

# PLACE-BASED LEARNING OF SCIENCE: EXPERIENCES IN INTEGRATION

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**Our journey to deeply connect to the living-scape that we inhabit as local citizens is a long, ongoing process — collective and individual. Seen from this lens, what role does science play in a child's journey of growing up and meeting the world? How do we encourage science learning that goes beyond textbook knowledge?**

*"There are no unsacred places, only desecrated places"* — Wendell Berry.

For the earth as a whole to matter, it is important for us to care for the place that we are in first. Our journey to reconnect to this living-scape is a long, ongoing process — collective and individual — of understanding, enjoying, and caring at deeper and deeper levels. This principle underlies a lot of the work at Marudam (see **Box 1**).

In terms of teaching, we don't always have ecology or earth science as subjects, but all the class groups take time to build relationships with the natural landscape and its lifeforms (see **Fig. 1**). This process

**Box 1. An introduction to Marudam Farm School:**

Marudam Farm School runs under the umbrella of The Forest Way — a registered non-profit charitable trust involved in education, afforestation, environmental education, organic farming, and more near the town of Tiruvannamalai in Tamil Nadu. The journey of the school, the campus, and the land are the result of the passion and energy of several committed individuals, and the generous support of a large community of friends and donors from all over the world.

As of 2020, Marudam hosts some 130 children between the ages of 4 and 16 years; about 30 teachers and staff in different capacity; roughly 20 residents; numerous dogs, cats, cows, chickens; and a rich, diverse, and ever-growing wildlife population of all kinds. Located on an organic farm, and spread over eight acres, land is something we constantly engage with as a rich, real-life, educational resource, integral to the learning process.

Being an immensely diverse group, originating from various cultural and social backgrounds, the richness of integration is a key element in our ethos. Working and learning closely together in such an environment, with very little formal structure, can be challenging at times. At the same time, it is endlessly enthralling, deeply rewarding, and never ever boring!

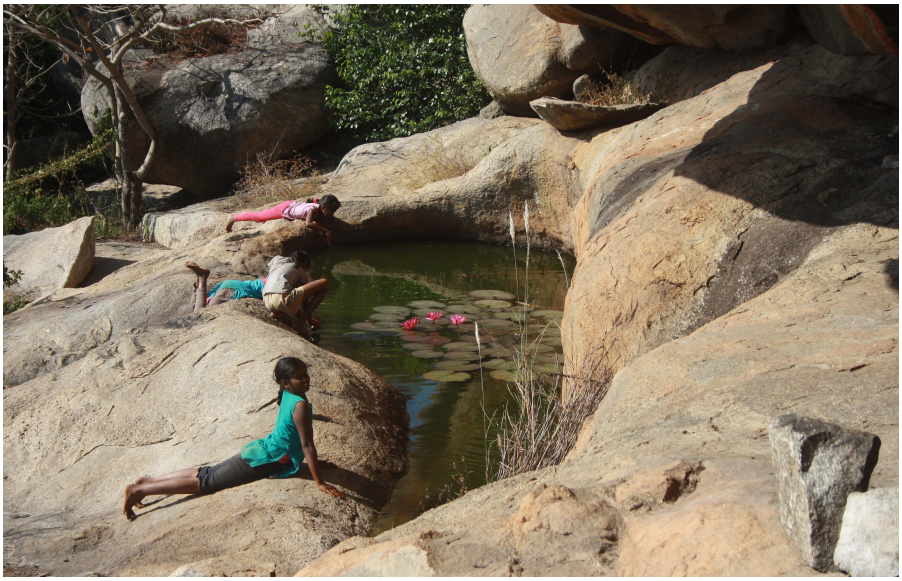

**Fig. 1. Children connecting with each other, to the natural landscape, and its lifeforms.**
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of reconnecting with nature is not an intellectual exercise, but one that emerges from experience, action, and reflection. Relationships between people are as important as other relationships. If we acknowledge that we are all on a journey to reconnect with nature, then it becomes important for us to learn from and with each other. Teachers must also learn from those they teach because children often have keener senses and sensitivities. On the other hand, everyone, including children, must take responsibility for their own learning. In this sense, classes can be seen as ongoing agreements that are discussed and arrived at as a group. Seen from this lens, what is science and what is its place in education? As teachers engaging with science, how do we bring our own understanding to these questions (see **Box 2**)?

