# LOCAL NATURE-BASED LEARNING PROGRAMME

## ANNUAL REPORT 2023-2024

# LOCAL NATURE-BASED LEARNING PROGRAMME

**A collaboration with Greater Chennai Corporation (GCC)**

PALLUYIR TRUST

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Office address: No.13/2, First floor, 7th Street, Tansi Nagar, Velachery, Chennai- 600 042.

Contact: palluyirtrust@gmail.com, +91-8838502767

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# Summary

The local nature-based learning programme is a collaboration between Palluyir Trust, the Greater Chennai Corporation, and various government schools in the city. Through this programme, Palluyir aimed to connect students with the local environment and the natural world through activities that involve learning about local animals, plants, and ecology to appreciate the importance of nature in their everyday lives. The programme's success is attributed to the support of the Greater Chennai Corporation, the students of the schools, the headmasters, teachers, and the Palluyir team led by Yuvan Aves. The project also received support from Nature Classrooms, Dr. Ovee Thorat and Vena Kapoor, Prof. Louise Chawla, Dr. Nomisha Kurian, and Prof. Milind Brahme, IIT Madras.

The Greater Chennai Corporation released a climate action plan in 2022, highlighting the city's climate vulnerability. Studies show that nature and climate education are crucial for vulnerable communities in reducing climate change impacts. With this in the background, Palluyir shaped a nature curriculum that focused on Chennai's biodiversity, climate and seasons, action pedagogy, and children's developmental stages. The curriculum aimed to improve students' knowledge, attitudes, and learning environment, leading to improvements in epistemic curiosity, critical thinking skills, knowledge of local biodiversity, and children's happiness in learning contexts. This approach is vital for reducing climate change impacts and promoting stewardship of the local landscape. At the same time, the programme also led to a study focusing on understanding how 8th-grade school students connect to nature and on assessing the impact of the nature education interventions introduced by Palluyir.

The study aimed to understand changes in students during the programme's implementation in four main domains viz. their curiosity, interpersonal skills, critical thinking, and nature connectedness. A pre-intervention or baseline survey aimed to assess the students' connection with nature and their understanding of the environment in schools in Chennai city. The schools were chosen based on proximity to parks and green spaces, with a focus on parks with good vegetation. The study included a pilot survey of selected parks, focusing on parks with good vegetation, such as Corporation Park in Besant Nagar, Robinson's Park, and Independence Day Park. The students were selected from five schools, with class strength ranging from 20 to 45. The methodology included pre and post-intervention surveys and indoor and outdoor activities conducted by a group of facilitators from Palluyir. These activities were designed for the specific

age group they were working with. Regular observations of sessions were made by facilitators to note down students' doubts, reactions to education materials, and peaks and lows in enthusiasm and later analysed qualitatively using coding. Palluyir also documented observations and received direct feedback from students through interactive sessions and feedback surveys. An icebreaker activity, Thiran Thedal, was used to establish momentum and facilitate meaningful connections with the facilitators. Further activities were conducted throughout the year, such as tree walks, frog and bird call sessions, and visits to Vedanthangal Bird Sanctuary.
The study reveals that children's observation of local nature motivates them to learn and be curious, particularly in language learning and scientific concepts. Noam Chomsky's essay on language suggests that all humans are born with the potential to learn language, but a poverty of stimulus inhibits it. Nature provides rich language nutrition and intellectual/cognitive stimuli, which can be more than what they usually receive in their learning contexts. The diversity of stories and stimuli that nature provides can support multiple learners and ways of learning simultaneously. The students gained knowledge and familiarity with bird calls, frog life cycles, and ants among other things in their surroundings. Other skills that showed improvement were drawing, writing, and identification of species using available resource materials such as field guides and posters.

The project aimed to make parks and school campuses interesting for children by maximizing nature connection and using visual aids and stories. In the pre-intervention, students mentioned that they get to learn about nature in forests, mountains, on TV/phone, and in schools, while some reported parks too. However, in the post-project survey, many more students recognized parks as spaces for learning about nature. The programme was designed around a school+park space, resulting in many sessions being carried out in public parks near schools. During the post-intervention survey, many students also said that they get to learn about nature from "Palluyir", whereas earlier the same students had mentioned nothing, or trees, park, or other things instead.

