs and mentioned, 'to sensitise the teacher to new areas impinging upon modern life, for example, population explosion, environmental hazards, deforestation, alternate source of energy, proliferation of nuclear weapons and so on.' The report also emphasised the need for in-service courses in EE, among others, and declared it a national need to do so.

The NCF 1988 included protection of the environment and conservation of natural resources as one of its curricular concerns for schools: 'The school curriculum should highlight the measures for protection and care of the environment, prevention of pollution and conservation of energy. It should also highlight the interdependence between the material environment and the plant and animal (including humans) life for survival, growth and development. The significance of renewable and non-conventional energy resources should also form an important component of the curriculum.' Another suggestion was to include core concepts in language and EVS such that these subjects provide a medium to develop an appreciation of the world around the learner.

In classes I and II, the learner grasps and absorbs concepts primarily through concrete situations related to the immediate environment by getting the encouragement to observe and explore their environment and to enrich their experiences related to different aspects of it. At the primary stage, EE looked at the study of science and social science in classes III-V through the lens of Environmental Studies (EVS) by moving away from an informal and unstructured approach to systematically exposing the learners to a variety of objects, events and phenomena in the environment. In this process, the child should be encouraged to systematically observe and explore things and occurrences in his/her environment, formulate precise questions related to them, record and classify the observations systematically, collect information based on concrete experiences and analyse it, and draw conclusions, including those related to cause-and-effect relationship discovered through simple experiments, activities and demonstrations.

The NCF 2000, while speaking of diverse curricular concerns opined that on careful analysis of areas of learning, the ideas and concepts of EE needed to be approached as an integrated domain. Under this scheme of studies, EVS was placed as a subject for classes III-V. Teaching and learning of language and mathematics were to be woven around the environment of the learners, with environmental concerns integrated with the syllabus. The framework urged that all vocational education programmes stress the concept of sustainable development with a focus on fostering an awareness of key environmental concerns.

The NCF 2005 moved from the hazy inclusion of EE in the earlier documents to specific requirements of it in the four curricular stages (primary, upper primary, secondary and higher secondary). Science and social science were to be integrated as EVS at the primary level,

unlike before, and EVS was to have a thematic approach. Here again, as in the NCF 2000, the natural and social environment would be an integral part of languages and mathematics. The learners would be engaged in activities to comprehend the environment through illustrations from the physical, biological, social and cultural spheres. The Framework document says: 'For Classes III to V, the subject Environment Studies (EVS) will be introduced. In the study of the natural environment, emphasis will be on its preservation and the urgency of saving it from degradation. Children will also begin to be sensitised to social issues like poverty, child labour, illiteracy, caste and class inequalities in rural and urban areas. The content should reflect the day-to-day experiences of children and their life worlds'.

At the upper-primary and secondary stages, environmental concerns were restricted to content only in geography. The Framework document goes on to say (for upper-primary), 'Geography can help develop a balanced perspective related to issues concerning the environment, resources and development at different levels, from local to global. Subsequently, for the secondary stage, geography should be taught keeping in mind the need to inculcate in the child a critical appreciation for conservation and environmental concerns along with developmental issues.' However, the Framework did include a Focus Group Position Paper on *Habitat and Learning*, considered to be equivalent to EE. The paper focused on the alarming environmental degradation and the need for learners to realise the importance of their habitat and take care of it. The paper, hence, recommended infusing the components of EE through activities across the subjects. The framework also recommended that learners be engaged in undertaking environment-related projects, thereby, contributing to the body of knowledge that could help create a transparent public database on India's environment. Science teaching would have to engage the learners in acquiring methods and processes that would nurture their curiosity and creativity, particularly in relation to the environment. Awareness of environmental concerns must imbue the entire school curriculum.

The NCERT, to implement the guidelines of the NCF, endeavoured towards systematically infusing EE at all levels of school education, thereby increasing awareness among stakeholders of the importance of EE implementation (Mehta, Menon). The infusion approach incorporated EE into the existing curricula of various subjects, as well as the development of project-based activities. The primary approach of the NCF was to make EE nurture and promote critical thinking and problem-solving, as opposed to rote learning of textbook content. The NCF's infusion paradigm is intended for multidisciplinary thinking and project-based learning to promote environmental understanding and related actions. Various programmes were instituted to develop materials to support teachers in the pedagogy of project-based learning (for example, *Paryavaran Mitra* by the Centre for Environment Education)

NEP 2020 and EE

The NEP 2020 encourages the curricular integration of essential subjects, their skills and capacities: 'Concerted curricular and pedagogical initiatives, including the introduction of contemporary subjects, such as Artificial Intelligence, Design Thinking, Holistic Health, Organic Living, Environmental Education, Global Citizenship Education (GCED), etc. at relevant stages will be undertaken to develop these various important skills in students at all levels.' The policy envisions EE becoming an integral part of school curricula. To do so, it recommends the inclusion of the appropriate integration of environmental awareness and sensitivity towards its conservation and sustainable development in all B Ed programmes. To achieve a more holistic and multidisciplinary education, the policy suggests that a '...flexible and innovative curricula of all HEIs [Higher Education Institutions] shall include credit-based courses and projects in the areas of community engagement and service, environmental education, and value-based education. Environment education will include areas such as climate change, pollution, waste management, sanitation, conservation of biological diversity, management of biological resources and biodiversity, forest and wildlife conservation, and sustainable development and living.'

NEP 2020, EE and the school scenario

As of now, EE is included in subjects in the form of just a few chapters in the textbooks. It is integrated into core subjects, thus limiting the scope of discussion on environmental issues. Centralised textbooks do not address the contextual issues of specific regions. The restricted range for EE in pre-service teacher education could be a reason for the teachers' limited preparedness towards its nature and pedagogy. A lack of reference materials

on the state-specific environmental concerns and problems, and inadequate infrastructure in schools make it challenging for teachers to integrate EE into their teaching.

The following are some suggestions to address the challenges stated:

- Authentic reference materials could be sourced from various governmental and non-governmental organisations and provided to the school libraries. This would support the teacher in contextualising the environmental concerns of the state.
- Information and Communications Technology (ICT) provided to schools would allow them easy access to digital resources and aid in creating awareness about environmental issues across the country and the globe.
- Teachers of core subjects should be encouraged to provide attention to EE topics which are integrated with the content of other subjects. Modules, workshops and regular discussion forums would need to be organised to support the teacher in the classroom.
- Periodic revision of the textbooks to enable the inclusion of contemporary environmental concerns should be carried out.
- EE teachers should share with the learners the state-specific examples of environmental issues and conservation practices.
- As a part of pedagogy, case studies/field visits/ nature walks/project works must be encouraged to develop a spirit of inquiry and exploration.
- Collaborations of schools with other departments dealing with the environment would be useful.
- Relevant, authentic and credible resource materials should be made available for use in the classrooms.
- Compelling stories and evidence through case studies would support the understanding of EE approaches by fostering critical thinking, problem-solving and decision-making in real-world contexts.
- Appropriate practices based on research and theory and authentic experiences, which are child-directed and inquiry-based could be developed.
- The curriculum framework for environmental learning could include the development of environmental understanding, skills for understanding the environment, curiosity and questioning, and a personal sense of responsibility and caring.

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Journeys in Nature | Centre for Learning School

Keerthi Mukunda

This quotation that has inspired us at the Centre for Learning School, located on a 25-acre campus outside Bangalore is: 'If a child is to keep alive his inborn sense of wonder … he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement, and mystery of the world we live in' (Rachel Carson).

For some years, we focussed on getting to know our rich space through 'nature journey' activities and projects with junior school children. In fact, it was a 7-year-old who coined the term one morning, 'Aunty, why don't we call this *nature journey*?' This included campus walks, land work, sensorial activities and games to draw the children's attention to our natural environment. As teachers of these 6-9-year-olds, we tracked paths along with them, we wrote nature journals, and planned what we would introduce and how, and then recorded what actually transpired. Our main aim was to develop skills, such as quiet observation and listening. Aspects of poetry, mathematics, craft, artwork, sketching and research processes also came into their classes.

Planning nature walks

Topics: Trees, plants, flowers, fruits, seeds and growing cycles; insect and animal behaviour and life cycles; birds and features, the campus and its features, and trails

Activities: Games/hunts, observation and sketching, art and craft, poems and journal writing, detailed descriptions, gardening, measuring

Habits of the mind: Observing but not interfering, curious and questioning not just identifying and knowing names, appreciating and not being judgmental

The children were divided into three groups based on their ages: *Fireflies, Butterflies,* and *Dragonflies*. Here is an explanation of how the campus walks played out, in the form of a nature diary kept by a teacher, at the end of a season.

Evening walks - June to September

On these walks, we explored campus trails and got to know our own rich natural landscape. The children observed wildlife, used maps of the campus to trace our walks and noticed changes over time and through seasons. Occasionally, children would take turns leading a walk.

Figure 1. A walking path through the grass.

June 15: Children noticed a decaying centipede being carried away by ants, cow dung on the path, a very colourful leaf growing close to the ground, and how the sun felt when we came out of a thicket. When we sat silently for a few minutes, they noticed a big butterfly come closer; they heard more birds and rustling sounds. They ended with the question: how did the centipede die? (For a few weeks after this walk, they wanted to check on the decaying centipede and noticed how its rings were disappearing).

June 22: On the evening walk, as we went past the vegetable garden, we all saw a green bird with an orange beak feasting on a very large agave flower which was shooting out of the agave plant. It was a parakeet and we all noticed how messily it was eating the flower. We continued on our walk and after half an hour as we retraced our steps and came back by the agave flower, the parakeet was still there!

On the same walk, we saw that the centipede on the steps had decayed more. We also found an exoskeleton of a beetle and some children wanted to dig a 'grave' for it and bury it. Towards the end of the walk, we stopped at a pomegranate tree near the vegetable garden and looked at all the stages: buds, flowers, and fruits. A little later, one child wanted to know what the lantana fruits looked like, so we saw the berries and tasted them.

June 29: When we went for our evening walk, we checked on the cocoon that was brought to our attention by the Dragonfly group. It was hanging from a slim branch near a hut entrance. Children observed how shiny and delicate it looked. As we proceeded on the same trail through the vegetable garden, memories of what we had seen earlier on the same path, came back to the children. Centipede…parakeet…one child started to notice very small things, like nibbles on leaves and was also curious about how the lantana berry came from the flower. This was a follow-through from our investigation of fruits emerging from flowers. We began to refer to a campus map and identified where we were on the map. Some children could do that using the buildings on the map as landmarks. We realised we were on the nature trail heading north.

As we came to the sanctuary, which is wooded and shady, we talked about how it felt to be in a different space. The children said: sleepy, tired, and cool and that it made them think of the hostel! We looped back to the guesthouse, following the nature trail throughout and went to the guesthouse balcony. From there, we saw many dragonflies resting on the brick sides of the balcony. I noticed that I had an urge to constantly pose the question to the children: why is something happening in the way that we notice it? Immediately, there are attempts at some right answer. I would like to slow down my own instincts so as not to influence the children or guide them toward answers but see what came to them from their own observations. Pausing is so important!

I also started feeling the pressure to be the one to alert them to something I had seen or heard, but I found over time that there was plenty coming from them, and it was not a bad thing to drift through the spaces and trails without fixed agendas. We also want the children to develop feelings towards this place, have experiences that they treasure and remember and not only look at it in a scientific way. One change I started to see at this stage was a greater awareness to not pluck and take things to possess them. Why do we want to possess something we find beautiful in nature? The little ones still struggled with this, though.

July 7: On the walk, it rained very heavily and despite having raincoats, the children got soaked. Some of them were scared but others were excited and energised by the adventure. We had to take shelter under a tree for quite some time. Children spotted a white and orange mushroom. I saw a hare on the path. It disappeared very quickly as our campus dog chased it.

We went back on the nature trail through the vegetable garden and again children remembered the parakeet's place even though we were going the other way. That evening, there was a feeling of accomplishment in the children, as they felt they had weathered a heavy rain and storm.

July 26: We decided to explore another part of the nature trail and began near the games field, up through our steep rock and on behind the Library and Assembly Hall. We suddenly saw many butterflies in the shady areas along this trail and even saw a wing stuck in a web. The children spotted many grasshoppers in the grass behind the Assembly Hall and a beautiful rock pool with green plants carpeting its surface. As we looked closely, we noticed little insects walking on the carpet. Again, some children had to earnestly remind the others not to poke sticks through the pond, throw

Figure 2. Exploring boulders.

little pebbles into it and disturb its life. This is such a strong instinct and urge in the little ones. We ended up at the dining area and looked at the campus map, retracing our walk.

August 3: Near the Art Room, there was a tall, leafless tree and we saw two jungle crows on that tree. We watched them for a while and then proceeded past the Assembly Hall. The butterfly wing was still caught in the web. When we came to the games field area, we saw a yellow flowering tree and took a few flowers back so we could identify them later.

August 10: We began this walk by talking about caring and not caring for things and how Basava, cared for the insects in the story, *Basava and the Dots of Fire* by Radhika Chadha. I showed them those pages. As we walked again past the Stage Rock and the Library, we noticed both damp and dry areas, grasshoppers, webs on leaves, a caterpillar suspended on a thin string, many butterflies in one particular area and little white mushrooms (fungi, the children said). When we passed the Assembly Hall, the children became aware that we were walking by the school fence. One child noticed a creeper with tendrils and little roots sticking out and thought of our bean plants and their tendrils. In the Rock Pond, we saw bugs bobbing in and out. We sat on a rock, and I showed them photos of birds we see on campus. We ended our walk near a hostel by a *camel-foot* tree (*bauhinia purpurea*). One child brought the pink flower to me and that is how we stopped to find the flowering tree. In the end, a child held up a rock with moss on it and a tiny stem sticking out above the moss. We decided to show it to the teacher, who explained that it was the sporophyte, the stage before the gametophyte stage, which then produces the male and female parts and the leafy moss as well.

There were some walks where the children's energy was very high, and they noticed a lot and other walks where their moods were low, and they passed spaces but were in their own worlds.

Figure 3. Children identifying animal tracks.

Other findings

Land work

We followed the cycle of preparing beds, composting and mulching them, sowing vegetable and flower seeds, watering and caring for the growing plants, harvesting, cooking, and saving seeds for the next sowing. On harvesting, we estimated the number or weight of vegetables and then checked our estimates. We visited a nearby farm from which the school buys some fruit and all marvelled at the diversity and number of trees being cultivated in a space smaller than two acres.

Activities and games

A range of games and activities related to the immediate environment (for example, *Tree Tag*, *Feel a Tree*, *Bat and Moth*, *Scavenger Hunt*, *Un-nature Trail*) and later, the bigger picture (for example, *Web of Life*, *Pyramid of Life*, *Recipe for a Forest*) were a part of the programme.

Other hands-on activities included: bark and leaf rubbings, collection of seeds, flower pressing, dissection of flowers to see the ovary, etc. Before researching something, like the cycle of bud to flower to fruit, we would do 'hypotheses drawings' (one's own explanations) of the life cycle. Drama/skits also played a role in this year's nature activities to help to better understand the processes.

Furthering natural curiosity

On display in the junior school, was a nature table with items the children had picked up through the year and felt like displaying, topic-related books, and a large poster saying, 'Curious Naturalists Ask', under which were many questions from them. Here are excerpts from teacher journals relating to the activities we did.

June 29: We wrote acrostic (words starting with each letter of a word) poems looking at leaves. Here the word was LEAF. Then we weighed the leaves and compared the weights of dry leaves and fresh leaves, there was no difference, or it was very little. We also dropped the dry and fresh leaves from the balcony in the junior school and talked about what we observed about leaves falling to the ground in different ways.

July 13: In this nature journey session, we began with a look at the *Usborne Book of Trees*. What is a flower? We talked about the fruits that we had eaten recently and what their seeds looked like. When the children mentioned eating guavas, we decided to go to the Guest House where there are many guava trees. There we were able to see the buds, the flowers and the guavas and we sketched them. That day the morning snack was guava.

July 15: Some weeks ago, as we stood looking at our vegetable plots and talked about seeds and growing plants, Anand had asked the question: What were the first plants on earth? So, in this day's session, we had arranged for a teacher to come and show us some ancient plants on the campus: mosses, ferns and liverworts. As she showed us these plants near the Biology Lab, other questions came up: how did the earth begin? When did man first become alive?

We looked at mosses through magnifying glasses and some children noticed how they looked like little plants with leaves. Ever since that session, children have noticed mosses and ferns in many other places on campus and at many other times in the day, not just in nature sessions.

July 29: As we have been noticing cycles in nature, we did some craft from Arvind Gupta's *Cycle of Life*. It showed a pod with seeds, someone planting the seed, the roots and shoots, the leaves and flowers and then the new pods and seeds completing the life cycle.

Moving to the second term, here are excerpts from a plan made by the three teachers who were facilitating the *Nature Journey* classes.

Term 2 (September-November)

Date	Activities	Actual and Suggestions
14/9	Plant *avarekai* seeds in a grid, in the vegetable plots. Scarecrow brainstorm	We pulled out amaranth that had not grown too well and sowed *avarekai* seeds in a grid format. We talked about scarecrows in the fields near the school and what materials had been used to make those. Each child then drew a picture of a scarecrow and labelled the materials used. We discussed cheap and easily available materials.

Date	Activities	Actual and Suggestions
28/9	Graphing: bar graphs of vegetables grown in the plots	Shared a book on graphs and how they show the information differently. Talked about making our own bar graphs. Children preferred to show favourite colours, fruits, shapes etc.
12/10	Continue graphs. Collect things from nature that weigh 1 kg and display them	
14/10	Play a group game about webbing predators and prey with string and seeing the connections	Talked about predators and prey and campus links and then played the game creating a web of string among the children. In the end, we showed how the web gets affected by disappearing prey or not enough predators.
2/11	Complete display of 1 kg items. Complete group bar graph.	In pairs, children went to find items like stones, dry leaves and *Gulmohar* seed pods, that would weigh 1 kg. We displayed them in bags in the junior school and asked, on a poster, 'All these items weigh the same. Can you guess what each bag contains, without looking inside?'