## Including differences

A key principle of our core philosophy is that we value a diversity of backgrounds and family lives, both among the children and the adults. We also recognise that each child's journey is different. For example, while some children respond to the approach of science, others prefer to work on a craft, and still others come alive in interpersonal relationships. This is where we, as facilitators of learning, may question our own focus on the conceptual and make space for other forms of communication and intelligence.

In another example, the way in which some children engage with science can show a growing momentum as it comes to interconnect more and more things for them. For others, science can make lesser and lesser sense, as any disconnection with its fundamental ideas only grows bigger. In some cases, the lack of participation in science could come from an emotional block. It is for this reason that we create multiple spaces for children to share their feelings. The regular practice of a sharing circle as well as theatre classes provide a space for such expression. Parallelly,

**Box 2. Some of our approaches to science education:**

These are some of our approaches to the teaching and learning of science that we described in detail in the first part of this article (published in the June 2021 issue of iwonder...):

- **A ground-up approach to learning science:** The most positive aspects of science can begin with a child observing their surroundings, and asking about the how and why of different things around them. The child learns by engaging in open discussions about their observations, and connecting these to other things they have heard or read, including the body of knowledge that science has to offer. In fact, till middle school, it makes sense to mostly focus on ground-up learning. To feed a child's natural curiosity, we expose them to different things around the neighbourhood and beyond.
- **Bringing together multiple perspectives to science:** Often, it can seem as if science is the only systematic body of knowledge. Also, a lot of scientific knowledge has been created with the assumption of human mastery over the earth. These aspects of science have to be questioned as they come up and, going beyond questioning, have to be integrated as different perspectives. It is important to understand science as found in textbooks as just one form of knowledge, and recognise that emphasis on universal laws can often cause us to ignore the beautiful complexities in nature.
- **Building an understanding of context:** Apart from bringing together multiple perspectives to science, it is also important to place science in its proper context. To do this, we often have to go into its history and sociology.
- **Weaving a web of concepts:** Since all the seemingly different divisions of science are actually interconnected and rest on each other, explaining almost any concept of science often brings up ten other concepts! To address the problem of interrelated concepts all hanging in the air, it often helps to reorganise the syllabus. This can be done along themes that help us draw from the rich experiences of a child in a particular place.

teachers are encouraged to share their individual understanding of a child's learning journey with each other in the course of regular formal and informal meetings. This is important even in a child-centric system because it is possible to not notice a block in a child's overall journey when their teachers don't communicate. What is important is to ensure that the child feels okay with the disconnection. If the child is open to it, we work with the fundamentals again. If not, we accept that the perspective of science may not be part of their learning journey at the moment.

## How it comes together

Despite their many differences, some things are common among the children here. There is an aliveness when they are outdoors; a vitality in their bodies which they enjoy within themselves while trekking, camping, gardening, dancing, playing sports, or doing gymnastics. They do not wait around for something external to stimulate them. They are ready to make up and play their own games. There is a deep connection with themselves that lets them take their own feelings into account even while doing things collectively. They also have a deeply personal relationship with nature that manifests itself in diverse ways. If they recognise that they'd rather be on their own for a while, they don't hesitate to perch on a rock or under a tree (see **Fig. 2**).

Even before they reach middle school, we see that children begin building on their experiences and making connections on their own. They also begin to engage with different degrees of questioning. For example, while observing a pond ecosystem, their questions are not limited to only what they can see. They are likely to envision hypothetical situations, like — what will happen when the pond dries? How does life come back when it rains and the pond fills up? There is depth in their practice of questioning, and also in the enjoyment and appreciation of things. If something, even a scientific fact, doesn't match their experience, they are not quick to agree. At the same time, they may stay open to the mismatch and keep the question alive for themselves knowing that it may get resolved in the future.