In the baseline (pre-intervention) survey, when asked about what they like about being in nature responded with more general words such as "everything" or "animals". Some said that they like to feel the breeze or rain and that they like pets such as cats and dogs. However, in the post-project survey, there were more groups of animals such as insects, and new skills they learned during the project, for example, "seeing birds through binoculars". Apart from this, they responded with "trees" much more when compared to the baseline as some of our activities

were designed around trees. On a Likert scale, when asked how much they liked observing animals and plants around them, the students showed a more positive response during the post-project survey. 45.37% of students showed a more positive response than the baseline to this. Similarly, when asked how much they liked learning about animals and plants around them, there was also an increased positive response.

Challenges included integrating nature-based learning with the existing schooling system, and children's socio-political landscape. The project aimed to make parks and school campuses interesting for children by maximizing nature connection and using visual aids. The students gained knowledge about bird calls, frog life cycles, and ants. The study also highlighted the importance of integrating nature-based learning (NBL) into the Ennum Ezhuthum policy for foundational literacy and numeracy. Teachers found the sessions meaningful and are now exploring opportunities to participate more actively in NBL. The Palluyir team has also drafted a detailed curriculum for teachers to implement NBL in a self-directed way for different classes.

# Introduction

Nature is often believed to be far away. People can be oblivious to the nearby nature- nature around neighborhoods and the immediate environment. We imagine that we need to go to forests, mountains, or similar places to be with nature. When children are not perceiving the nearby nature, there is a disconnect. Unlearning and experiencing are required to understand and connect to this nature. When we started this project, one of the schools we visited had images of animals, such as ostriches and kangaroos, which the students had yet to see in person most often. There is a lot of literature and other media on exotic wild animals and encounters with them. But there have also been works such as Ranjit Lal's *Birds From My Window And The Antics They Get Up To* and M. Krishnan's *Nature's Spokesman* that call for engagement with local or nearby nature.

Neighborhoods can be powerful learning spaces to connect to local nature. We started by taking the children to the parks next to their schools and telling stories about trees to create a fascination for the "nearby." By the time we came to groups such as ants and insects, it captured children more to see fascinating things around their schools. Most of these activities were based on school campuses and public parks, which shows how invaluable the commons are as learning spaces. Wetlands, grazing areas, and parks provide innumerable opportunities to learn and explore nature and are extremely important for children's well-being. A 2018 study by Sivajanani Sivarajah and colleagues in hundreds of Toronto District School Board schools shows that the diversity of trees around a child's environment can positively impact the learning abilities of primary school students (Sivarajah, Smith, & Thomas, 2018).

We designed this local nature-based learning project intending to increase the connection of students in Chennai with the nature around them. Another aim of the project was to understand the impact of local nature-based learning on other capacities of children. The project included three main elements: a curriculum-aligned nature-based education programme, nature-based learning classroom resources, and close observation of students and their participation. The project was conducted from August 2023 to March 2024 for Grade 8 students of five government schools in Chennai. The schools for the study were chosen based on their nearby access to green spaces, such as public parks.

Each session of the nature-based learning programme had an active learning component where students engaged with local biodiversity and society. The programme had three pillars around which all the activities were designed: direct engagement, local relevance, and interconnectedness. We call this an 'Action Pedagogy' (see Figure 1). Each class had a 1.5-hour session every fortnight (excluding school holidays, exams, etc.) and around 14 sessions yearly. Throughout the programme, nature-based learning materials were progressively added for children to engage with. These include guidebooks, bingos, surveys, activity sheets, etc., based on local biodiversity. Each session is anchored by a teacher(s) from the school to ensure the safety of the children and 2 to 3 facilitators from Palluyir.

We aimed to implement an excellent place-based nature education programme and study its effects on children, especially for their critical thinking, curiosity, interpersonal skills, and nature connectedness, as well as their motivation to learn, academic performance, mental health, and environmental sensitivity. Such a project is a first of its kind in India and Tamil Nadu. We hope it provides important insights into the applicability of nature and climate literacy and its many benefits, especially to vulnerable communities, and informs the state's future education policy.