Term 3 (January to March)

Date	Planned Activity	Actual
18/1	Recipe for a forest	We discussed what forests have and what creatures live in them. Then, on a large sheet of brown paper, we created a forest scene with trees, plants, creatures, and water features. The children used paper, thread, origami animals, real sticks and leaves from outside, and sketching to fill their forest.
8/2	Continued sketching birds, on pages for the book	The birds we wrote and sketched about were ones from our chart of bird observations on campus: Red-wattled Lapwing, Red-whiskered Bulbul, Purple-rumped sunbird, Cattle Egret, Black-shouldered kite, drongo, Red-vented bulbul, Large-billed crow, White-headed kite

We think what we have absorbed through the nature walks experience is the realisation that there is a vastness beyond ourselves and our consciousness. We hope that has touched the children too. In the words of Ruskin Bond: 'These little miracles don't happen especially for us. Sunlight will filter through leaves, dew will settle on a web, birds will sing and a mountain stream bubble and chatter even when there is no one around to see or hear. All that is in our power is to be there. To be there, wherever we are.'

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Nature Education in the Mountains | Marpha Foundation

Madhurya Balan

In a village as stunningly beautiful as Marpha, situated in the Kali Gandaki valley in Nepal, it was not usual to be indoors for long. Nature education and education in nature became a core part of the approach to early learning at the Rosehips Centre for Creative Learning[i] started in 2016 in the village of Marpha. The approach of the Marpha Foundation[ii] with older children had been through creative projects that would invite curiosity, appreciation and wonder through experimentation. It was very much part of the approach to integrate themes from the surrounding geography and cultural context; use local materials and creatively repurpose waste. The Foundation took inspiration from the village way of life and honoured it.

There is a meme of two young fish swimming in the water, and they happen to meet an older fish swimming the other way. The older fish nods at them and says, 'Morning kids, how's the water?' The two young fish swim on for a bit and then one of them looks at the other and says, 'What is water?' This highlights how often we cannot notice the most obvious things around us. A good education can invite the ability to see from other perspectives and help us appreciate or critically view many of the things that we take for granted.

The breathtaking natural beauty that surrounds the village in Marpha inspires different relationships with the different generations based on their education, values and lifestyle/daily practices. Embedded in a balance with nature was the older generation's way of living, with minimal dependence or interference from the outside world. They held the deepest knowledge about the landscape, seasons, farming and forest practices in the village. With time and the drawing of state boundaries, education, travel, more exposure to the outside world and interaction with tourists, the older generation was pressured into altering their traditional ways of life and livelihoods. This led to the opening of homestays, apple farming, growing of ingredients for herbal products, etc. The younger generation, exposed to the world through television and social media, has a whole new set of aspirations that has little or nothing to do with nature-based living.

This dichotomy is not easy to resolve, especially when there are vast inequalities of power, respect, money and access to opportunities between families that practise agriculture and those that have settled in cities. It was this dichotomy on which the Foundation based its work, creating pathways to reconnect the knowledge in local practices, like traditional farming, festivals, and intergenerational relationships which are not given importance in formal education. It provided the children exposure to some of the most engaging tools of education – illustrated children's books from around the world, teachers adept at using alternate pedagogies and creative practices that need problem-solving and working with hands.

Marpha is also a village where there is a divide between the indigenous community and the more recently settled communities that plays out in the village democracy, ownership of land and hence, family wealth. The kindergarten, therefore, was an important place of inclusion, where the little ones from families that do not mingle culturally in the village apart from village festivals and functions were eating, playing, learning (and napping) together.

There were three learning levels at the kindergarten – the playgroup, lower and upper kindergarten. The learning spaces for them included the kindergarten building, the garden, village fields, the stream, the horticulture centre in the village and the village grounds, the last two being the longest walk for the youngest children and considered 'an outing'.

Playgroup

For this age group of 2-3 years, working with clay was an important part of their schedule. We included the children in as much of the process as we could – from collecting different types of clay from the riverbed and mountainside to preparing it for use. We used clay as a means to talk about the body, members of the family, mountains and trees. We introduced a topic in a variety of ways, which

helped children in listening, imagining and asking questions.

Collection walks were also an important part of their learning. This age group notices minute details. Pre-verbal learning is an important developmental stage when an incredible amount of learning takes place through observation and touch. Themes for the children included the sky, the changing patterns of clouds and large animals in the village, like cows, horses, and donkeys.

Lower KG

Children of 3-4 years are always excited to file new words into their vocabulary, seek answers to questions, and sometimes, they require immediate validation for their efforts. In a learning environment, they are exposed to and are actively making associations with all the things around them verbally.

With this group, the garden was a beautiful site for learning. Not only did we involve them in the process of sowing seeds, planting and transplanting saplings, but we also extended this experience into the understanding of the concepts of the lifecycle, and interdependence between creatures that they see – earthworms, caterpillars, bees and ladybugs in the soil – and using these to expand vocabulary and teach even arithmetic.

For example, we first introduced an edible plant through a story and asked the children questions about what they knew of it, where they had seen it, and if they liked it when it was cooked in their homes. Then, depending on the season, we had an activity with either the seeds, leaves, vegetables or fruit. This could be a craft, cooking, painting or matching activity. The children had individual cups to germinate the different types of seeds. This made them realise that some seeds take up to two weeks to germinate, while others have very low chances of germination. The disappointment of the latter was usually balanced by their joy in seeing seeds in the other cup sprout and the plants grow over the weeks.

Upper KG

For the older children in the age group of 4-5 years, the emphasis was on language learning. The children first learn Nepali formally and are then introduced to English.

The learning sites for these children extended to the village fields, slightly longer walks and the horticulture centre which was colloquially called the *pharam* by everyone in the village. The horticulture centre is where the villagers buy seeds, saplings and vegetables. Trips to the horticulture centre not only engaged the children in various aspects of farming but also gave them a sense of pride and institutional validation for the profession of their parents and elders.

At this age, children are eager to assume responsibilities. In homes where there are chickens, many of the children took care of the chicks or the goats – feeding and looking after them. So, an important part of the UKG schedule was house visits as learning trips.

The fields were also an important learning site. As a village that practices traditional rotation crops, walking through the fields in different seasons was to witness a spectacular change in colours – the fresh green of the saplings to the delicious golden of the barley, the gorgeous pink flowers of buckwheat, the giant greens of winter, the inconspicuous flowers of the potato plant. Children enjoyed walks and activities around the fields.

Another aspect of their schedule was activities and exercises that answered students' questions – how does a caterpillar become a butterfly? How does a dog or cat have babies? Why can't we lay eggs?!

Conclusion

Our main aim, as teachers, was to guide learning experiences that would help the children to grow up into curious, confident, expressive, sensitive and intelligent versions of themselves. Working at Marpha, confirmed that at the core of our lives lies cultivating a sense of belonging to the place where one lives and being able to open one's senses to what surrounds us, for instance, creatures, and seasons. These are the threads in our culture that connect different generations and reinforce a sense of being and belonging. Education that includes meaningful learning from nature helps enrich our lives. Non-verbal visual memory and a subjective sense of time facilitate the all-around development of children.

Note: The year the pandemic hit was very difficult for the kindergarten. Since the model required external support, both in terms of funds as well as people and resources, when the lockdown was enforced, the core

functioning of the Foundation and kindergarten came to a standstill. In the midst of some very testing times, the village committee took a decision in September 2020 to close the kindergarten.

Endnotes

i http://marphafoundation.org/kindergarten/

ii http://marphafoundation.org/

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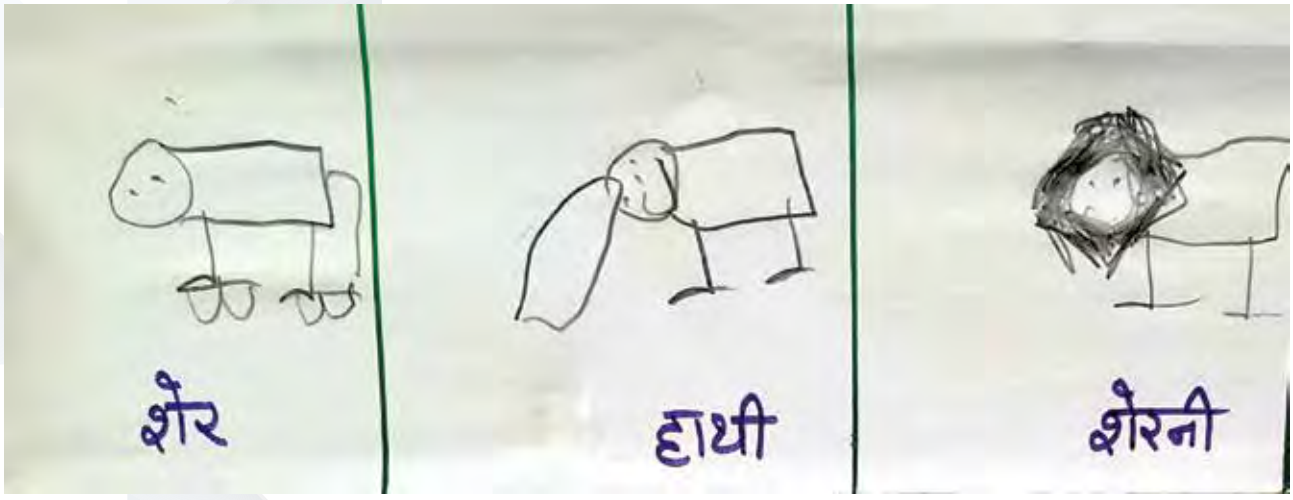
Art and the Environment

Malavika Rajnarayan

In the Malayalam film *Ottaal* (2014, directed by Jayaraj), the lives of two young boys are portrayed. One of them is Kuttapayi, raised by his poor and ageing grandfather who rears ducks in the backwaters; and the other is Tinku who belongs to a wealthy family and attends a local private school. Kuttapayi does not go to school but carries a wealth of knowledge about ducks, plants, trees, birds and butterflies – minor details observed daily from a life shared with these beings and from the innumerable questions patiently answered by his grandfather. Tinku, on the other hand, struggles through boredom and a lack of meaningful connection with his school lessons. His friendship with Kuttapayi opens up a whole new world of discoveries, enticing him to spend entire days away from the uninteresting routine of school. Although the story turns darker when Kuttapayi is sent away to work in a fireworks manufacturing unit, the essence of the entire film is firmly anchored in the beauty and wonders of nature – each scene allowing us to experience the sounds and sights of the backwaters and persuading us to find a bit of Kuttapayi in ourselves.

Bringing the environment into the classroom

In one of the Early Childhood Education (ECE) classrooms at the Azim Premji School in Uttarkashi, animal drawings made by four-year-old children were displayed (Figures 1 and 2), each labelled



Figures 1 and 2. Animal drawings made by 4-year-old children.

by the teacher. There are several reasons for this being a remarkable example of integrating arts in the classroom. In the early years, all drawings made by children are considered forms of written expression and communication. In this case, it was the role this display played that could be considered as art because of the multiple imaginings it triggers in viewers' minds the question as to how different animals can be perceived by different minds. Let us imagine that the children drew these animals, but they were not displayed and instead of their drawings, a regular animal chart printed in bright colours is permanently displayed. Such a display would gradually condition the children's imagination to be limited to images seen in the chart and at the most a few textbooks, and storybooks. They would gradually begin to model their drawings of horses, cows, dogs, pigs, tigers and mice in the manner these are portrayed in popular imagination. Any representation of animals that deviates from the norm would either make them uncomfortable or confused or even worse, be perceived as 'flawed'.

From a very early age, children need to be exposed to a variety of artistic representations of the natural world, in addition to real-life exposure wherever possible, and video documentaries that capture animal habitats and behaviour in authentic ways. Folk paintings of animals, ink sketches by different artists, unusual angles of animals captured by photographers – all these are invaluable sources of igniting the imagination and emotional responses of children. When such diversity of artistic expression is shared and discussed in the classroom, children get sensitised to also perceive diversity and nuances within their own environment.

Creating opportunities

Schools face many challenges in deciding how to include the arts into learning experiences to create environmental awareness. While one of the problems lies in limiting the arts to providing cultural 'entertainment', the other problem is our dwindling relationship with nature. For thousands of years, art has sprung from a deep engagement with nature. It is, therefore, not surprising that any disengagement with art would also likely cause disengagement with the environment and vice versa. Another challenge lies in how we design school environments and routines – do learners have adequate access to a variety of trees and plants? Are they encouraged to nurture flora and fauna as a part of their everyday learning routines? Are they allowed to spend adequate time outdoors to explore and discover the wonders of the natural world, and share their discoveries with others in the classroom? Are creative imaginations, ideas and expressions of children appreciated and encouraged?

What teachers can do

While many teachers make an effort to incorporate hands-on learning, learning-by-doing and experiential learning pedagogies, we may need to closely examine whether the chosen activities actually result in the learning/experience that is desired for children. Let us look at some examples of how some environmental themes can be planned with an arts-integrated approach. Here are some possibilities for arts being used as a tool for experiential learning.

1. Let us imagine a class IV classroom where a discussion is on about water as a source of life and a basic need. The teacher leads the discussion and prompts students to talk about the problems caused by pollution. They also discuss measures that could be undertaken to address the problem. As an art activity, children are asked to draw on the theme of pollution from their own imaginations – create posters, poems and stories to raise awareness and display these in their class or school premises. Here, children use their own observations and experiences as the basis for learning and creating artworks. The process of making art also provides an enjoyable and memorable platform to establish concrete connections for the concepts they learn. The teachers would, however, need to ensure that the learning extends beyond the classroom and prompts behavioural change and conscious actions in the everyday lives of children.
2. In class V, children can be assigned group projects where their task is to conduct a survey in their own school, neighbourhood or village to study different aspects of their local environment. Some of these could be:
    - Number of stray animals and their care and wellbeing
    - Natural sources of water in the locality, its storage, distribution and usage
    - Waste collection, management and disposal practices

Following the survey, the groups can be asked to develop creative modes of presenting their learnings from the data gathered. Some children can create decorative charts with pictures and key

highlights; some can create a story and perform it as a play, some others may create a 3D model of an imaginary ideal neighbourhood, and some can make drawings and paintings. The component of experiential learning might be more effective here because learners engage in a deeper examination of their own living environment through a survey and are given the opportunity to re-imagine it and propose solutions and models through a creative/art process.

3. Music and simple voice experiments with sound can be other modes of sensitising children towards the environment and developing an appreciation for nature. Children can be made to listen to the sounds of animals, a variety of bird calls; sounds of rain, water, thunder, and wind. They can then try to reproduce these sounds while also mimicking their movements in role-play activities. This can be a very powerful mode of developing empathy and compassion for other living beings and observing the delicate balance of co-existence in the environment.
4. As much as it is important to create a print-rich environment for learning, creating an aesthetically pleasing ambience that can stimulate all the senses is also very impactful for children. This can be done by making and installing wind chimes by using light pieces of discarded wood, metal, or any other object found in nature. Simple experiments can be carried out with children to explore sounds produced by a variety of materials to make their own instruments that are modelled like xylophones. Children love to touch different textures, drum on different surfaces and explore rhythm. Special surfaces can be created within the school premises where children can explore sounds that are linked with nature. Sculptural artwork can be created out of dried twigs, pinecones, seed pods, and many other natural forms that have a variety of textures and patterns. If these are lightweight, they can be suspended as kinetic mobiles that sway and move in the wind.

Art as a holistic experience

While these examples given above support experiential learning, they may vary in the intensity, impact and effectiveness of the experience of every child. However, they broaden the opportunities for children with diverse learning abilities (or multiple intelligences), as well as learning outside the classroom. The key objectives of art and arts education are to awaken all our senses, develop compassion for all forms of life around us, and develop the creative capacity to think boldly and imaginatively.

The arts are also a means of creating immersive and enjoyable experiences for children, which can have a long-lasting impact on their learning. Most of today's cutting-edge scientific inventions have had their seeds in science fiction, cinema, and art. This fact must encourage us to expand our ideas of art beyond the mastery of technical skills and aesthetic spectacles to give ourselves a little practice in flights of imagination.

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Nature Education at Marudam Farm School

Poornima Arun

Nature is the world all around for children. It is all-encompassing. It is everywhere. Small children love being outdoors. They need to be out and about. It orients them, grounds them, teaches them relationships, connections, and the scale of things; it gives them rich sensory feedback.

It is said that the first sense that humans develop is the sense of touch, in many ways, it is this sense which governs our nature experience – touching the soil, picking up rocks, playing in the sand, the feel of wind and sun on their faces, the wetness of water. Of course, the senses of smell and taste follow closely and are very strong, which explains the irresistible urge to put things in the mouth, an exploration in its own right. Children perceive nature from the ground up because the ground is that much closer to them – or they to the ground.

At the Marudam Farm School,[i] our circle-shaped kindergarten building creates an environment where children look around 360 degrees and feel, smell, hear and see what is happening outdoors and get a feeling of being outdoors even when they are indoors. Bees come through, wasps make nests on the walls, bats live in it, frogs, rodents are permanent residents, and snakes have made themselves welcome more than once.

The kindergarten has a solid nature education programme with an hour-long nature walk every day through the same route in the school. Our experience has been that when children continuously interface with the same route, walking through the same trees and rocks, they internalise the different seasons. This internalisation is made evident in the children's play; for example, in summer, for creative, imaginary play, like building houses, making domes, dams and ponds, they use a lot of dry sticks, leaves and twigs; in the rainy season, they use mud, pebbles and water, while in winter, they collect butterfly wings, wild berries and fruits.

Summer times are rich with collections of flowers. For instance, Flame of the Forest or *Palash* (*Butea monosperma*) flowers that fall to the ground are collected to make a natural dye which they then use on cloth to tie and dye. This summer, they used this cloth to make hand-stitched pouches for their own use.

Figure 1. A sling bag naturally dyed and hand-printed by kindergarten children.

Additionally, nature provides a playground for children to practise and develop all their new moves, such as crawling, climbing and balancing. For instance, in our school, children are supported and encouraged to climb trees, balance on rocks, crouch and crawl into holes. While they do this, we have observed how children help each other in these new explorations. The sense of where one's body is in a space is, then, often at the centre of the child's perception of nature.

Figure 2. A group of children helping each other climb a banyan tree in the neighbourhood.

Stages of growth and awareness

At age 5 to 7 years, children begin to become more conscious of the difference between themselves as 'human beings' and other elements of nature. They move from a purely sensory mode of interaction to a curious, inquiring mode, which we can see in the way they begin to make and articulate detailed observations. It is at this age that it is critical for an educator (whether in school or at home) to hone that curiosity without stifling the spontaneity of the child. The capacity and ability to engage with new experiences and make meaning from them is phenomenal at this age, and nature offers unlimited opportunities to utilise this capacity. For example, when we go into the forest with the children, every aspect of the forest fascinates them. They have to deal with different textures, thorns, slush, dry leaves etc. They have to understand different concepts, like camouflage, diversity, temperature and so on.