With the gradual introduction of universal concepts, we see that children start formalizing their knowledge. The study of ecosystems and the further realization that some beings are ecosystems unto themselves (a fig tree is home to hundreds of species) generates the first concrete understanding and appreciation of concepts like adaptation, reproduction, migrations, ecological niche and so on. We also see that children start to viscerally understand that they are part of a food web, and their experience of nature is altered by this realization. Even the simple facts of one's surroundings that have always been considered 'normal' start taking on a greater significance. For example, the cockroaches, lizards, and ants that have always lived in our houses are no longer seen as just creatures that we share space with; they are now perceived as being part of our own local ecosystem.

Children also begin to develop an understanding of privilege. They experience the gravity of being part of this system with more intensity and more conscious thought than before. They also begin to see, with more clarity, that human participation with natural processes is different from and more capable of causing damage than that by other living beings. This kind of understanding leads to a more personal relationship with nature — one which features empathy and responsibility as much as excitement and curiosity. This takes many forms including, for example, the deeper relationships that children in urban spaces develop with pets and houseplants.

Another aspect of this growth is that children start perceiving sensorial experiences at a deeper, more emotional level than before. For example, we observe that a younger child's experience of rain may be joyful because they love to play in the rain. In contrast, an older child can enjoy the sight of rain and other children playing in the rain internally while understanding the significance of the life support that rain provides. Many of them begin to express their connection with nature in the form of poetry and art. As their connection with nature

**Fig. 2. Children at Marudam Farm School have a deeply personal relationship with nature.**
Credits: Teacher, Marudam Farm School. License: CC-BY-NC.

deepens, the child becomes ready to understand more complex concepts in ecology, like biodiversity and conservation (see **Fig. 3**).

## Meeting life's challenges

To some extent, science is part of each child's journey of growing up and meeting the larger world (see **Box 3**). Topics in biology often allow them to have deeper conversations about their own changing bodies, health, and medicine. The study of ecological concepts adds layers to their time in nature, adding to what they might look for and how they might share their observations. Concepts in physics and chemistry can help appreciate where many of the problems with unsustainable technology come from.

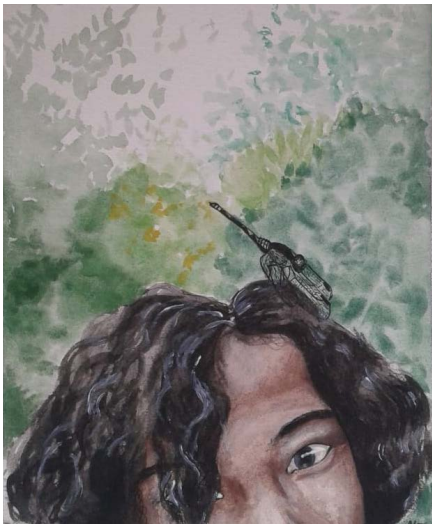

**Fig. 3. Many children express their connection with nature in the form of poetry and art.**

Credits: Teacher, Marudam Farm School. License: CC-BY-NC.

**Fig. 4. Reaching new horizons with one foot on the ground.**

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Science also gives them a framework to talk about the changing world, and to connect everyday activities with what is happening on a larger scale (see **Fig. 4**). For example, connecting the use of motor vehicles with climate change makes them more conscious about their transport choices. Many of them also develop relationships with walking, running, and cycling.