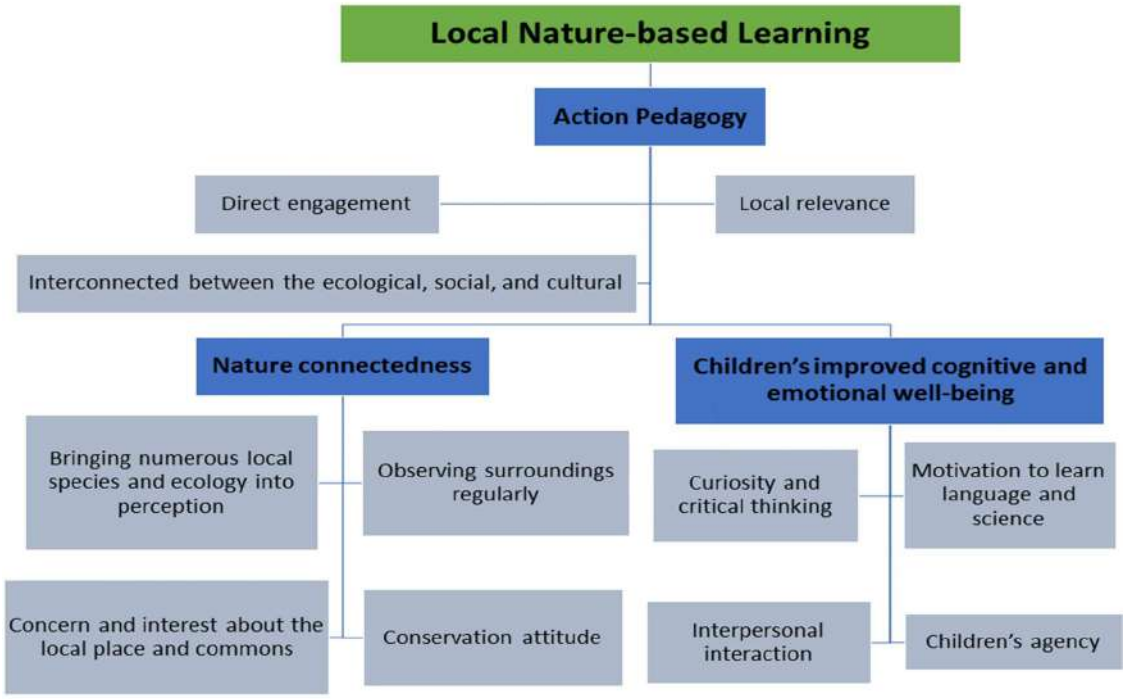



Figure 1. Action pedagogy with its methods and expected outcomes

# Why Nature-based Learning?

One of the most comprehensive meta-reviews on this subject is by Ming Kuo et al. (2019), which brings together nearly 100 studies from across (primarily the Western) world showing how ‘nature’ in education benefits a child's learning and the learning context. They show this leads to academic achievement, personal development, and stewardship for one’s ecology and other species. This is summarized in the diagram below -