In Marudam, for this age group, we do project-based learning where we connect observations to an organic inquiry – like young scientists they carry bug boxes, measuring tapes, magnifying glasses and checked paper for drawing graphs. We once observed a 6-year-old engaged in studying ants. She noticed how they were moving homes and taking their larva from one point to another and guessed that this was because the rains were about to come. Another child studied the *praying mantis* and came back to class exclaiming how different it looked from the images she had seen. When presented with a 'formal' book with real diagrams (ostensibly meant for older children), she was satisfied. This example also reminds us that children do not need to be talked down to. When they are engaged in a study born of their own curiosity, they will learn to make meaning from whatever material is given to them – therefore, we need to be responsible and give them accurate, sensible explanations.

Children are naturally alert and so are able to observe things in detail. In their excitement and curiosity, they rush to explore more, such as reaching out to touch any plant or animal that excites them, plucking flowers, reaching out to birds' nests, going after a snake and so on. At the same time, children readily understand that they are sharing the space with other beings of the environment. This provides an opportunity for educators to explain the need for silent observation and for respecting all creatures and the spaces we share.

In Marudam, we often talk about respect and care for other beings coexisting around us. When we did a project called 'Voices of Children', many children expressed themselves as sunbirds and spotted doves, which build nests around their classrooms. Very soon, we found children making caution slips around the nesting area and its environs, warning others to be careful.

In the age group of 8 to 10 years, this engagement with nature develops further, aided by the greater understanding of the world that the children are starting to develop. They start to understand that they are part of a food chain, and their experience of nature is altered by this realisation. They start considering the concept of interdependence among species. They also start paying more attention to details, like the differences between the various

bird species and their habitat. In Marudam, children often get very motivated and excited on spotting the arrival of migratory birds, like the *Indian pitta* and the *Eurasian cuckoo*; they also get curious to know where they are arriving from. Many a time, during the morning class hours, one of the children spots a migratory bird which results in the entire class going out with the teachers and welcoming the arrival of these birds. As nature facilitators in Marudam, we have come to understand that nature learning cannot be restricted to specified, structured timings.

Figure 3. A 10-year-old's painting of the Crested Serpent Eagle that he observed during a nature camp.

In Marudam, we started a patch-monitoring programme over the last six months, half a day every week, at a specific time of the day. Students choose a particular patch, it could be a small shrub area, a plant, a path that attracts a lot of butterflies, a small garden patch or a scrubby path in the neighbourhood and observe the biodiversity. They record the names of the insects, birds, shrubs, and trees in a sequence. We have experienced some magical moments and learnings out of this continuous programme. For instance, when we were observing a castor plant next to a thorny shrub, we saw a spider hunting a butterfly (Common Castor) which lays its eggs on the castor plant. At the same moment, there was a *Bronzeback* tree snake trying to hunt a small frog; a drongo caught a dragonfly at the very moment. Such rich experiences bring immense opportunities for understanding the interdependencies in an ecosystem.

As with the young of any species in the wild, every moment is a moment in which our children are facing something new and trying to understand it.

Figure 4. A child's illustration and sequential summary of things observed during patch monitoring.

And just like all young creatures, they learn a lot by observing the behaviour of the adults around them. In Marudam, both the adults and the children are co-learners in their nature education journeys.

This process is continuous and requires support and encouragement from the children's parents or guardians. We have observed that this support takes many forms and, at its core, manifests itself as a sharing of the child's excitement; some parents even become participants in the journey and not just observers. We have provided a platform for interested parents to join our nature walks, planting drives, and gardening together with the staff and children. We also feel this experiential learning and foundation at the primary school level is key to the child's concrete understanding and appreciation of concepts like adaptation, reproduction, migrations, ecological niche and so on, which are developed in the middle school.

Keeping the natural fascination of the child alive is most important. It is a wonderful journey for every child to engage with nature, and when supported by the adults around them, it has the potential to result in some of the most meaningful relationships of their lives.

Endnotes

i https://vikalpsangam.org/article/marudam-farm-school-becoming-while-it-is-being/

Poornima Arun is a Founder-member and Head Teacher of the Marudam Farm School and is involved in all aspects of running the school – from curriculum development to teacher training and administration. She has also been involved in creating innovative approaches to science in her classrooms for the past 20 years. For the past eight years, Poornima has been organising an annual craft week at Marudam to showcase traditional arts and crafts from all over the country. She has also been an active member of the Alternative Education Network and was instrumental in starting the Tamil Nadu chapter three years back. She can be contacted at poornima.arun12@gmail.com

Saving Our Ponds | A Classroom Interaction

Anju Das Manikpuri

From the Kothari Commission to the New Education Policy (NEP), there have been many policies that recommend connecting basic education with the environment and the needs and aspirations of people's lives. Teachers play an important role in educating students to ponder over the environment and become responsible citizens. Environmental literacy, combined with the efforts of teachers to promote it, creates opportunities for dialogue that increase awareness of the environment.

The Azim Premji Foundation works closely with teachers to ensure better education in government schools. The members of the Foundation co-teach with teachers in the classrooms so that the children can achieve better learning outcomes. In this context, an effort was made regarding environmental literacy, the experience which I am presenting here.

Promoting environmental literacy

My intention behind this effort was to give children an opportunity to interact with the world around them. To do this, it is necessary that the children observe, record and reflect on what is happening around them. This must be followed by a reflection on the possible reasons behind their observations; learning of the ways in which to examine the causes; discussing if there is a connection between the causes and the occurrences, and then, creatively and sensitively arriving at solutions to improve the conditions. In short, children also need to be given opportunities to participate in making our natural environment better and safe.

Contexts, dialogues and functions

While I was planning environmental literacy with a teacher, I read about the sources of water in Chhattisgarh in the newspaper. The data showed that in the year 2000, there were 2.79 lakh ponds in different districts of the state, but by 2020, the number had come down to 1.34 lakh. Along with the ponds, the number of lakes had also reduced.

Everyone knows that ponds, canals and lakes play a major role in conserving water. Due to the reduction or disappearance of these water bodies, the groundwater level has declined drastically in most places. As a result, many wells and hand pumps in the state and various water sources of the *patwan* (a municipal water source) have dried up. Therefore, there is a constant problem of water scarcity.

On observing the surroundings of the schools that I visit, I found that water is not easily available. Taps installed by the government supply water only at fixed times. Those who miss filling water at those times have to go without water, especially drinking water. In summer, this problem gets worse, and people depend on water tankers to supply water. So, I thought of integrating the above context and environmental literacy with basic education. I started my work with 27 children from class V. The main thrust of my work was the scarcity of water sources, especially ponds.

Something interesting happened during this visit. As they do every year, the children were planning to visit their relatives after their final examinations. Most of them were going to their maternal uncle's place. So, I asked them the following three questions:

1. Where are you going for your summer holidays?
2. Which activity do you enjoy the most there?
3. How many times have you been to that place so far? What kind of changes have you noticed?

Here are some excerpts from this discussion, which went on for almost four periods.

My question: It is vacation time now. Where are you all going?

A few children said that they were going to their native village or to their relatives' places. Some children said they would go to their maternal uncle's village. A few others added that they would go to attend a wedding at some relative's place and the remaining said they were not going anywhere.

I said: Great! Which are the places you will go to?

The children named many places, including Jamgaon, Sankara, Dhamtari, Pahanda and Bhothali.

I asked: Do you go there every year? What do you do when you go there?

The children enumerated their activities excitedly – playing, drinking fresh cow's milk, relishing the treats cooked in their grandparents' homes, and bathing and swimming in the ponds.

They added that they had nowhere to swim near their homes but in the village not only did they get a chance to do that but can go for a bath in the morning and evening.

I replied: That sounds great! You seem to have a lot of fun there. Just like you, even I used to go to my grandmother's village in Bilaspur during my holidays. She had many cows and we used to get a lot of milk, curds and ghee. But tell me, all of you have been going to your native village for so many years, do you see any difference there then and now?

It was clear from the silence of the children that they did not comprehend my question clearly. Their teacher prompted them in Chhattisgarhi, 'How was the village when you visited it earlier and how do you feel when you go there now?'

Now there was a flurry of answers from the children:

- The water in the pond does not look as clear as before.
- The lakes were bigger earlier but now they are shrinking.
- The pond has been converted into a *gothan* (cow shelter).
- A house has been built where a *gothan* used to be.

The teacher was quite surprised to see the children's eager participation in the discussion and said to me, 'See ma'am, how well they are answering now! Otherwise, even after studying environmental science, they are unable to write the answers.' I understood then that it is very important to speak a familiar language for mutual communication.

The children continued: The houses have been made bigger by breaking the platform outside the house and the trees have been cut to make bigger houses. So now the place where we used to take rest when we got tired of running, is gone too. Some children also mentioned that during the COVID-19 pandemic, due to the shortage of money, some families had to sell their farms and cattle because of which they could no longer pick mangoes and berries to eat from the land that they formerly owned.

Now it was the turn of the children who were going to stay back during the holidays to speak. They were to stay back to take care of their younger siblings and help their parents with household chores. They said that they too face water shortages and have to help with filling, carrying and storing water in their homes during summer.

The teacher listened to them sympathetically and agreed with them since she had lived and worked in different places in Chhattisgarh which had also experienced water scarcity. She asked the children: You say that the pond has become dirty, and its size has reduced, but can you tell us how the pond can be saved?

She divided the children into two groups. One group, let us call them the *Activity Group*, was asked to dig a pit in the ground, and then fill it with water. When it dried up, more water was poured into it till the time the water stopped drying up. The other group, let us call them the *Survey Group*, was instructed to go to the village and ask the people about how to keep the pond water clean and save the pond.

Results of the experiment

Both the groups were asked to bring their observations and reports in writing. On the second day, the children were ready with the results. These can be consolidated as follows:

1. The Activity Group's observation was that keeping the soil constantly wet led to the water in the pit being retained. The teacher and I connected the idea of the pit with that of the pond, saying that if the groundwater is to be increased, then we have to revive the ponds to save them.
2. The Survey Group's findings were that increasing population, continuous construction of *pucca* houses and exploitation of land are the main reasons for the disappearance of ponds. It is important to plant trees and to not fell them. The ponds need to be deepened, and not filled up with soil to make a pasture or build a house there.

The end is the beginning

This dialogue brings out the fact that most of the children are aware that the water in the ponds is not like before, and it looked dirty. The children also figured out a way to solve the problem on their own.

This exercise also breaks the misconception that

children do not like to study or do not speak in class. It is important that their curiosity is given space, their words are patiently heard, and their questions and experiences are respected.

This was just one example. There are many issues like this that can be discussed in class to create awareness and sensitivity towards the environment and environmental challenges. Such exercises enable them to express their concern for the environment and be motivated to improve or maintain the quality of the environment. Environmental literacy, like any other form of literacy, is a must if we want children to grow up in a richer ecological world.

My personal experience is that environmental literacy tends to be confined to primary school. There is a lack of environmental awareness content in the subsequent classes. When children see in their own lives the events that they have studied about as a part of their curriculum, they learn better and are able to retain their learning. There is a need to seriously consider how to make environmental issues a part of the classroom dialogue. Had this not been felt as strongly as it was, the Supreme Court would not have intervened to include environmental literacy in the school curriculum in 1991.

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Living Near Forests | What Children Learn

Ankit Shukla

A forest that is untouched by human activity is home to numerous species of trees, vines and bushes, as well as birds and animals. However, when trees and plants are chopped down not only does the earth lose its natural forest cover, but these animals lose their natural habitats and gradually begin to become extinct. There are numerous examples of human intrusion in the natural environment that disrupt its balance and eventually cause it to deteriorate. Most students are aware of these issues to some degree, but a constant dialogue is required to reiterate facts and create awareness about our ecosystem and what we can do to maintain the balance in nature so that it does not turn back on us to cause natural disasters, like floods and rising temperatures.

Nature camp

Exploration of nature, by way of visits to rivers, mountains and forests etc. is more effective than studying about these in books. This is cited in the book, *Totto-Chan: The Little Girl at the Window* by Tetsuko Kuroyanagi, in which the headmaster takes the students for a walk in the forest and listens to their views about trees and other things found in forests. He clearly understands the value of knowledge of nature for his students.

Taking inspiration from the story, some of us, the teacher and resource persons, planned a visit to a forest nearby with some children of a government school. We planned this activity during the summer camp. We began by getting to know everyone through activities like drawing, painting and reciting poems, etc. Once rapport with the children was built, we decided to go for the nature walk.

During the walk, we found that the children knew a lot about different trees, water resources, and rituals related to these that are performed in their village. They spoke about the special attributes of different trees that we came across. They knew the fruit from each tree and how it could be used and if it was a fruit or a vegetable.

Figure 1. Students setting out on the nature walk.

Their village was very close to the forest and many resources, such as water, were abundant. Almost every house had a well which was functional. The children had named every well according to the usage of its water, for example, a well used for irrigation was named *sinchan kuan* (irrigation well).

After this walk in the forest and through their village, we discussed the usefulness of trees with the children. Their replies took us completely by surprise; they knew so much! They were aware of the fact that their livelihoods depended on the forest from which they got fruit to eat and picked mahua, which is a major source of their income. Another source of income is the *tendu patta*, the leaves of which are used for *bidi*-making. The children knew the entire process from picking the leaves from the forest to bundling and drying. The children also spoke about the different parts of the lotus plant that are used in their cuisine, such as the stem, which is used for making a delicious curry and the small, sweet seeds inside the lotus flower.

Figure 2. The lotus fruit.

The discussion then moved to the check dam in their village. Its usage and utility were discussed in a detailed manner – how it is used for irrigation and water harvesting etc. In the initial discussions, the children had shared how they are dependent on river water for their irrigation, when probed further, it came out that in one or the other ways, they are dependent on the rains for irrigation.

After these discussions, we went for a picnic near the check dam. They cooked food on an open fire, the wood for which was gathered from the area. The children did not litter the place as they did all this. They used vegetables that were grown in their *bari* (kitchen garden). We used the leaves of trees to make plates by folding them and punching them with twigs. Observing them doing all this made me realise that children living in villages are already living their lives in a sustainable way.

Exposure to government schemes

When the Chhattisgarh Chief Minister assumed office, he gave the state four symbols that they should all protect, *narva* (waterworks), *garwa* (animal wealth), *ghurva* (pit for cattle dung to make into manure) and *bari* (kitchen garden).

Figure 3. Food being prepared for the picnic.

The state government believes that through this scheme of groundwater recharge, irrigation, and organic farming, it will be easy for the farmer to take up double cropping, proper care of animals will be ensured, traditional kitchen gardens and rural economy will be strengthened, and the nutritional level of all will improve.

Students should also be made aware of initiatives such as these which directly impact their villages and quality of life. One of the schools we work with planned an educational visit to a nearby *gothan* (cow shelter) for the children to actually see this initiative so that they will be able to relate to it when they read about it in their textbooks The children took a tour and were very curious about small details, such as how manure can be made so easily or how cows do much more than give milk.

After these interactions, I would say that the children living in villages are quite aware of the different aspects of nature. They live in a way that ensures that nature does not get exploited. It is the main source of their income or their whole livelihood is dependent on nature. Whether it be trees or rivers, they try to preserve and sustain them so that they get a continuous supply of natural wealth and at the same time, the natural world does not deteriorate.

Figure 4. Children on a visit to the cow shelter.

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Traditional Knowledge in Modern Classrooms

Namami Sharma

In the late 2000s, I was associated with organisations working in the field of environmental conservation and restoration when I came across several communities that were conserving their forests. The relationship communities shared with the forests fascinated me. I realised that though the conservation of forests was based on religion, superstition, myth, ecological services and subsistence, these practices which are deeply enmeshed with conservation practices also keep traditional knowledge systems alive. Traditional knowledge emerges from conservation practices and also contributes to ecological awareness and consciousness.

Future of environmental ethics

During my field visits, I observed that the young members of the community did not share the same belief systems as their elders. In Uttarakhand, the focus was on getting an education and grabbing a white-collar job and eventually migrating. In Madhya Pradesh, there were multiple factors at play. The *Baiga* community faced forest alienation and displacement due to the demand for protected area for the Kanha National Park, which kept expanding. Resorts and hotels took land on lease and started employing the *Baigas* as support staff. Members of the community also migrated to nearby cities. Gradually, the younger generation started losing their sense of belonging and connection with the forests.

In Arunachal Pradesh, the status of the forests is unclassified, and the ownership lies with the community. There I saw that although the conservation ethic has reduced in the younger generation, religious fear still persists. On one occasion, a certain village traded a hill with the army for the construction of a tunnel. Subsequently, many people in the village fell critically ill and the villagers attributed it to the 'disrespect' they had shown to Mother Nature by trading off the hill. However, the younger generation is gradually moving away from the traditional occupations of farming and yak-herding. The distance between the young and the forests is growing.

I visited schools and interacted with young students in various locations. I realised that the modern school curriculum seldom includes traditional knowledge systems or engages the students in inculcating environmental ethics. I also felt a hierarchy of knowledge systems in school education: the traditional knowledge systems would be the prerogative of the older generation and the young would unabashedly admit their ignorance of the same. The traditional knowledge system would be dismissed as 'old school', without recognising its potential in generating environmental ethics amongst children. For instance, a *Kumaoni* (person from the Kumaon region of Uttarakhand) knows the importance of an oak tree in maintaining the water level of the traditional step-wells. A child being educated in the state curriculum, who does not get this knowledge, might not see the importance of protecting the oak forests and would systematically get alienated from the forests.

Thus, it becomes imperative to engage children in various activities to generate an eco-centric ideal in a classroom. The immediate question is: how to do it? The teachers are engaged in giving information in classroom transactions. For example, the children might know the phenomenon of photosynthesis but not how it impacts their lives.

Classroom activities to inculcate ecological consciousness

Understanding our local 'friends'

In the West Kameng district of Arunachal Pradesh, I witnessed the WWF (World Wildlife Fund) team making a beautiful intervention in the schools. They had come up with small activity books filled with activities like joining the dots, crosswords, colouring blank space, finding similarities, filling in the blanks, and matching words. All the activities were designed to raise awareness of the wild species present in the district. For instance, there was an activity to differentiate between venomous and non-venomous snakes and why it is important to conserve snakes. The facilitators from WWF had taken classroom sessions on the activities and had

trained the teachers to continue. The local names of animals were used.

Herbariums

Students can be asked to collect local species of flora and make herbariums with the local name, key characteristics and use of each. In the process, they will get to know the plant by its name and use, will be able to identify it and also understand its role in the ecosystem.