### Box 3. Challenging conditioned thinking:

Many of the practices that we see helping children negotiate life's challenges go beyond the framework of science:

- One core practice is to learn to be outdoors, and find ways to be at ease with it. Being alone in a forest, or learning to swim, or climbing a rock, or having to find one's way through a landscape when lost can bring up many fears. But they are also opportunities for growth, and this growth is deep and continuous. Even someone who's been to the same forest many times will find new ways to challenge themselves. We often experience ourselves deliberately getting lost! Something in us is attracted to it because the adventure of finding our way back is so nourishing. It builds trust in oneself, trust in the landscape, and a sense of belonging to it. There is a rock on the hill that we call *saruku parai* or sliding rock. We often go to it during our weekly walk. Scaling it brings up doubts for many of us. We learn to take up the challenge at our own pace. Some beautiful journeys have begun there, at the base of that rock.
- Another aspect that we emphasise is being open with feelings, while also being emotionally resilient. This is helped by creating safe spaces within which children can express with vulnerability where they are in their lives. Sharing about one's own journey takes reflection on their part, which in turn helps them be more conscious learners. It also encourages us to recognise, appreciate, and care for all that is supporting us — humans and non-humans. Children also learn to listen to others empathetically. This is a skill that is not very common in adults. To listen to someone without immediately responding with advice or consolation or connecting it to aspects of our own lives often takes unlearning for us.
- Questioning and examining what we see happening around us is also critical to meeting life's challenges in a way that, although aided by science, often goes beyond it. Why are we talking about pesticides, but still sometimes eating potatoes grown with it? Why are people living the way they do in the village? What decides where someone's house is? Why do some people believe that the excessive use of mobile phones can be harmful? Thinking through our and our society's most deeply entrenched habits is something each of us has to do for ourselves.

Similarly, studying about chemical and industrial methods of agriculture helps them appreciate the gardens they are tending to with organic methods as well as the food that comes from it and neighbouring farms. They are also able to talk about many of these things with their families.

For a child to meet the world on an even footing, it is also important that they feel empowered in doing positive, life-affirming work. This work could be tending to tree saplings, caring for a garden patch, collecting seeds, taking care of animals, participating in farm work, helping with the learning journeys of other children or even adults, cooking for the community, immersing in a craft, and many other things. It starts within their own local ecosystem of relationships, and slowly grows outwards.

We see that many of the practices that help children meet life's challenges are also practices that are important for a society (adults very much included) that wants to shift into a phase of being more in harmony with the earth. Our approach to science, and education in general, then becomes the same as our approach to reconnect with and care for nature.

## Parting thoughts

While we have tried to share some general approaches that are practised at Marudam, there is much more to share in terms of what we actually see in specific individual and collective learning journeys. Articulating these 'experiences of integration' has been an act of self-reflection for us, and will hopefully be interesting to other practitioners.

## Key takeaways

- As teachers, we should be able to help students get a grasp of the many interrelated concepts in science in a way that gives them a framework to talk about the changing world. It often helps to reorganize the syllabus by incorporating the rich experiences of our students.
- Children need to be allowed to cultivate a deep connection with themselves that lets them take their own feelings into account even while doing things collectively.
- For a child to meet the changing world on an even footing, it is important that they feel empowered in doing positive, life-affirming work.
- We also need to be prepared to accept that the perspective of science may not be part of a child's learning journey at the moment, and be ready to return to it when it is.
- As teachers, we need to be ready to question our own focus on the conceptual and make space for other forms of communication and intelligence.
- It is also important for us, as teachers, to have formal and informal spaces to share our individual understanding of a child's learning journey.

**Note:** Source of the image used in the background of the article title: 'Moving beyond'. Credits: Teacher, Marudam Farm School. License: CC-BY-NC

**Poornima Arun** is a founder member and head teacher of the Marudam Farm School, which started in 2009 with 20 children and has around 120 children now. She 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. Poornima has conducted the annual craft week at Marudam for eight years now, where traditional crafts people and artisans from all over come and teach their skills to children from various schools. She has also been an active member of the Alternative Education Network for the past seven years, and was instrumental in starting a Tamil Nadu chapter three years back.

**Nishant** has been learning to teach for some years now, mostly in Marudam, and over the summers at Marpha Foundation in Nepal. His interest in ecological science is matched by an equal interest in gardening and forests. He is constantly challenged by the process of bringing these together as group learning experiences. He also has a deep interest in practices of harmonious living, especially in the context of community life.