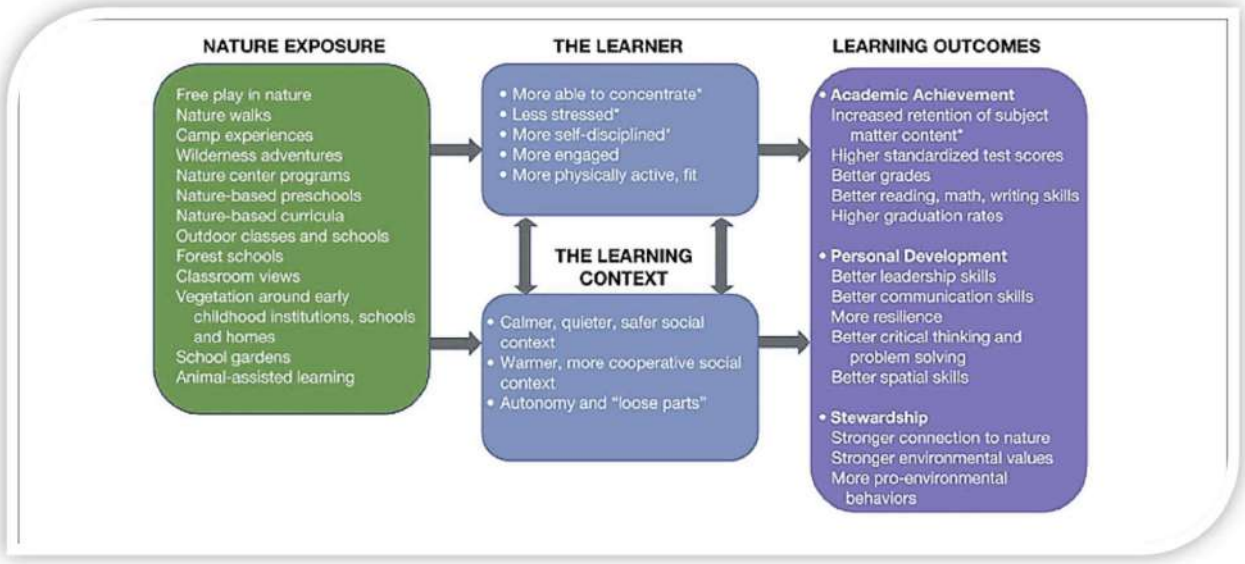



Figure 2. How nature can aid learning outcomes Source: Ming Kuo et al., 2019

The authors of this meta-review study also note that - “Not only can nature-based learning work better for disadvantaged students, but it appears to boost interest in uninterested students, improve grades, and reduce disruptive episodes and dropouts among “at-risk” students. Nature-based learning may sometimes even erase race- and income-related gaps…. If nature is equigenic, giving low-performing students a chance to succeed and even shine, the need to document this capacity is pressing."
Palluyir’s work with coastal communities and children and youth from vulnerable backgrounds has repeatedly shown that nature-based learning can be an equalizing force.

The benefits of nature in education are found to be both academic and socio-emotional. For instance, Nancy Wells’ work (2021) shows how access and engagement with nature can create

mental resilience among children, especially those in poverty and facing adversity. Nature engagement can also reduce behavioural and emotional dysfunctions amongst at-risk students (Flouri, 2014) and improve affective and cognitive development across ages (Kellert S.R., 2002). There is a significant connection between nature-based learning and better mental health (Harvey et al., 2020). Some studies find that nature can reduce symptoms of ADHD in children (Faber Taylor et al., 2001). Another study by Camasso and Jaganathan (2017) investigates the impact of a programme called 'Nurture Thru Nature' whose curriculum was aligned with those of the mainstream subjects of elementary school children. They found significant improvements in the children's grades in science, math, and language in the programme compared to control groups. These findings are also echoed in other studies (Hodson, 2017). Nature-based learning has been shown to improve children's skills in language and interpersonal collaboration (Fjortoft, 2000, Moore & Wong, 1997) Similarly, knowledge retention is also markedly greater among students who had biology lessons linked with the local ecology outdoors (Fägerstam & Blom, 2012). It has also been shown to reduce absenteeism in school (MacNoughton, 2017).

# The Local Context

Studies described in the above sections are almost absent from the Indian educational research and policy field except for anecdotal examples from numerous practitioners. The benefits of nature-based learning, especially for the urban working class and socio-economically backward in the Indian context, have never been studied. Similarly, the importance of nearby wild and accessible wild spaces like parks, marshlands, and grasslands in children's literacy and well-being has not been investigated. If nature-based learning can improve children's academic performance and overall well-being, it could make a significant difference in the lives of children in Tamil Nadu, especially those from socio-economically challenged backgrounds. If meaningfully and place-sensitively implemented at scale in the richly biodiverse state of Tamil Nadu, nature-based learning could significantly improve literacy rates, pass rates, employability, stewardship for the environment, and dropout rates.

Figure 3. Biodiversity of Chennai

Chennai is the capital city of the state of Tamil Nadu, situated along the Coromandel coast. The mean temperature of Chennai is around 28.6°C. During the northeast monsoon, Chennai gets a lot of rain, and the annual mean precipitation is 140 cm. Tropical dry evergreen forests, scrub forests, grasslands, mangroves, coastal areas, and dunes are some of the habitats in the city. This habitat variation shows how diverse the flora and fauna of Chennai are. Mammals such as Jackals and Blackbuck, reptiles such as Rat Snakes and Fan-throated Lizards, and birds such as Yellow-wattled Lapwings, Spotted Owlets, and more common Indian Robins, not to mention a variety of insects, amphibians, and fishes enrich the biodiversity of the region.

Figure 4. Common Jay butterfly, Common Club-tail dragonfly, Cattle Egret, and Painted Frog are integral parts of Chennai's biodiversity.