Sow and grow

Each child can be given a small pot and a seed and helped to plant the seed. The child can be asked to observe the seed each day and maintain a journal. The plant may be given a name as well. As the plant grows, the teacher can talk a bit about how a plant breathes, how it feels and how it can communicate.

Our living soil

Children can be taken out and asked to dig the soil and identify the bugs and worms in the soil. The teacher could elaborate on the role of each in maintaining the quality of the soil. This activity will change their perception that 'soil' is dirty, and children will gradually learn to be comfortable touching it. The teacher could also ask children to describe the feeling of touching soil.

Growing our food

In the Viswema village in Kohima, Nagaland, the K Khel school had recently grabbed the headlines for running its mid-day meal kitchen with the vegetables grown by the students in the small backyard plot. The vegetables are grown organically. In doing this, children learn about growing food and about their traditional knowledge systems. They also develop a strong connection with the soil and Mother Earth.

One world, one family

Children can be taken on field trips to different local ecosystems. For instance, children of Thembang village in the West Kameng District of Arunachal Pradesh can be taken to the higher altitudes on a trek and asked to enumerate the species they see in the forests and repeat the exercise at lower altitudes. This will facilitate drawing a species-relationship diagram where they will highlight the connection between the different species at different altitudes. A discussion can further describe how all species are a part of one big family and why it is important that all species are protected.

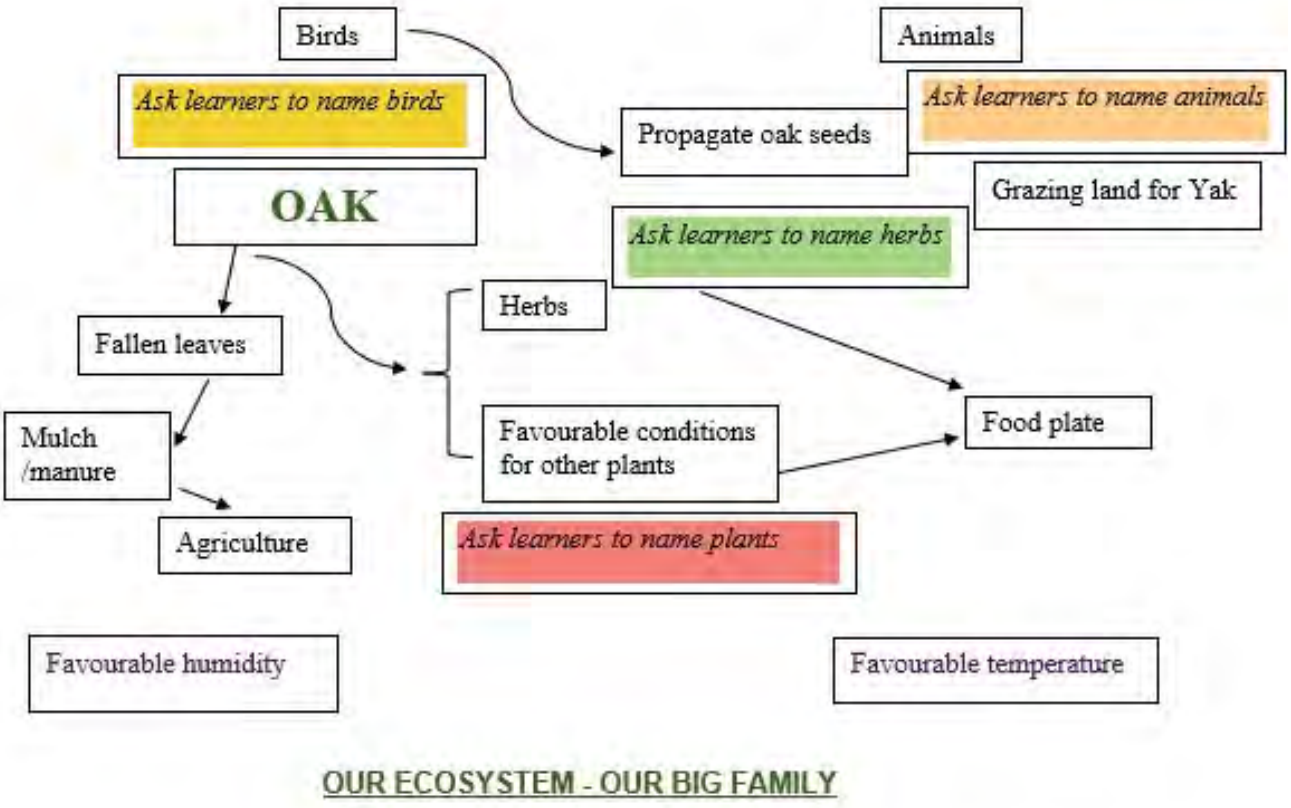

Figure 1. Understanding the importance of maintaining biodiversity.

The chart (Figure 1) can be used to show the fallacy of monocultures. In the chart, the number of a certain species can be increased, and children asked to describe the consequences. Suppose all the oak trees are cut and instead only pine trees are planted in the higher altitudes, which are the species that will be directly affected? How will that affect the other members of the 'family', including human beings? The importance of maintaining biodiversity can thus be explained.

Ecology in folklore

Children can be asked to collect stories from folklore. The teacher can take up one story per session. The stories will have to be analysed beforehand by the teacher so that he/she can facilitate the discussion on it in such a way that it highlights the components of nature in traditional stories.

Festivals and nature

During local festivals, children could be asked to identify the integration of nature in the rituals. The teacher can elaborate on the importance of the concerned species. The teaching-learning processes can go a long way in inculcating a strong environmental ethic amongst children. This will play a significant role in developing an ecologically conscious future generation of adults. The process of replacing anthropocentrism with ecocentrism can only begin in a classroom.

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Nature Around Us | Leaves to Trees

Nandini Shetty

Children are naturally curious about nature. We can see them enjoy playing with dogs, cats, and cows and look at plants and trees with interest. We can transform this interest into a concern for nature as they grow up. Global temperatures are rising day by day due to increasing pollution and our disregard towards nature and it is necessary to create awareness about nature in children so that they develop a sensitivity towards the environment. As we know, children who are brought up in rural areas naturally associate more with nature and natural life around them than children living in urban areas.

Unfortunately, smartphones have become a major source of entertainment for children - according to the National Commission for Protection of Child Rights (NCPCR) 76 percent of children consider smartphones as their primary source of entertainment. Consequently, they do not know that there are many interesting and curious things to learn about in nature. We need to attract them to nature to cultivate eco-consciousness. Every aspect of nature is interesting and full of lessons and several activities can be organised for every age group. Here I am describing a few of the activities we did with classes II - V, which can be done with children anywhere.

Learning from leaves

Children collected and dried leaves of various trees in their surroundings. Later, they classified simple and complex leaves and pasted dried leaves on chart paper to create a poster. They measured the width and length of the leaves and represented the data on a graph sheet by column mapping, integrating what they learn in maths also.

Learning seed propagation in different fruit

Children collected dried fruits and seeds from various trees around their school and homes. This led to a discussion on the structure of each fruit/seed that was collected and also about the animals and birds who feed on them. We also discussed how fruits/seeds are dispersed by animals and birds. We talked about the features of fruit/seeds that are not eaten by animals and birds, as well as those that are propagated by water and wind. We talked about the role of humans in seed propagation. So, this activity touched upon a bit of biology also.

Observing living organisms on the school grounds

We planned a programme on butterflies found around the school and saw eight types of butterflies. Children wrote down their common names. We taught children about the life cycle of butterflies, and they drew pictures of the life cycle. The children were asked to bring the fallen feathers of birds, unused nests, dead insects, moths and butterflies found in their surroundings and helped in identifying and learning more about these and other common species.

Getting to know trees

Children identified and wrote down the names of common trees found in the school surroundings. We collected flowers, bark, leaves, seeds and fruits of those trees for drying. We identified 50 trees and plants in all and drew pictures using the materials the children had collected.

Our learnings

Children participated enthusiastically in all these activities and did a lot of the work on their own. For example, they prepared posters from the dried leaves that they themselves had collected. They collected feathers of birds (crow, pigeon, and hen), broken eggs of lizards, and exoskeletons of crickets. They even searched for the larvae of Oleander Hawkmoth in the periwinkle (*vinca rosea*) plants, collected larvae, grew them and showed me the moths which emerged. We saw fully grown butterflies from the larvae of common castor butterflies found in the castor oil plant.

What do we achieve through these activities?

Through these activities, we can foster the interest and curiosity of children about nature because they learn how beautiful and full of wonder nature is. This realisation leads them to observe all living creatures in their surroundings. Another big learning is the value of trees and the life each tree

supports.

The most important learning, however, is the interdependence of all living creatures - children learn that the survival of human beings is dependent on that of the other species and natural resources and vice versa. Also, that every single species has as much a right to life on earth as human beings do, which eventually helps them in protecting and conserving their local environments.

Change in outlook

These activities have resulted in children becoming more aware; for instance, they search for insects and eggs in plants and trees. They show them to me and ask for my help to identify their names. If they find larvae in the plants near the school, they put them in paper boxes and feed the larvae leaves. They have shown me butterflies and moths coming out of their cocoons. Now children bring leaves, flowers, and fruits from nearby plants and trees, ask me their names, and give them to me for drying. They themselves try to identify trees and plants by browsing through books and trying to remember their names. They can identify all trees in the school compound.

They take care of the plants in the school compound and if they see somebody plucking leaves or flowers, they object. Even while they themselves are collecting leaves, they only take as much as is necessary, never more.

I have noticed that children learn easily if they come across any learning points related to these activities in their lessons. They can distinguish between simple and complex leaves; they can identify parts of leaves. They can narrate the life cycles of insects as if they are telling a story.

When I began these activities not all children who were involved, were fully interested. As we proceeded, more and more children participated with enthusiasm. All these activities can be done involving all interested children. Each child participates as much as he/she can. Children in classes II and III can be asked to write what they can according to their abilities.

Some pointers

It is better to use books with colour photos to identify butterflies, moths, trees and birds as children love to see pictures. They look up the names of the animals, insects, birds, moths and butterflies by observing every minute detail of the pictures and this is a good practice. If books are not available, we can show them pictures on our mobile phones and computers. A magnifying glass can be used if a microscope is not available. As teachers, we have to use every opportunity we get to create respect for the environment.

These kinds of activities certainly help to develop eco-consciousness in children; not only that, but these activities can also help in cultivating different scientific skills in children, such as observing, exploring, explaining with pictures, thinking, questioning, and logical reasoning. These activities help children to construct knowledge through self-experience.

As the NCF (2005) has recommended, we have to take children beyond the syllabus that is given in the textbooks to create awareness about nature. We have to provide as many opportunities as we can so that they grow into responsible, nature-loving citizens.

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Saving the Planet by Saving Water

Nawlesh Kumar

Let us say you think you are a great teacher, and you do an excellent job of instructing your students. Your children pass exams with flying colours. On the other hand, these same students of your class waste water in their homes, spread garbage around their neighbourhood, destroy trees and the plants on the school grounds or participate in all of these actions as part of a group. If you think this may be true, you should reconsider the definition of a school teacher. A school is a centre of learning and the best place to educate youngsters. As a result, it is reasonable to conclude that the primary goal of educational processes in schools is to educate future adult citizens.

Children should, and can, be made aware of their surroundings from a young age. This awareness not only allows students to engage in experiential learning outside the classroom but also allows them to connect with the real world and apply what they have learnt to life situations. Environmental education teaches pupils how social, ecological, economic, cultural, and political issues are intertwined. It also assists children in comprehending how their choices and behaviours affect the environment.

Teaching environmental awareness

Environmental awareness should be taught in the school in a way that is appropriate for the children's age and maturity levels. At the same time, instruction should not be just theoretical, but also practical, interesting, and enjoyable. I spoke with a few teachers to find out what kind of environmental activities they could perform in their classrooms.

Classroom interventions

Anuradha, a teacher at the Azim Premji School in Mandwa, Sirohi, believes that Nature Walks are a wonderful exercise that help children connect with their surroundings. This practice assists youngsters in developing skills, such as seeing, understanding, knowing, and inquiring about their surroundings. She organises nature walks with her students from classes I to IV. According to educational psychology, nature walks are an effective method for connecting youngsters with observing their surroundings. Children up to the age of 7 years are said to have excellent observational skills and are quick to grasp new information. Children have a proclivity for noticing everything and, as a result, are better at learning new things.

Sharing her experience, Anuradha further states that one of the learning outcomes set by NCERT for science students in higher-order thinking skills (HOTS) is to take measures to protect their environment. As a result, she ensures that all her lesson plans provide sufficient scope for children to achieve the recommended learning outcomes as well as to carry out the specific activities suggested. She discusses the topics extensively with the children, shows them videos, organises debating competitions for them, and asks them to prepare charts, posters, etc. Some of these projects are directly linked to the environment. For instance, for National Science Day, the children made a working model of a particular technique for irrigation of crops in which water consumption is very low and irrigation is better. While teaching the transportation of water in plants, she also raised the important issue of the frequent pumping of water from the ground leading to a dangerous shortage in the groundwater supply, with the added disadvantage of water required for trees and plants gradually getting exhausted. Anuradha asked the children what steps should be taken to stop the excessive exploitation of groundwater resources. The children gave some suggestions and concluded through discussions that the exploitation of groundwater can be reduced only when the freshwater sources on the surface of the earth are not polluted and are conserved. Children prepared plays on this topic on their own. Taking this idea forward, they also completed a project on waste disposal at the school. By taking the school as a model, they could spread awareness about it in their village as well.

Rekha Rathod, a teacher at the Government Primary School, Dharda Paoti, says that a teacher should tell the children about the plants and

animals in their surroundings so that children know their importance. She has done this with her class and, as a result, the children are sensitive to trees and plants. They have started telling people at home and around them to not cut down trees. It is the result of constant interaction with children that their families understand that paper is obtained from trees, and notebooks and books are made from it. Rekhaji says that she takes the children to the village and on the way, shows them the nests that birds have built on trees. She tells them that if trees are not saved from being felled, the birds will lose their homes. Eventually, many species of birds will become extinct, resulting in an imbalance in the environment.

After talking to Rekhaji, I came out of the class and saw that some children were making soil beds and watering the trees and plants in the school compound. I spoke with them, and they seemed to understand that trees and plants need to be watered and fertilised for them to grow well and that more trees would make people, animals, birds and bees enjoy a better quality of life.

Pictures 1 and 2. Children watering and caring for trees in the school compound.

Pointers for teachers

I believe a teacher should keep the following things in mind while teaching about the environment:

- Awareness of the environment includes the assimilation and appreciation of key human values and attitudes. It encourages youngsters to actively participate in environmental conservation by promoting an understanding of the link between all living organisms and their environment.
- The teacher should make an effort to connect children's local knowledge with academic or classroom learning. This can help in breaking the tendency of rote learning and stimulate developmentally age-appropriate environmental learning.
- Pictures play a vital role in environmental awareness. As a supplement to written content, children should be encouraged to engage in picture-reading and tactile activities that are both entertaining and challenging.

Lesson Plan: Environmental Awareness

Class I

This is a systematic lesson plan on the theme of environmental awareness to demonstrate how a teacher can work with children in primary classes.

<table>
<tr><td colspan="3">Theme: Water</td></tr>
<tr><td colspan="3">Key concepts: Need for judicious use of water, reusing water in the home/family</td></tr>
<tr><td colspan="3">Learning outcomes:
Children will develop awareness in the following learning areas:
• Need to save water
• Activities where water wastage can be reduced both at home and school
• Ways of reusing water at home and school
• Appreciation for the reuse of water at home and school</td></tr>
<tr><td colspan="3">Classroom transaction</td></tr>
<tr><td>Learning points</td><td>Strategies</td><td>Pedagogical process/classroom interaction</td></tr>
<tr><td>• Awareness of water reuse
• Need and ways to save water at home and school</td><td>Observation</td><td>When introducing the concept, use the children's prior knowledge (on water usage).
Ask them to look at the pictures of water usage and activities done without water on the display board and share with the class.
What is happening in the pictures?</td></tr>
<tr><td></td><td>Group discussion</td><td>In a small group, start discussing those pictures in which water usage is high and whether it can be reduced.
Children will respond to this in different ways, such as:
• We can brush our teeth with half a bottle of water instead of a full bottle of water.
• We can save water by taking a bath with water in a bucket instead of a shower.
Encourage children to respond independently.
Now encourage the children to give examples of where water wastage can be reduced in the classroom.
Expected responses could be:
We can reduce the use of water that we use for painting and take only as much water as we need for drinking.
Tell children the following story and ask them to think about it.
Madhu is a little girl who lives in a desert area. Her village gets water supply for only two days a week. Consider the ways in which Madhu can reuse water to overcome its scarcity.</td></tr>
</table>

Some pictures that teachers will use in their class: Madhu is taking a bath sitting on the charpoy and a tub is placed under the charpoy to collect the bath water. Madhu uses the water from the tub to mop the floor and clean the drain. The children will think about the story and the teacher can expect the children to have questions. The question session on the story could be as follows: 1. One child may ask, 'There is a lot of water in our city, so we do not have to reuse it' 2. Second Child, 'Since we don't live in a desert, we don't need to save or reuse water.' 3. The third child might add, 'Why should we use dirty water?' 4. Some children may appreciate the need to reuse and save water.		
	Small project	Ask the children to collect poems, stories and songs related to saving water and bring these to class. Read them aloud for children to enjoy and learn. They can also create their own stories and poems on water, which can be kept in their portfolio.

Learning assignment

- Ask the children to identify an activity in which water can be reused at home and illustrate this through pictures.
- Ask children to suggest any two ways of reusing water in school.
- Children can talk to their grandparents/elders to find out if, as children, they needed to reuse water. Consider why it is needed now. They can share their findings with the class.

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Use of Theatre for Environmental Awareness

Rajkumar Rajak

Theatre is a powerful medium for facilitating learning-by-doing in the classroom by establishing an inclusive environment. When a child achieves something on her own, she is able to express herself in her own unique way, in an effort to engage with issues of social life. The definition of drama is to enter events with one's own personal context and connect it to ones imagination and explore this relationship with the real world. We realised this while working on the Environmental Studies (EVS) topic 'Pond in the Classroom'. The role and responsibilities of social and administrative institutions and the residents in the upkeep of the village pond is investigated by the children through role-play.

This is a sample of a plan for class IV, in which the work on the pond as a local water source is being shared. The following points are examined in this work:

1. Recognising the availability of water and its distribution as a basic necessity.
2. Awareness of the need for a pond (water body) in their neighbourhood and its socio-cultural context.

Prior experiences as foundation

Several times in the past, these children were exposed to theatrical games and children know how to construct dramatic events based on minor incidents by improvising and performing local happenings. They can break up short stories into different scenarios and exhibit them as frozen pictures. They have also worked in both small and large groups, a skill which was helpful when working on the theme of ponds.

Action plan

The steps and experiences gathered over several sessions are presented here.

Session 1

What: A review of a source of water in a context.

Why: To educate children about local water supply, as well as the distribution and availability processes, and to motivate them to work on both and in the process, discover the difficulties in the local social context and the associated problems.

How:

1. Initiate a group conversation, perhaps during circle time, about when we use water, who carries the water to our residence and from where it comes. Make a simple map and picture of it on paper.
2. Have another group discussion with the children about these issues, this time focusing on: Where does the water come from in our homes and why does a particular person from the family go out to bring it?
3. Have an interaction about maps and pictures displayed in the classroom that the children have made.
4. List the sources of water in the village.
5. Highlight 'the pond' in this list and ask the children to talk about it with their family members and residents of the locality to know more.

Results

1. Doubts were cleared by talking with the children and posting the list on the blackboard.
2. Some of the questions were: What is the source of water? The response to this question revealed how some families do not have to transport water from outside since they have a borewell at home, whereas many others collect water from water supply tanks. Many children reported that they received water from a distant source, though this chore was usually done by their mothers and sisters. This gave rise to another discussion. Why was carrying water the responsibility of the mothers and sisters? The answer was that either the father went to work or that, because the mother cooks, she brings in the water most of the time. Such responses gave us an insight into children's perceptions of home, something we can work on in more detail later.

Session 2

What: An awareness of the relationship between the village and its source of water (the pond).

Why: Residents' relationships with the local pond, including their concerns and suggested solutions.

How: Listening to the children talk about the pond and identifying the problems and concerns regarding it.

Finding solutions through theatre

The teacher recounted this story about the pond: There is an old pond in Arnia village that is being contaminated by waste from the surrounding area, and the pond is shrinking. Because of this, the cattle are not getting enough water to drink, and the fields are parched. Seeing the condition of the pond, a lady named Sophia complained to the *Sarpanch* many times, saying that the pond should be cleaned, and a solution should also be found to maintain cleanliness so that her goats and other cattle of the village could also drink water. Despite this, the problem remains unresolved. A meeting with the *Sarpanch* is scheduled in the community hall, and Sophia is expected to attend. What would you like to say as a villager, since the decision has to be taken in this meeting?

All the children were given the role of villagers, and the teacher suggested that they form smaller groups and write down what they are going to say to the *Sarpanch*.

Only a few children spoke; there was some repetition because they are from the same neighbourhood. These were their main points:

1. Earlier, a few people in the village bathed in the pond. When someone from the village died, everyone would stop under the tree near the pond, and many took bath there. Since the water supply through taps began, this practice has become less frequent. However, animals still used it as a water source.
2. Garbage from nearby villages was being dumped in the pond.
3. Sometimes, small animals drowned in the pond.

As the meeting was going on, there was some whispering going on among the children. Then, two children suggested to the *Sarpanch* that animals and family members were falling ill, so the garbage should be thrown somewhere away from the pond and all the villagers should be informed about this.

Session 3

What: Problem-solving by focusing on the wider relationship between the local pond and the villagers.

Why: To get acquainted with the administrative and systematic processes of the village and collect suggestions for a human solution to the identified problem.

How:

1. By asking the class if there was anything more that they wanted to tell the *Sarpanch*.
2. By telling the groups that they would now go to the community hall where one of them would play the part of Sophia. The children were told to state their case clearly so that the pond would be cleaned and the water, made safe.

Finding solutions through theatre

As soon as the children settled down, the teacher took on the role of the *Sarpanch*, complete with the *saafa* (turban). Seated in a chair, the teacher said, 'You are all welcome to the community hall. In today's meeting, we need to talk about the pond in our village. Now you can tell me your concerns.'

The children talked about their problems and the *Sarpanch* listened to them, all the while making sure that everyone in the group had the opportunity to speak. Some of the main points made by the children were:

1. Provide a garbage container in another place, so we can throw the garbage there.
2. The pond must be cleaned, otherwise our animals will die.
3. The pond water has to be cleaned for another reason – our animals drink that water, and we drink their milk.

The *Sarpanch* finally agreed to get the pond cleaned, and said, 'I will make arrangements for the cleaning of the pond, and now I will have to leave as I have some other work.' The *Sarpanch* got up from the chair and went out of the classroom and returned as the teacher.

Thus, through role-play, the relationship between the children and the teacher in the class deepened. They were able to speak freely: some children pointed out that if the pond was not cleaned, the irrigation canals to the field would get obstructed and they did not have enough money to fetch water from far away sources. A child said that dumping

waste would make the pond completely unusable and would also degrade the quality of groundwater. They asked: What will we do then? Where will the animals go to drink water?

In the theatrical process, the children were participating in the same way as before, with some children more active than others. But the conversation failed to include Sophia's character, which could have, perhaps, led to a more effective discussion with the *Sarpanch*.

Follow up

The teacher wrote down a list of the functions of a *Sarpanch* in the village on the blackboard. The Circle Time discussion was on ways to get the pond cleaned with the help of the people of the village. The teacher aided the process by helping the children to write down their thoughts and conclusions.

Reflection on effectiveness

One of the results of these discussion sessions was that the children were able to see what the *Sarpanch's* role in the village is. Although some of the children did not even know who the *Sarpanch* was, others realised that he/she had many other duties, such as obtaining Aadhar cards for the residents.

The next discussion with the children was to find out what should be done with their lists. Some said they would give it to the *Sarpanch*; others wanted to keep their lists. Some others offered to collect garbage from their houses and dispose of it in the right place.

This activity can be followed by a discussion on the water system and its distribution in the village. Especially in class IV, work can be done on related themes like carrying water and gender sensitivity and the invaluable significance of water in a home.

Conclusion

During our regular school visits, it is usually seen that children hesitate to express themselves in the school environment and in the classroom teaching processes. Thus, expressing opinions and finding solutions remain neglected, which gradually starts to settle into the basic nature or character of the child. A child has to explore his intimate connection with the environment again and again in various ways. Only then will a child, as a citizen, realise his connection with the environment and be able to protect it.

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Integrating Environmental Awareness with Academic Subjects

Salai Selvam and Shankar K

In a Voluntary Teacher Forum (VTF)[i] meeting, a group of primary school teachers from various schools in Puducherry and Resource Persons from the Azim Premji Foundation, Puducherry met to analyse Tamil textbooks. In this discussion, we noticed that the Tamil textbooks of classes IV and V revolved around environment-based themes, like water, seeds and germination, trees, enjoying nature, etc. We categorised the lessons/topics and extended our analysis to other textbooks, like EVS, English and mathematics. We selected the lessons and learning outcomes related to nature, livelihood, health and the possible learning activities that revolved around environmental awareness and language skills. We discussed the lessons and framed lesson plans and activities for the teaching-learning process to comprise experiential learning, sensitivity to nature, and multilingualism.

Planning and focus

Reorganising the lessons

Traditionally, teachers take up lessons in the order that they are given in the textbook. Here, we decided to collate the environment-based lessons together and re-ordered the lessons in this sequence – germination, planting a tree, water bodies, enjoying nature and proverbs based on nature and agriculture.

Designing classroom activities

We designed some common activities, like the germination of seeds and a few others which were location or school-specific. Teachers could pick these depending on their interests and available resources. For example, for the palm tree lesson, class IV students and their homeroom teacher (class teacher) went to see a palm tree. They had a dialogue with the palm tree climbers whose livelihood depends on the tree; attended a palm craft festival showcasing the various parts of the palm tree and food made out of palm.

Integrating lessons and subjects

Since in Puducherry schools, a single teacher teaches all the subjects to a class, the teachers were easily able to integrate environmental awareness activities with other subjects. The same was true for some language teachers who taught both languages, Tamil and English. Hence, this idea ensured dual language acquisition opportunities in the classrooms.

Inculcating values and aims of education

From the aims of education, we selected the part on sensitivity towards others' feelings and well-being for the classroom discussion. The questions we would ask were: Are we sensitive to nature, soil, water, and air? Are we sensitive towards other species living with us in nature?

Scope for multilingualism

During classroom activities and writing/sharing of experiences and doing exercises, most of the teachers used and connected both languages, Tamil and English.

Classroom plans and activities

The activities were designed to help students experience nature by involving them in various nature-related daily activities, engaging and interacting with the community, and developing reading and writing skills through these experiences. The collated lessons included singing, nature-based field-work and basic language activities. Children involved themselves in the activities independently – planting at home, group seedling, with the community – collecting various information, visiting places - waterbodies, palm craft, etc.

Lesson 1: Mulaipari[ii] festival

The academic year started with a folk song and dance performed around the seedlings during the *mulaipari* (sowing) festival. A conversation on the process of sowing – preparing the seeds for sowing, the festival of sowing, and how the entire process is planned – was initiated in the classroom. Children were divided into groups to collect the required information from the locality. All of them were involved in various activities, especially germination-related activities, like observing and

reporting the growth of the seedlings. Talking about, drawing and writing about the germination became a part of their daily schedule.

The whole class got involved in most of the activities, which included preparing beds for seeds, identifying the types of seeds, collecting seedlings etc. Collecting information, reading and discussions on activities which are directly related to their life, made the children happy. The community was also involved in all this. Students did some of the work independently, too, like planting seeds at home.

The many conversations that were generated over these ideas helped in bringing new ideas from the various other school subjects. Children were eager to share what they knew and were ready to learn what they did not.

Lesson 2: Palm tree

The teacher wrote words from the palm tree lesson on the blackboard, and these were read aloud first by her and then by the students. These included words in Tamil that stand for the palm tree, fan, leaves, birds, bird's nest and basket. Students made sentences with these, and they were asked how each of these words was connected to the palm tree. For example, what part of the tree is called *panai olai* (palm leaf)?

The discussion then moved on to the parts of the tree or a plant (integrating EVS). Now that the children had identified the leaf and the fruit of the palm tree, the question was what would the other parts look like? One student described it while another drew the tree on the blackboard. Students were further made to talk about the palm fruit and the tender palm fruit. Some children were confused about the two, so pictures of the palm fruit were shown, and this helped them to distinguish between a mature palm fruit and a tender palm fruit.

The students were shown a picture of a toy made using empty shells of the palm fruit and one of the students demonstrated how it was made. The teacher also organised a palmyra leaf craft workshop in which children were able to make a fan, watch, sparrow, crown and other small articles using palm leaves. They were enthusiastically involved in the process. They were shown other articles made of palm leaves – small purses, containers, hats and hand fans. Children were seen excitedly discussing the weaving methods among themselves.

Other lessons and learnings

Similarly, for the lesson on proverbs on nature and agriculture, children collected proverbs and discussed the context. They also made illustrations and posters on the proverbs. For the lesson on water bodies, children made a list of water bodies; they visited and observed these and took notes. This helped in creating an awareness of the uses of water and in studying water consumption.

For the lesson 'enjoying nature', we visited a waterbody and asked the children to use their imagination to write and draw the early morning scene to make it even more enjoyable. We included

Picture 1. Mulaipaari lesson in class IV Tamil textbook.

the sharing of feelings about early morning weather and read out some poetry and stories on the theme of nature, these included the poet Bharathidasan's nature songs and poet Bharathiyar's poems on wind, sun and water. So, art and other aesthetic components, like singing, dancing, creating posters of popular proverbs and food displays were included in our teaching plans.

Along with these activities, mathematical concepts, like counting trees and seedlings, measuring, and estimating the height of the trees, and the area covered by the trees, were also incorporated. Language skills dovetailed into the EVS, as well as mathematical concepts, to ensure students' learning. We created various worksheets based on nature activities with children. We have used EVS worksheets of class V for class IV seeding.

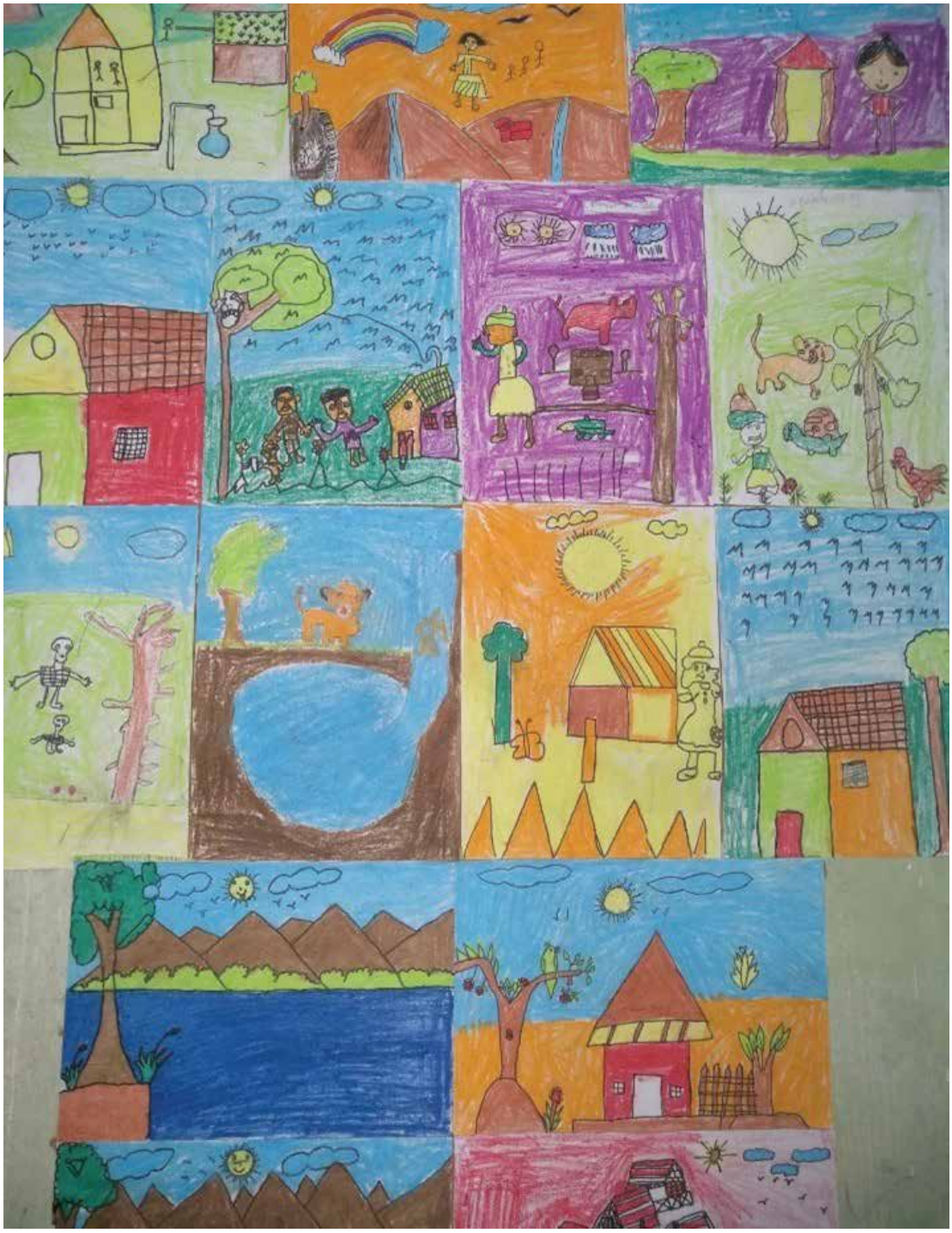

Figure 2. Students' drawings based on nature-based outdoor activities.

Figure 3. A child presenting an environment-based story to the class.

Figure 4. Clay figures of animals made by the students.

In summary

The idea of integrating environmental themes with language teaching ensured meaningful experiential learning with the help of various aspects of nature and moving from the known to the unknown with the support of events from daily life practices made the students' understanding better. Homeroom teachers were able to integrate nature-based lessons and activities by combining subjects, like language-EVS lessons, and Tamil-English. The teaching-learning process, including the classroom practices, became so much more effective when we integrated nature-based experiences along with languages and maths to increase ecological consciousness.

Endnotes

i Voluntary Teacher Forums (VTF) are facilitated by the Azim Premji Foundation in different locations of India, as part of an integrated and multimodal approach toward continuous teacher professional devel-opment.

ii A festival in Tamil Nadu to celebrate the sowing of seeds/seedlings and hoping for a good harvest.

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An Inter-disciplinary Lesson on Trees

Sariya Ali

Environmental studies - a perspective

As thinkers, and as a society, we have taken some time to discard the thought that children come to school with a tabula rasa[i]. Recognising this, multiple guiding documents, like NCF, NEP, and NIPUN Bharat[ii], have emphasised the need for referring to children's local environment for an inclusively engaging pedagogy. The local environment is always an easier reference point for children to pick and then, imagine that as a larger issue or concept. This gives them a perspective and facilitates understanding.

Even though children are used to seeing the natural environment around them, education is the catalyst that makes them aware of the importance of the various aspects of the environment and creates in them a sensitivity towards it. This is where the role of Environmental Studies (EVS) as a subject comes in. Introduced in class III, the main objective of the subject is to help children gain a deeper understanding of their environment, which includes knowledge about human relationships with it, and natural and man-made resources. In classes IV and V, students are expected to be able to understand the significance of the natural environment around them along with the knowledge of those outside their immediate premises. With an intensive engagement with them on this, the faculties of awareness, establishing correlations, respecting diversity, etc. are expected to be enhanced. Even though the subject holds a wide scope of both practical and language learning along with the development of socio-emotional skills, it is often treated in schools with a limited vision. As with other subjects, the completion of the syllabus is the ultimate goal, which is unfortunate.

During my days as an Associate (of the Azim Premji Foundation) posted in Barmer, Rajasthan, I was teaching classes IV and V in a primary government school. The main area of intervention was in English and children's self-expression. Extending this scope, I attempted to work in a way that an inter-disciplinary session of language learning and environmental awareness in the shape of a lesson plan could be executed with children. This article shares the plan, execution, and experience of this lesson in the classroom.

The context

Barmer district is located in the extreme west of India and has an intensely desert terrain. Trees here are revered for providing shade and multiple resources to the inhabitants of this region which has limited natural resources favourable for their existence.

My lesson plan focused mainly on 'trees', and the objective was to initiate a dialogue about trees and to discuss their relevance in our lives. It was also meant to create awareness so children would treat trees with sensitivity and engage in conversations about saving them. I introduced this plan when the children were eventually getting used to my activity-based learning methods in the classroom and in the language class, I had started working with English sentence-making with given keywords. Given this context, learning outcomes of both environmental studies and English were kept in mind while sketching the plan, including the activities. To make it more relatable, we decided to have the class under a tree as the school had several huge *neem* trees and the children were pretty active in watering and caring for them on a daily basis. However, the scorching heat of Barmer refrained us from stepping out of the classroom for this session.

Execution of plan

As this was my first attempt at an inter-disciplinary session, this session on trees was sketched over a two-day engagement, inclusive of multiple activities and modes of learning.

Day 1. Talking about trees

My strongest learning as a teacher has been that the more you 'talk' in the classroom, the better. It not only gives children ample space for expressing their thoughts and ideas, but it also lets them connect with the topic in a way that they can acknowledge

the entitlement to the knowledge they have about a topic. So, we began by talking about trees to understand how the children see them as part of their day-to-day life. The children were asked the following questions:

How many of you have trees in or near your house?

Response: Most of the children replied that they have trees in and around their premises.

Which trees are these?

Response: *Neem, Rohida or Khejri* (these are the trees commonly found in Barmer).

Why do we need trees?

Responses: Trees give us shade, oxygen, fuelwood, and medicines; we can play under them.

This small activity helped in context-setting and noting that children did recognise the existence of trees in a manner which is closely related to their immediate lives.

Picture reading

Reading and talking with pictures is another creative medium of engaging with children. It builds their imagination not only to enhance their powers of interpretation but to also illustrate the fact that art is limitless. Taking the session ahead after the preliminary conversation, we read the book *A Tree* by K.K Benigni. It is a pictorial book with one-line text on each page. Detailed picture reading was done with children during which the abstract images of trees were interpreted by the children together. This was a particularly interesting exercise to do because they were pretty much used to understanding drawings limited to a single image, for example, a flag, butterfly, fish, flower, etc. This book provided them with new exposure. Some interesting dialogues also emerged, for example, in a picture, there were some fish under a tree, which puzzled the children. In an attempt to understand it, we reached an interpretation that trees play an important role in water conservation and that is how fish survive.

Figure 1. Fish under a tree.

Figure 2. Chipko Movement.

Proceeding further, there was a brief introduction of the *Chipko Movement* in the book. Children were told about the movement, its history, and its relevance.

Putting learnings into words

As we were already working on the ability to write and not just copy, children were asked to write down whatever they learned about trees in the class that day. It was great to see how the children attempted, even in broken Hindi and wrote down four or five

sentences on why trees are important and why we should not cut them down unnecessarily.

Day 2. Let's paint

Along with talking and picture reading, painting is another creative activity which enables children to express themselves freely. Continuing with the session the next day, blank sheets of paper and paints were given to the children, and they were asked to thumb-paint trees. After this, the sentences they wrote were revisited and English keywords, like fruits, vegetables, firewood, etc., from those sentences were written on the blackboard. In the end, the children were told to make sentences with the keywords at the back of their paintings. Some examples of the sentences they made, were that trees give us fruits like mango, banana and apple; trees provide us with firewood to light our earthen stoves; trees give us shade; we get vegetables from trees. This is where we closed for the day.

Picture 3. Thumb paintings by children.

Extending this learning, a small drama was enacted in the class after a week in which the characters included a mango tree and birds. This is where a child in the class personified a tree. This was an added activity to the lesson plan which was done a week later and helped in the continuation of the dialogue on the theme.

Picture 4. A child personifying a tree.

Overall, this was a comprehensive set of activities done as an initiating session on environmental awareness. What I realised was that the inclusion of multiple activities for a single theme kept the lesson interesting and children participated in the activities with full enthusiasm. More than that, space was given to them, at every step, to discuss what they knew and understood. This kept the dialogue relevant. Adding to it, this plan worked on learning outcomes of both language and environmental studies. This one session made me realise that environmental studies can indeed be made fun to learn with creative planning. Had the second wave of COVID-19 not hit, resulting in the closure of schools, I would have taken this plan forward by including more activities around the details of trees and methods of conserving them. Themes like water, pollution, etc. would have been taken up and a strong connection could have been made. This experience gives us ample evidence that all of us practitioners working in primary education must work and plan a subject as important as environment studies in a manner which can stimulate children's sensitivity, creativity, and understanding of the importance of nature.

Endnotes

i *Tabula rasa* is a Latin phrase often translated as 'clean slate' in English. It is the theory that individuals are born without built-in mental content, and therefore, all knowledge comes from experience or perception.

ii NCF – National Curriculum Framework
NEP – National Education Policy 2020
NIPUN Bharat – National Initiative for Proficiency in Reading with Understanding and Numeracy

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Birding with Children

Sruthi PK

A Summer Camp, this summer, offered a platform to begin birdwatching with students and a teacher from village Atand, (Kurud *tehsil*, Dhamtari district, Chhattisgarh). I am sharing some of the camp's highlights and insights with you, here.

Day 1

On the first day, we began by listing out the local bird names that the children are familiar with or see around. They started enthusiastically: Crow! Hen! *Padki* (dove)! *Myna! Mittu!* (parrot) *Gorayya* (house sparrow)! *Bagula* (egret)! *Koyal* (cuckoo)… Then there was a long pause. We were able to add only a few birds' names to the list.

'Only these many?', I asked.

'Nahi didi, aur bhi hai, magar naam nahi jaante.' (No didi, there are others, but we don't know their names).

'Let's try one thing: here are thirty flashcards of local birds that we can spot around us. We'll carry them with us and go on a search outside to see how many birds we can identify with the help of these cards.'

We communicated some simple, but important, instructions clearly to the students before we set out on the birding trip – being as quiet as possible, avoiding sudden movements, whispering or conveying with gestures if anyone had anything urgent to tell. I told them that since birds are very sensitive to sounds, they can hear sounds much better than we do. If anyone were to spot an unusual bird, they should refrain from exclaiming loudly so that everyone could get closer to it and the bird too was more likely to remain in the same place for everyone to see.

A giant *peepal* tree, the village's largest, stood outside the Sahu Bhavan (a public hall where the Summer Camp was held) and we spotted two Indian Pond Herons sitting near their nest on this tree. We matched the features of these herons with those on the flashcard and identified them by their local name, *Talaab Bagula*.

Then we moved to a paddy field nearby. It was dry and had been ploughed in preparation for sowing once it rained. A neighbouring pond flanked by trees that were the habitat of many birds. Within the next half hour, we observed one Sunbird, two Great Coucals, four Oriental Magpie Robins, three Cattle Egrets, two Indian Silverbills, two Black drongos and three Black kites.

Figure 1. Birding at Atang village as part of the summer camp.

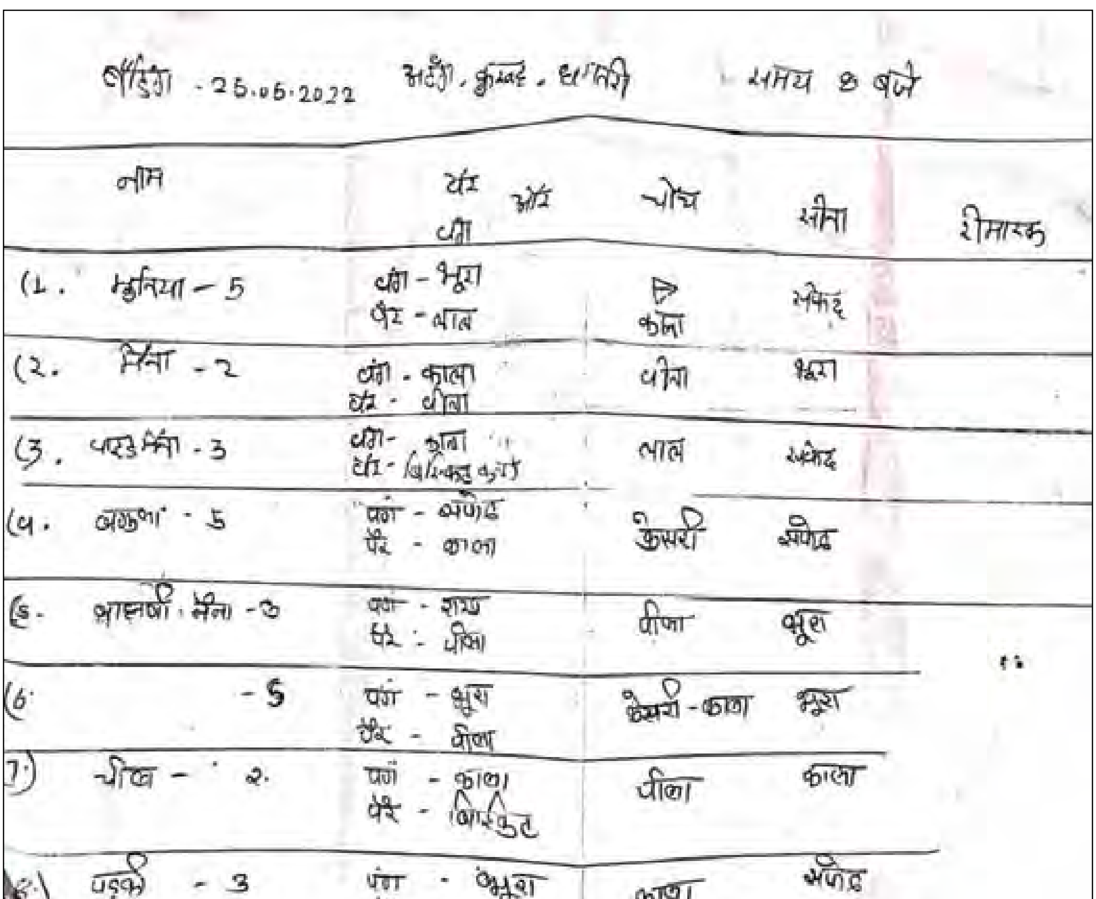
Figure 2. Students looking at birds and nests in a peepal tree.

Day 2

The following day, our group grew to thirty children from classes II - VII. The class teacher accompanied us. We started from the *peepal* tree. That day, we spotted three different egrets (Little Egret, Cattle Egret, Indian Pond Heron), two types of *Mynas* - two common *mynas* and one Asian Pied *myna*, three Red-vented bulbuls, and four squirrels. We spotted four nests in this giant *peepal*, which we identified as belonging to the *myna*, Cattle Egret, Little Egret, and Pond Heron.

'Toh agar koi is ped ko katenge toh kitnon ka ghosla chale jaayega!' (So many birds will be homeless if this tree is felled!) remarked a child from class II, gazing at the tree. *'Haan sahi baat hai, ek ped bahuton ke liye unka ghar hai,'* (Yes, that is correct, a single tree is home to many creatures) a class V student added. I witnessed how much more impactful it is when children sense the importance of environmental conservation on their own, rather than getting a lecture from a teacher on the topic of environmental education.

After the birding trip, we recorded our detailed observations in a table (Figure 3): the bird's local name, the number of birds spotted, the colour of the chest, the eye, the bill, the wings (the children refer to these as 'arm'), the tail, and the claws. This recording has two objectives, one, to encourage the children to observe keenly and the other, to enhance their data/inference recording skill (useful in developing a scientific temper as well).



सीहिगा - 25.06.2022 अटौंआ, कुम्हई, धमतरी समय 8 बजे

नाम	पंख और पैर	चोंच	सीना	रिमार्क
1. मुनिया - 5	पंख - भूरा पैर - लाल	काला	सफेद	
2. मैना - 2	पंख - काला पैर - पीला	पीला	भूरा	
3. पहड़ मैना - 3	पंख - काला पैर - बिल्कुल काले	लाल	सफेद	
4. बगुला - 5	पंख - सफेद पैर - काला	केसरी	सफेद	
5. ब्राह्मणी मैना - 3	पंख - राख पैर - पीला	पीला	भूरा	
6. - 5	पंख - भूरा पैर - पीला	केसरी - काला	भूरा	
7. चील - 2	पंख - काला पैर - बिल्कुल	पीला	काला	
8. पड़की - 3	पंख - भूरा	काला	सफेद	

Figure 3. Recording observations.

Follow-up activities

In the following days, we discussed the relationship between the shapes of the beaks/bills of different birds and their eating habits. Egrets have spear-like bills for jabbing fish, shellfish, frogs, and other amphibians, whereas the house sparrow, which eats millets, grains, seeds, very small worms, and insects, has cone-shaped, strong bills for cracking seeds and nuts. Downward-curved, long-pointed bills of sunbirds enable them to feed on the nectar of flowers.

Further, we learned about 'family', 'genus', or 'species'. To understand this, we took the example of the *Brahmini myna*, the Common *myna*, and the Pied *myna*, since they are commonly seen in the area. All of these belong to the same family but are of different genera and different species. We listed the similarities and differences between these three.

Other activities related to birding

- Listing out several sounds after keeping quiet for a while. We listed out seven different sounds – bird calls, sounds made by squirrels, crickets etc.
- Making ID cards of birds with the basic details of each type of bird that we observed. This was an activity for class V students. The ID card had a picture of the bird (either a hand drawing by a child or a photograph), its local/common name, shape and size compared to other birds (for example, the Great Coucal compared to the cuckoo because they have similar features, the colour and shape of the bill, the colour of breast feathers, crown, eyes, claws and habitat (inference derived from observations). The bird-watching record (Figure 3) is a daily data record, whereas the Bird ID is made by compiling some observations. In making the IDs, children get the opportunity to understand how to draw inferences from observations. Here there is some scope of developing writing skills as well. Most importantly, these Bird ID cards remain useful for bird identification for new birders.
- Making a collage of birds by using old newspapers (Figure 4). This activity gave scope for the psycho-motor development of the younger students and served as a platform for creative art for the older students.

Figure 4. Students making a collage depicting the Great Coucal.

We are happy that some students in Chhattisgarh are getting an opportunity to explore nature through the study of birds. This is the first step, and we hope to follow it up with more practical lessons.

It is my firm belief that activities, such as this birding experience, which help in creating a connection with any species, draw us closer to nature. This helps us in appreciating every other creation of nature, be it the trees or butterflies. This bond formed at a young age will help these children to care for and protect not just one or a few species of living beings but be environmentally conscious citizens for life. They will not hesitate to play their part in saving this planet.

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Children Plant Trees, Learn Valuable Lessons

Shuchi Dubey

The indiscriminate exploitation of nature over the years has created an environmental imbalance for the planet. So even as the protection and conservation of the environment become a matter of prime consideration, we have not been able to rise above seminars, speeches and sloganeering and are continuing to suffer the consequences of environmental degradation. It is important that every aspect of the environment be linked to its protection. We will continue to struggle with this problem until people of every age, especially children, are made aware of the importance of conserving the environment and are involved in it.

Environment protection must be linked with activity-based teaching in primary classes. Children have to be told about the environment in simple words and in their first language. For this, we have to develop in them an understanding of the environment at a conceptual level by connecting them with their surroundings, classroom activities and processes outside the classroom.

Practical ideas

In an upper primary school, the teachers, along with the children, planted trees in schools, the village and surrounding treeless hills; they watered and manured them as a part of their day-to-day activities and understood the importance of trees in our lives. It took several months of preparation to start this work before which the school did various activities with the children to take this work forward.

During the rainy season, the teachers along with the children planted trees on the school premises. A function was organised on this day. Education Department officials and local public representatives were also invited to the tree planting ceremony. For a few months, these trees grew well. But when they did not get water during the fifteen days of winter vacation, all the trees were destroyed. This led to the realisation that merely planting trees as the fulfilment of one's duty towards environmental conservation was not enough.

During the next rainy season, the Education Department directed schools to plant trees on their premises. An independent organisation also contacted the school for planting trees. But looking at the plight of the trees planted in the previous year, teachers felt that the matter should be discussed with the children: the trees should be planted only if they were willing to take full responsibility for the trees. The issue was discussed with the children elected to the *Bal Panchayat*, which had started functioning by this time. The children agreed to take the responsibility of planting and maintaining trees and the following points were discussed:

1. Which trees to plant? The children knew the answer to this because they had seen the trees that grew easily in their surroundings and recognised those that were not eaten by animals, like goats, etc. The children told us that goats do not eat custard apple trees.
2. A team of children from each class was formed to water the trees every day and on holidays and the responsibility of this job was given to the environmental *panch* of the *Bal Panchayat*.
3. To protect the trees from animals, the teachers at the school took responsibility for arranging bamboo tree-guards.

A day before the planting of trees, children decided on a class-wise location for planting trees and dug the pits. Since the school was in a rural setting, most of the children knew how wide and deep the pit should be. The villagers had also come to know about the plantation drive in the school from the children, and they too came to help. On the appointed day, children planted *neem*, *peepal*, guava, *jamun* and custard apple trees according to their choice.

The teachers were constantly talking informally about the trees in the morning assembly and classrooms. The children were also very alert. They even started coming to school half an hour early to water the trees. If the resources for watering the trees, like buckets, etc., were in short supply, they would even bring these from their homes. They

keenly observed the progress of the trees daily; they brought manure and adjusted the tree guard. In this way, their bond with the trees and concern for their safety began and grew.

Continuing the good work

This work continued even during the holidays. But the teachers were worried about the six weeks long summer vacation when the children would go to their relatives' place. The matter was discussed with the children, and they found a solution. There were some children in the class who were not going anywhere and were ready to look after the trees. The children also said that since everyone would go at different times, they would take turns watering the trees. As a result, the children kept the trees alive in the most difficult times, that is, when the trees needed water the most. In this way, the interest in environmental education was developed in the children without any formal teaching.

In the next rainy season, this programme was extended further. After talking to the children, it was decided that trees should be planted around the hill near the school and also in the students' homes. The children were very excited. But there was the challenge of protecting the trees from animals and the problem of water availability on the hill. Since everyone had bulls, goats, buffaloes, cows, etc., in their homes, it was decided that before planting trees in the houses, the whole family should be consulted. The experiment with trees in the school was successful, so the villagers were also ready to plant trees in their homes. The children took the responsibility of watering and maintaining the trees. Then, the trees were planted with the help of the Forest Department and a local, independent organisation.

With regard to the trees on the hill, it was decided that custard apple trees should be planted there because, as mentioned earlier, goats do not eat them. For water supply, a hand pump on the temple on the hill was repaired with the help of the *panchayat*, and the children took on the responsibility of these trees also.

The teachers, children and their parents also took part in this activity, and the work went on uninterrupted. Now not only were the teachers discussing trees, their conservation and benefits in the classroom but the children and their families were also fully involved.

Effect of COVID-19

But another challenge was yet to come from circumstances beyond anyone's control – the pandemic. Everyone stopped coming out of their homes during COVID-19. The trees in the houses remained safe, but the trees in school and on the hill were destroyed due to the lack of water and care.

However, during this whole process, it was evident that if there is complete participation of the children in any activity, and the children are given the right to make decisions and these decisions are respected, then children can easily understand and get involved in environmental conversations.

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Saving the Western Ghats | A Recollection

Umashanker Periodi

One of the most powerful campaigns in coastal Karnataka was the *Save Western Ghats Jatha*[i] of 1985. There had been a huge outcry and many discussions on saving the Western Ghats prior to 1984, with a number of reports on the plight of the Western Ghats being published in the papers. A few of us like-minded people gathered to discuss this sorry situation. We felt that pointing out the disaster was easy but suggesting concrete actions to combat the situation would be more constructive though difficult.

We concluded that we needed to build awareness of the Western Ghats and empower the people of this region about what we could do to save its biodiversity. We decided that we would need to give people enough information on the importance of biodiversity and its significance for the ecology and survival of this rich ecosystem. More important was suggesting small actions everyone could take to combat the destruction of the region's biodiversity.

The plan

Our plan was simple - we would start a *jatha* in Sampaje and go through Mangaluru and move to Kundapur. We would meet people in groups, talk to them, convince them and move forward. A large part of it was meeting people in the streets in an unplanned, spontaneous way, wherever they were gathered. We had organised meetings with teachers, *gram panchayat* members, community-based organisations, leaders and opinion makers, youth *sanghas*, school children and self-help groups.

To reach people and convince them, we planned street plays, puppet shows and songs. There were very colourful and creative, eight-foot-high puppets, designed by Shashidhar Adapa.[ii] Shashi created a host of puppets so that we could build stories with different characters.

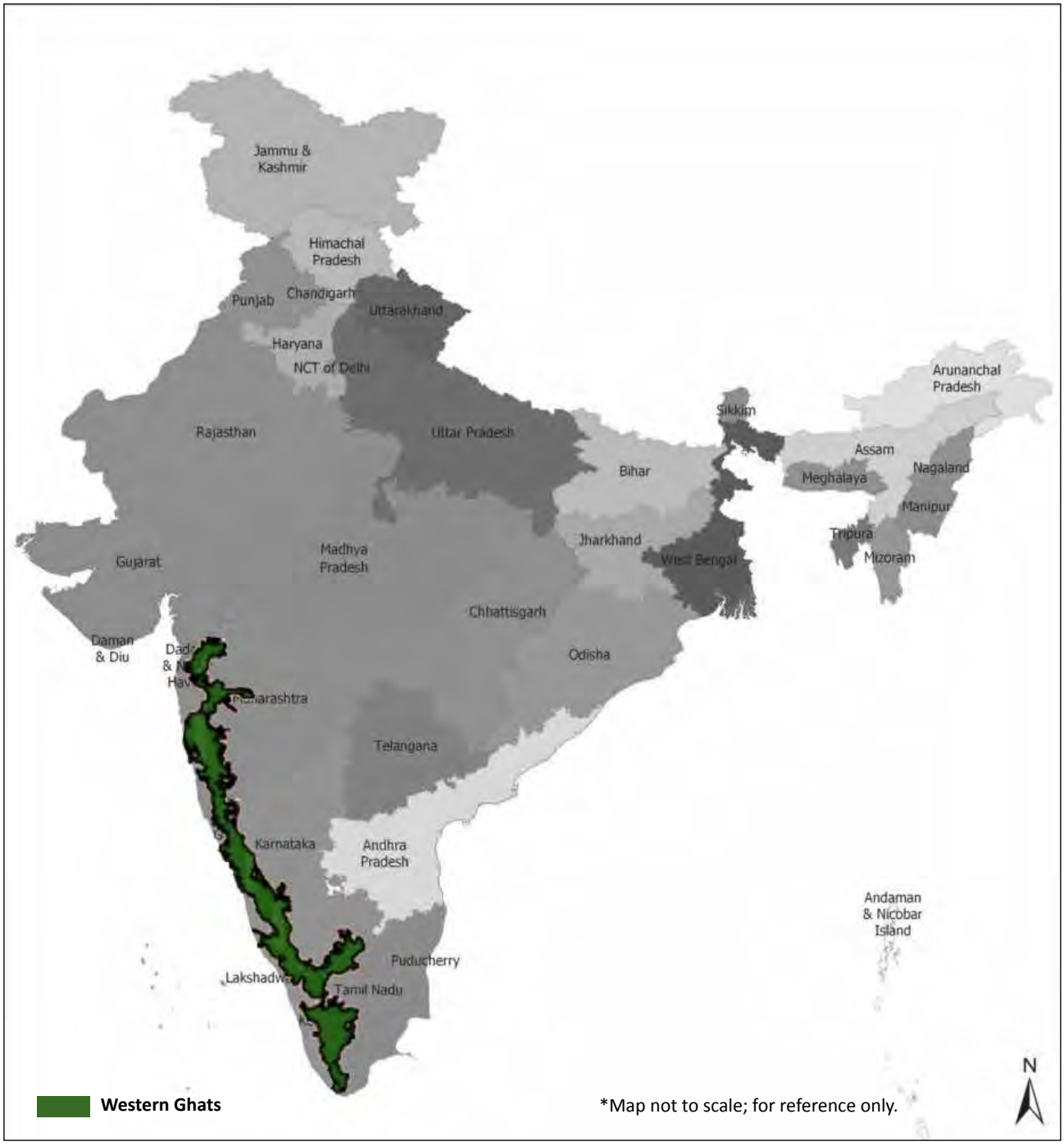
We planned and worked for a month to create various puppet shows. A very powerful show was a short one, which very clearly brought out why biodiversity is important, and how if destroyed, it could destroy the world. It concluded with the message: save biodiversity, save the forests and grow more trees. There was one show on the havoc plastic has created in this world, how it does not get degraded for thousands of years and stops the percolation of water into the soil and prevents replenishment of groundwater. The stress was on not using plastic in any form and when absolutely unavoidable, to recycle and reuse it. A lot of times, we had seen people burning plastic in the villages thinking that this was the best solution. The puppets conveyed the message very clearly and strongly that the burning of plastic pollutes the atmosphere and harms us.

We created another story around the water cycle, which told of how water-bearing clouds are formed by the temperature of seawater and how the clouds, thus formed, travel to the land and how they are stopped by the trees/forests so that we get water from the rain. We also spoke about the rains and how rainwater is collected and goes to the sea through streams and rivers. Here, we were emphasising the importance of forests in the water cycle.

Another story we built was around eclipses. Using balls and torchlight, we demonstrated how eclipses are formed. This was explained through a story and the characters were some children and their grandmother. Apart from these stories, we also spoke of water harvesting and optimal use of water, and other natural resources.

Some special memories

Our fifth show was in a small *panchayat* near Sampaje. The show was organised by the *panchayat* members who had gathered along with the village community. There was a brief introduction and a few leaders spoke, after which we performed our puppet show on the detrimental effects of plastic on the ecosystem and society. The puppet show gave a vivid account of what happens when there is a lot of plastic on the ground; when there is no degradation, it does not allow water to sink in; the metabolic action of the soil stops, and nothing grows in the otherwise fertile land.



The Western Ghats is the mountain range along the west coast of the Indian peninsula from Tamil Nadu to Maharashtra through Kerala, Karnataka and Goa. Well-known for its natural beauty, this region is among the top eight biodiversity hotspots in the world and is home to over 300 globally threatened flora, fauna, bird, amphibian, reptile and fish species.

The land becomes completely useless. Immediately after the show, there were a lot of questions, which we answered. The crowd decided to pick up plastic and not use it in future. Fifteen years later, I had a chance to visit this village and the *panchayat* even today has remained plastic-free. They handle plastic very efficiently. The people are aware of the plastic menace and do not use plastic and whatever plastic comes to the village is dumped in a place which is collected by the *panchayat* and disposed of systematically.

Another memory is of a small school, built unusually on barren land. Normally in the coastal belt, there is a lot of greenery around the school. In this school, there was no compound wall, and the compound was unkempt, with no trees and plants. We performed two shows, the first one was on the water cycle, and the second was on the importance of trees. The children were very smart. They asked a lot of questions. It was a small habitation known as '5-cent houses' – the land is given to poor landless people to build their houses and is usually far from the village centre and usually barren. Our point was that, even with these limited resources, could we do something to make the school green? The teachers also got involved and decided to make the school green. By now, the people from the habitation had also come together and they said they would make the school and the habitation green. This motivated the inhabitants to go anywhere they could to get plants. They got saplings for free from a nearby nursery and started planting them. Today, the school has a beautiful compound with big and strong trees around it. The beauty is that this act has not remained limited to the school, but the entire habitation is now lush green.

In a school near Bantwal, we performed our play on eclipses. This was the most challenging piece mainly because it required a background of light and shadow and we needed total darkness to perform this play. The school was quite big and semi-urban. The science teacher at the school helped us a lot to put up the play. By now, we had a lot of practice, and the play came out very well. The discussion was very intense with a lot of questions from the children. A person who went out during an eclipse was found dead, a lot of women had miscarried, and all sorts of things were said by the students. We spoke with evidence. We asked - had they themselves seen all these things that they had heard about? We reiterated the fact that we need to be more scientific and form our opinions based on evidence and facts, believing only that which can be proved. We felt that the discussion was very fruitful.

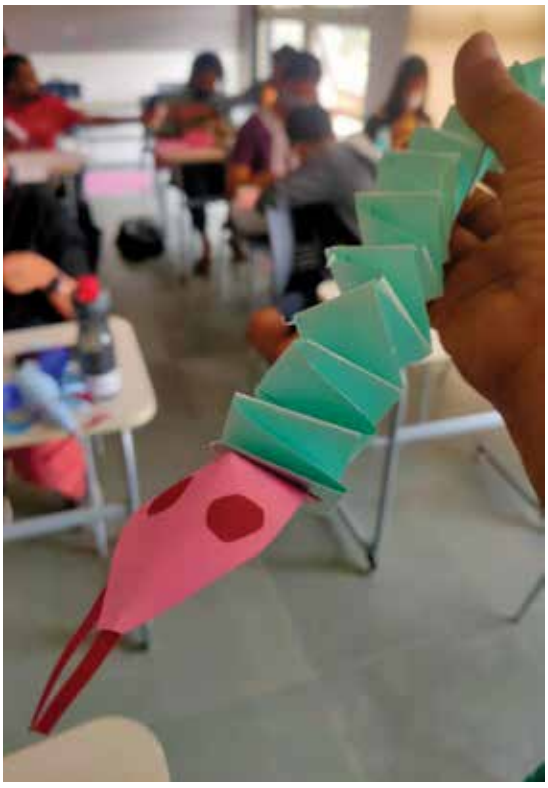
These are a few examples of our performance in public and in schools. In many places, people took an oath to conserve the environment and in other places, they immediately got on to cleaning up the surroundings, planting saplings, and picking up plastic. The most important part, we believe, was the discussions – the questions people had, and that we could clear their doubts. The *jatha* lasted for 15 days. We, as a group, moved from one village to other speaking, discussing, and making decisions for change. Everywhere people welcomed us with open arms, gave us food to eat and a place to stay. We would stay in schools and *panchayat* offices. On a few occasions, we stayed in some people's houses too.

It was not always easy, in a few places, we had to face opposition. For instance, in one of the most famous temples of South Kanara, we were not allowed to perform the play. We fought with the management of the temple. They were adamant. In the end, we performed shows outside the temple premises. We collected all the people who had come to the temple, made a huge circle, and performed on the open ground. This was a very effective show, with a lot of discussion and oath-taking by the public. The most difficult places to perform were the marketplace and the streets because people kept moving about in these places, going about their business. We could not stop them, so we had to throw our voices so powerfully that they stopped what they are doing to look at us. Schools and villages were the most peaceful places to perform.

Executing the jatha

Planning and preparation were key to the success of this *jatha*. This planning took us more than six months. The route was chalked out in detail. People were contacted well in advance. A pre-*jatha* discussion was a great help in all the places. When we found that a particular route would not work, we changed it. There were many teams working simultaneously. The research team did a lot of the groundwork in collecting information and sharing it with the participants. The performance team created the plays and prepared the performances which included the play, puppetry and songs. Three separate teams practised and prepared the performance well in advance. The publicity team worked very hard to get media coverage and

publicity in that era of newspapers. But the most important part was mobilising a group of committed people – the core group was made up of highly committed people. The success of this initiative was due to the commitment of the people involved and the coordination between all various groups. The impact of the *jatha* was immense. Even today we see the impact – plastic-free *panchayats*, people growing trees in public places, *yuvak sanghas* involved in environmental work. The impact of the *Save Western Ghats Jatha* has been very positive.



The use of puppets as a pedagogical tool. Umashanker Periodi's puppet workshop with student-teachers at the Azim Premji University, Bengaluru.

Endnotes

i Jatha: an organized event in which a group of people walk through the streets together to celebrate something, spread a message or protest against something.

ii Shashidhar Adapa is a renowned Indian production, set and puppet designer.

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Environmental Education for Young Learners | The Udaan School Experience

Vandana and Kalpana

Background

Our school is in a village near Palampur in Himachal Pradesh. Many of the children who come to the school are from homes where farming is a daily part of their lives, and for most of us, the year is divided according to planting and harvesting cycles. The land we study on was once a forest, and more recently, a tea garden and borders both farmland and a pine forest. We are lucky to have a perennial stream running by, which empties into the river Aava at the bottom of the hill. In this setting, it feels natural to us that focus on the environment and ecology should be central to our practices in the school.

Environmental exploration

All the children from the youngest (nursery, roughly age 3 years) to the oldest (class V, roughly age 10-11 years) participate in caring for the school's vegetable garden. They help with planting, maintenance and harvesting, and sometimes, we even cook the produce together in the school. We have found that as the children watch the crops grow, they learn the whole process of growth – from sprouting and flowering to fruiting, and once again producing seeds – better than any book can teach them. In later years, as they enter classes IV and V and study EVS as a subject, this knowledge is already tangible in their minds, and the abstractions of the textbook make much more sense to them.

Figure 1. Children grow and harvest vegetables in the school garden.

We are also lucky to be housed in a larger campus where experienced gardeners grow vegetables and tend to fruit and other trees and flowers around the year. We take several walks in and around these gardens, as well as in the pine forest and the areas by the water. On these walks, along with learning directly from the gardeners about the work they are doing, we learn a lot by observation. The children notice that they tend to see more of certain species of birds in the gardens, and different species by the water. They also notice that in the pine forest the undergrowth is very different from the growth around the stream, or in the gardens. Using these observations as starting points, we are able to have important and nuanced conversations about biodiversity, climate change, invasive species, and much more. As teachers, we are also always learning in this process, starting from the preparation and pre-work we do before going on these walks to the end of our explorations. In fact, we are forced to learn more after the walks to keep up with the questions the students ask – for most of which we do not have ready answers.

Along with the campus, we also make it a point to try and explore newer and wider experiences, such as visiting the nearby government nursery when they had an unprecedented blooming of tulips or going to the Science Centre to look at displays of butterflies and insects from all over the country or learning about sericulture. This shows the students a little bit of the world outside their immediate experience as well.

Critical thinking and asking questions

We have even taken the students to the dairy nearby to witness the birth of a calf, something that was a new and wonderful experience for some, but perfectly commonplace for others. This experience led us into meaningful discussions at all ages, from the youngest children who wondered at the fact that we drink the same milk as the baby calf does, to the older ones who asked out loud about human 'mating' and birth. We also see the scope for engaging in critical thinking and questioning at all ages triggered by these experiences, which pushes us to engage more deeply as well.

We have a Nature Table in the school, where any child or teacher can bring interesting things to share with the school from around their homes or places, they have visited. The entire school can access this table, and sometimes, classes are taken to curated collections in groups. Some of the students have challenged us there as well – 'You tell us to not pluck flowers, but you yourselves have picked these flowers to bring here'. This kind of critical questioning is very important in the teaching-learning process.

Adapting to young learners

What we have seen is that the younger the children are, the more excited they are to learn. We sometimes miss out on this because we think that certain things are 'too complicated' for very young children to understand and so we do not engage in certain conversations. However, the children are ready for these; it is we, teachers, who need to find the right way to talk to them. Young children need practical, hands-on experiences. If we try to explain the parts of a flower using a diagram on a blackboard and insist on their memorising the terms, petals, sepals, anther and so on, it will definitely seem 'too complicated' to the children. But if we first look at different kinds of flowers and identify how many of them have similar aspects, and carefully observe the different parts, when we come to naming, whether later that day or a later year, it makes much more sense to the learner.

Knowledge consolidation

It is important to consolidate this knowledge, and perhaps that is an area we need to work more on. At one level, we need these different kinds of knowledge in order to build up as the school grows, so that the learnings are not isolated or stagnated – what they learn at age five, should still be relevant and built upon at age twelve. For that, we need planning and consistency across age groups and conversations that consolidate knowledge. As children grow, these experiences also need to be translated into textual, sometimes even abstract, expressions that the schooling system requires. Most of our students will be moving into mainstream government and private schools and will hope to move into colleges where they can take their studies further. For these processes, learning to give the responses expected in examinations is important, and we are in the lucky position of being able to start from experience and build, using conversations, towards a better understanding and mastery of their textbooks as well.

While the experiences and practices themselves are ingrained in our day-to-day functioning, we are not always able to have these consolidated conversations to give these experiences the closure they deserve. We do try using strategies, such as drawing our observations of a particular tree in different seasons, having classroom discussions and sometimes writing our thoughts after an experience. We also try to turn interesting 'distractions' into learning moments, such as when an unusual beetle enters the room and is trying to escape, or when a student absent-mindedly (or so it seems to us) is staring out of the window and exclaims loudly when a bird she has not seen before lands on a tree outside.

We try to always celebrate these kinds of observations, just as we do the asking of questions. We also encourage students to discover answers themselves, using the resources around them – the library, adults in their homes and, increasingly, mobile phones and other technologies. Sometimes, they share these learnings with the whole school in our Friday sharing assemblies, and those memories stay all the more with the student, the teacher and the other learners. We also connect our experiences with the local environment when engaging in activities, such as singing, clay modelling and other arts and crafts. But we still feel that we can do a lot more in this area. A better-planned progression of activities and experiences across age groups will also make the learnings more meaningful for all of us.

Our learnings

Some of these activities and experiences feel over-simplified, or perhaps very obvious – people have questioned us if these can be categorised

as ‘learning’. But over the years, we have found that these small experiences add up in invaluable ways to help students develop a sense of how the world works. There is also no better teacher than the environment when it comes to learning how to value things, and how to develop sensitivity for things and beings apart from ourselves. When the students grow older and have more academic or serious conversations about climate change, balance in the world and their lives, their own understandings of what their needs are and what is and is not exploitative, it will be these experiences that will form the foundation for those ideas.

All of this is not limited to the students, as we have mentioned before. As teachers, we learn daily as well, and we learn a lot from the students, both from their questions and from what they bring of their lives and observations. There have been many times when they have pointed out something we have not considered before – how a particular kind of mushroom favours a particular kind of wood or the behaviours of insects. A parent once conducted a session on ‘bamboo’, covering its life cycle, many uses, and cultural value in different spaces. The session ended with her and the students eating a dish made from bamboo shoots that they had cooked together. One of the students raised questions about the morality of eating the ‘baby trees’ (tender bamboo shoots), something that had never occurred to any of us. Children point to minute things in the hedges and help us understand how even a small shrub can host an ecosystem.

When we ask about family members in their houses, almost every child includes their animals in the list they give us, their dogs, their cows, their goats – this is a sensitivity we ourselves do not have, making a distinction as we do between ‘family’ and ‘pets’. When a snake is spotted on campus, children have no fear – only curiosity, often accompanied by concern for the snake. The fear and potential harm from the snake are almost invariably fostered by us. Our role as teachers is to find ways to make sure the children neither lose their curiosity nor develop our fears and inhibitions.

Figure 2. A student preparing a bed while learning about different soil types.

Figure 3. The Udaan School, Village Kandbari, Palampur, District Kangra, Himachal Pradesh.

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Environment Awareness in Anganwadis

Yogesh G R

The climate crisis is making it increasingly important to make children environmentally conscious and to teach them about sustainability from an early age. Developing an ecologically empathetic attitude towards the environment by imbibing the habit of taking care of and protecting the environment around has become a part of education.

The National Initiative for Proficiency in Reading with Understanding and Numeracy, better known as *NIPUN* Bharat, a national mission on foundational literacy and numeracy, categorises learning outcomes for foundational learning into three development goals. The third goal is, 'Children become involved learners and connect with their immediate environment.' In *anganwad*i centres, this connection is established through various themes, such as plants and trees, animals, 'air, water and surroundings', fruits, vegetables, flowers and birds.

Early childhood education plays a crucial role in a child's overall development process. *Anganwadi* centres across the country serve as public preschools with *anganwadi* teachers taking care of not just pre-school children's nutritional needs but also their psychological, physical and social development. Children in their early years can connect easily with their immediate environment. So, through various activities, like nature walks, field visits etc., *anganwadi* teachers create opportunities through which children are able to observe and explore local habitats and a foundation for greater environmental awareness is laid.

Theme-based curriculum

Many states have implemented a developmentally-appropriate curricula based on a thematic approach for early years. The themes are chosen based on children's interests, culture and environment. Since the thematic content is integrated with their lives, it helps children to understand it better. Of the 14 themes in the Telangana state ECE curriculum, nine are related to the environment. Conversation, stories, songs, play and games revolve around a particular theme in the *anganwadi* centre reinforcing the learning and, thus, ensuring that children retain the learning. Children learn by asking questions and exploring the world around them.

The teacher has the flexibility to modify the content of a theme to suit their local context and make it more relevant for the children in her *anganwadi*, for example, substituting local fruits, vegetables, trees and animals that children see and know in place of others that they may not. A child in the north will not know *gongura* leaves which may

be common for a child in Telangana. Children are also able to relate what is being taught to real-world experiences and learning built on their prior knowledge, which makes it more meaningful and interesting for them. The use of these themes also helps them to develop an awareness of the natural resources in their ecosystem.

Using these themes, teachers can actively engage smaller children in activities to introduce the concepts of sustainability and reduce-reuse-recycle for available resources. Energy and water conservation techniques, such as not wasting water and power by turning off taps, lights and fans when not in use, need to be instilled by example and reminders into habit-forming practices at the *anganwadi* centres and their homes.

Following are a few illustrations of themes around environmental awareness, how these impact young children, and what the *anganwadi* teachers do in the classroom.

Plants and trees

Many *anganwadi* centres, especially in rural areas, have trees and plants on their premises. The teacher takes the children out and helps them identify and name different plants and trees and shows them the different parts. The teacher guides them to touch parts of different plants and trees to help them feel the different textures.

Figure 1. Children exploring the texture of the bark of a tree on the anganwadi premises.

The teacher also asks the children to collect fallen dry leaves, twigs, seed pods and flowers in a small bag. After coming back to the centre, the teacher helps the children in sorting and grouping all the collected materials and in naming them. She also encourages them to explore what happens when they break open the seed pods.

As part of the conversation, the teacher discusses farming and how various products, such as furniture, paper, cloth and food derived from plants and trees are useful to us. The teacher also tells them about the importance of trees in giving us pure air and rain and being the home to birds, insects and animals, thus, emphasising the need to protect them.

Animals

Children are fascinated by animals that form a part of their world –they have pets at home, observe them in their surroundings, or see their pictures in books, cartoons or movies. Teachers help children recognise animals by looking at their shapes, size, colours and habitats and emphasise the importance of being gentle and caring to animals in their surroundings. Children enjoy imitating animal sounds. Teachers use flashcards and books to introduce wild animals, where they live, how they move and what they eat. Activities based on animals provide children with the opportunity to discuss how animals are useful and help us. Children who grow up with pets and domestic animals around them, learn to love and be empathic towards animals.

Air, water, surroundings

Children, like scientists, are naturally curious about their surroundings. They observe how things work and try to imagine why things happen as they do. The more opportunities the teacher provides, the better the children will understand and develop sensitivity to their surroundings. The teacher points to the clean and filthy areas when she takes them on a nature walk in the surroundings and discusses the importance of cleanliness in their homes, in the centre and outside.

Involving children in cleaning up the neighbourhood by picking up plastic bags and bottles creates awareness among children and through them to their families and community about keeping their surroundings clean.

When transacting the theme of water, the teacher initiates the conversation by asking the children to name all the things that they use water for and highlighting the importance of water. When washing hands before lunch, the teacher reiterates the fact that they should not waste it. The water from the hand-washing is directed to the kitchen garden, thus, reusing it. These practices help children be mindful of the conservation of naturally available resources from a very young age.

Activities that instil sensitivity towards environment

Action songs and stories

Children get early exposure to the environment from the stories their elders tell them, which usually have animals as main characters. The *anganwadi* teacher builds on this by using songs and stories as a predominant way of teaching in the early years. Children learn the different characteristics and behaviours of animals, their habitats and food habits which increases their curiosity to explore the natural world further.

Nature walks and field visits

Depending on the theme, the teacher takes the children to visit nearby farms, cattle sheds, parks etc. to give them hands-on experience on a specific topic that the teacher is transacting at the time. For instance, rather than the teacher discussing different stages of growth of a plant from a seed, the children learn naturally by visiting a farm nearby and seeing how grains or vegetables are grown by farmers. Children also learn from interacting with their community elders during field trips. Teachers instruct children not to pluck flowers or leaves from plants, not to throw stones at animals etc. before a nature walk which adds to their environmental awareness and sensitivity.

Nature walks instil a sense of wonder in children, feeding their curiosity and giving rise to many investigative questions that they ask their teacher. Hence, nature walks provide many opportunities for them to learn something new. Children also see plants and trees of different shapes and sizes, which makes them appreciate the diversity in nature.

Looking out for things during a nature walk encourages children to observe with all their senses. Observing animals in their natural settings and seeing the beauty of nature helps them appreciate the natural world and also creates an opportunity for joyful learning experiences.

PRESCHOOL 1	PRESCHOOL 2	PRESCHOOL 3 (BALVATIKA)
IL1.1 Uses all senses to observe and explore the environment	IL2.1 Uses five senses to observe and explore the environment	IL3.1 Uses all senses to observe and explore the environment
IL1.2 Identifies and names common objects, sounds, people, pictures, animals, birds, events, etc.	IL2.2 Describes common objects, sounds, people, pictures, animals, birds, events, etc.	IL3.2 Notices and describes finer details of common objects, sounds, people, pictures, animals, birds in the immediate environment.

Figure 2. Nature walk helps in achieving many of these learning outcomes.
**IL: Involved Learner*

Figure 3: Children observing goats during the nature walk.

Figure 4: Teacher explaining the different parts of a plant during a nature walk to a garden in a nearby house. Children touch and feel the plants.

Kitchen garden

As part of the *Poshan Abhiyan* initiative, the Women and Child Welfare Department has been encouraging *anganwadi* centres to have kitchen gardens in which vegetable and fruit-bearing trees are planted on the premises. Children learn best when they do things themselves. Involving children in creating a kitchen garden helps them in nurturing plants, taking responsibility and caring for them.

The teacher conducts an activity to make children understand how a plant grows. She tells the children that they are each a small seed in the ground. Each one is asked to curl themselves up like a ball. She then says that it is raining followed by the sun shining. Every time she tells it is raining the children are told to move a bit and slowly uncurl themselves. She then asks the children to raise their heads saying that the seed is beginning to grow, and they are now a small plant popping out of the ground. Then, the teachers ask them to slowly stand up indicating that the plant is growing taller and taller. Children are asked to raise their hands stretching them outwards indicating small branches. The children with closed fists are now asked to slowly open out their fingers to represent a flower blooming. Activities like these help children understand that plants too, like themselves, are alive and need to be cared for and protected.

The teacher then tells the children that they are going to plant a seed and take care of it till it grows into a big plant. She assigns a small patch of the ground to each child and asks them to loosen up the soil using a small stick. Then, each child is given a few seeds and asked to plant these in the ground and cover it up with soil. Every day, the children water their respective patches waiting for

the seed to sprout. Every week, during circle time, the children are asked how their plants are and the children share their experiences eagerly.

The teacher also plans other activities around the kitchen garden, such as asking the children to draw and colour their plants at different stages. They are encouraged to show their plants to their parents when they come for the monthly ECCE Day (parent-teacher meeting). Children are also helped in picking the vegetable from the kitchen garden and giving it to add to the mid-day meal. Children are thrilled when while having their meal, they are told that they are eating what they have grown themselves.

This experience of growing plants in a kitchen garden, watering them daily and observing them grow helps children understand the process of a plant growing and aids in cognitive development. Working in the garden helps develops their motor skills. Waiting for plants to grow instils patience and perseverance and improves concentration and focus. Children develop a sense of responsibility and accomplishment through this process and caring for plants will gradually lead them to care for their natural environment.

Conclusion

Interacting with their natural world in the early years helps children build a connection with their surroundings. Learning from what they see daily makes it easier for them to relate to and retain what they have learnt. Talking about what they see with other children, teachers and parents helps build their social skills. When they learn the names of different plants and animals and their parts, it expands their vocabulary and enhances their language skills. This skill of observing things around them is a precursor to what they will learn more deeply about in primary classes. Creating environmental awareness and engaging children in their early years to participate in protecting the environment creates a lifelong impact.

IL 1.8 b Expresses curiosity about the immediate surroundings and asks related questions	**IL 2.8 b** Expresses curiosity about the immediate surroundings and asks questions (develops related concepts)	**IL 3.8 b** Engages in investigating and manipulating objects in the environment, asks questions, inquires, discovers, and constructs own ideas and predicts
IL 1.8 c Demonstrates awareness and sensitivity towards environmental concerns (example - watering plants)	**IL 2.8 c** Demonstrates awareness and sensitivity towards environmental concerns (example - watering plants, not plucking flower, or do not hurt animals)	**IL 3.8 c** Demonstrates awareness and sensitivity towards environmental concerns (example - Do not waste water, switching of light when not in use, etc.)

Figure 5. Activities related to the kitchen garden help children in achieving many of these learning outcomes.

**IL: Involved Learner*

Figure 6: Children tending to young plants in a kitchen garden.

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Red Soil Spring is a print magazine on nature for children in the age group of 7-12 years. The idea was conceived by Amrutha Preetham (Co-founder and Editor-in-Chief) and Senthil Nathan (Co-founder and Creative Director) with the hope of connecting children with the natural world and illustrating to them how and in what ways humans and nature form the web of life on the planet Earth.

Senthil Nathan (SN) speaks with Shefali Tripathi Mehta (STM).

STM: Red Soil Nature Play came first so let's begin with that. What was your inspiration for this unique play space that you created for children in a burgeoning metro where children rarely get to experience nature?

SN: From the time we became parents, we realised that urban spaces lack natural environments for children's play. Children do not have the opportunities to climb a tree, roll down a grassy slope, dig in the sand or follow ant trails. Children's leisure and entertainment activities are around shopping malls, mobile phones and video games that breed passivity, frustration and aggression. We've deprived them of the joy that comes from spending time in nature. Sadly, this produces people with zero knowledge and awareness of the earth they live on.

As we came to understand the critical need for natural environments in a city, in 2016, we set out to develop a natural habitat for children called *Red Soil Nature Play* located in Bengaluru, where children can immerse themselves in nature to wonder, explore, discover, connect and experience natural surroundings.

Red Soil Nature Play, spread across approximately 2 acres of land, is the first nature play habitat to connect nature and children in the city of Bengaluru. The barren land was restored by planting indigenous trees, and a wide assortment of vegetables, grains, herbs and plants. It is a sustainable environment where the built structures are made of natural building materials, and sustainable practices like rainwater harvesting and composting are practised. It seeks to inspire and ignite young minds to explore and experience nature in a peaceful and unhurried manner. Children can run, climb trees, jump on rocks and boulders, play in the water or with mud, watch butterflies and birds, water plants, and run through tunnels – there are infinite opportunities for nature play depending on what the child wants to do.

STM: The nature magazine, Red Soil Spring, is a first of its kind in India. What was the thought behind it?

SN: When the pandemic struck, *Red Soil Nature Play* had to be temporarily closed and while we were thinking of alternate ideas to bring the wonders of nature to children, we struck upon the idea of this magazine.

Red Soil Spring magazine is another medium of work where we present children with fascinating knowledge about our planet earth. We intend to reach a wider audience of children through the magazine. Our nature play environment, Red Soil Nature Play has resumed its operations in January 2022 and is open for visits.

STM: While you saw this as a bridge to connect children to nature, to provide them with opportunities to experience and immerse themselves in it, there must have been the larger purpose of nature conservation that now, more than ever, needs the concerted focus of everyone. How easy or difficult is this 'messaging' to your young readers – to make the desired impact without creating a 'doomsday anxiety' in them?

SN: The knowledge we bring through *Red Soil Spring* proposes to lay a deep foundation in how children perceive nature and how they respect their environment. *Red Soil Spring* inspires the next generation of children to become social change-makers and caretakers of the Earth. We hope to communicate to children that we are all connected in the web of life, and it is this interconnectedness that makes us sustain our lives.

STM: The first thing one notices on opening the magazine is the striking illustrations as if the magazine is recreating the beauty and wonders of nature.

SN: Yes, it was a conscious decision aimed at making the magazine attractive to children. Children come into the world, full of joy and love. If they are equipped, rather empowered with information and knowledge about nature, they would naturally want to take care of it.

STM: You chose to bring out a magazine knowing that the culture of reading is quite limited– how do you hope this magazine will reach more children? Are you reaching out to school libraries and children's reading groups?

SN: We think that when the content is visually appealing and the narrative is interesting, children cannot but want to read it. The magazine also encourages early readers who are beginning to navigate the literary world. It allows us to reach children through various interesting narratives, like stories and poems. The art and illustrations appeal visually, and the nature engagement activities can be done whenever they want to. We also have nature journaling pages for them to record what they see, and it is like a personal nature book. Also, children can read a magazine at their own pace, and it doesn't need to be taught. Red Soil Spring is not just a magazine, it is a collectable.

Currently, we are reaching out to a lot of school libraries and reading groups and have a very positive response from them.

STM: Do you think there is a difference between how children in the metros and big cities perceive the natural environment versus how children in smaller towns and villages perceive it? Is the magazine more focused on children living in towns and cities whose experiences and engagement with nature are limited?

SN: Yes, there is a difference in how children perceive nature in cities and in smaller towns. Cities have pollution, traffic jams, more concrete buildings and lesser green spaces. Most schools are constrained by smaller spaces and consequently, little or no outdoor environments.

The magazine is made for children growing up in all kinds of environments, be it urban or rural. Although children in villages may have more green spaces, the impact of issues like climate change affects everyone around the world equally. For example, if the Amazon rainforest is being cut down, it heats up the Earth; if the polar ice melts, it leads to unwarranted floods and drought.

Or, say, when children come to know that the production of palm oil is destroying the only forests where orangutans live, they have a choice of making a conscious decision of not buying the product, when they grow up. As adults, it is our responsibility to let children know about what's going on with the natural world and give them the knowledge that they need to create a better future.

STM: In school, children have a variety of topics on nature and the natural world as part of their curriculum. How does this magazine go beyond that? What are the things that you keep in mind to engage young readers?

SN: There are many things in the magazine that go beyond the school curriculum. For example, each issue has a story narrative about a particular season in a country. Children get to know about the culture, the seasonal changes taking place and the lives of the people living in that country through that season. There is a section about music in nature presented through a beautiful narrative. Beyond factual knowledge, *Red Soil Spring* delivers its content in creative ways.

The selection of content for the magazine is diligently curated for its meaning and purpose. The first section of the magazine explores the Earth, and the second section 'Know your co-habitants', delves into the lives of animals, plants and their habitats.

The next section 'Connect with the Earth' presents DIY nature activities related to sustainable living skills, nature art and nature immersive experiences. For example, our recent issue, *Red Soil Spring - Blossoms* had 'Making flower tea', 'Pressing flowers and leaves' and 'Bird watching' in this section. The last section 'Celebrate nature' discovers the music in nature, has a nature story, nature poetry and a nature word search. It also talks about an exceptional naturalist of the month whose life and work made the world a better place. There is also a section about important nature days to be celebrated every month.

The content is crafted for children's readability. The design is pleasing. The art and illustration are presented to inspire wonder and give wings to the imagination of children.

> The content is very informative and made my 8-year-old very curious about a lot of things. Both my kids thoroughly enjoyed flipping through the colourful pages and images. They read and reread! – Deepa Sam, parent

> Red Soil Spring is a new children's magazine about nature that will grip the imagination of people of all ages. Beautifully illustrated with drawings, paintings and stunning photos, it will open a large window into wonder and will inspire awe - while remaining fun. The magazine's future will surely be as bright as the contents of its first issues. – Richard Louv, author of *Last Child in the Woods*, *Our Wild Calling* and other books.

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