In 2022, Greater Chennai Corporation released the Chennai climate action plan. This document showed how critically climate-vulnerable the city is. A Council of Energy, Environment, and Water report shows that Chennai is India's second most climate-vulnerable city. This being the case, good nature and climate education become essential during an increasing climate crisis, especially for vulnerable communities towards adaptation, mitigation, and action. Good climate education contextualized in the nearby ecologies has been studied to effectively reduce climate change impacts (EC Cordero, 2020). This has been echoed in several United Nations reports as well. It would be new and vital to investigate the relationship between climate mitigation/adaptation and good, locally relevant nature and climate education pedagogy in the Indian and Tamil Nadu context.

# Curriculum

We formed a curriculum that is based on the following core aspects-

1. Chennai's biodiversity
2. Climate and seasons

3. Action pedagogy
4. Children's developmental stage

Our nature curriculum is based on the action pedagogy we are evolving. This action pedagogy has three pillars: direct action in any form of learning, local relevance in any form of learning, and interconnectedness between various subjects, concepts, and skills. It also weaves with it the importance of local nature/biodiversity for the learner's cognitive, social, and emotional well-being and for developing their stewardship of the local landscape.

# Expected Outcomes

Through this study, we intend to lead to specific improvements in students' knowledge, attitudes, and the learning environment. They are as described below-

1. Significant improvement in epistemic curiosity, driving the student to learn better and involved in intrinsically motivated learning in the classroom and at home as well
2. Significant improvement in critical thinking skills, allowing the students to think for themselves, make interconnections and learn better
3. Improved knowledge of local biodiversity and ecosystems leading to stewardship of the local environment and awareness of ecological issues
4. Significant improvement of children's happiness in learning contexts and capacity to work with others by developing interpersonal skills

# Methodology

From the boundaries of Chennai city, we were appointed schools by GCC that had proximity to parks and green spaces across North, Central, and South Chennai. We did a pilot survey of all the selected parks and decided to concentrate on parks with good vegetation as it is the most accessible form of biodiversity. For example, the Corporation Park in Besant Nagar, adjacent to the CMS Gandhigram School, has about 25 species of trees. Robinson's Park, a few meters away from CUHS and Chennai High School, has about 55 species of trees which is the maximum species diversity of all the parks we surveyed. Independence Day Park has about 30 species of trees. We also used the school campuses to conduct activities. We selected class 8 students from five schools. The class strength in schools ranged from 20 - 45.

The final list of school and park combinations we decided to work in is as follows-

| No. | School Name | Zone | Parks | Distance to Parks | Class Strength |
|---|---|---|---|---|---|
| 1. | Chennai High School, Manikanda Street | North Chennai | Robinsons Park | 230 m | 27<br>9 Girls<br>18 Boys |
| 2. | Chennai Urdu High School, Washermanpet | North Chennai | Robinsons Park | 600 m | 41<br>15 Girls<br>23 Boys |
| 3. | Chennai Boys Higher Secondary School, Nungambakkam | Central Chennai | Independence Day Park | 230 m | 15 Boys |
| 4. | Chennai Girls Higher Secondary School, Nungambakkam | Central Chennai | Independence Day Park | 350 m | 42 Girls |
| 5. | Chennai Middle School Gandhigram | South Chennai | Corporation Park, Beasant Nagar (Near Kalakshetra) | 10 m | 22<br>9 Girls<br>13 Boys |

Table 1. List of schools included in the project

To help us assess pre- and post-project changes and to generate primary data on students we work with, we designed a baseline survey that included personal information, including name, date, and class. To assess the current levels of epistemic curiosity/intrinsic motivation, critical thinking, and nature-connectedness of the children, a questionnaire with 24 statements was formulated. The students were instructed to rate the first 18 statements on a scale from 1 to 5, with 1 indicating the lowest level of agreement and 5 representing the highest level of agreement.

There were another 6 questions included to assess the students' connection with nature and their abilities to observe their local ecology. Students were given the opportunity to provide detailed responses for this particular section of the survey. This helped in assessing the mindset

and attitude of the students towards nature. It allowed us to identify gaps in children's understanding or misconceptions about the environment, which helped tailor the curriculum so that it resonated with their energy levels.

In addition to the baseline assessment, an icebreaker activity -Thiran Thedal (People's Scavenger Hunt)- was provided to establish momentum and facilitate a meaningful connection with the nature facilitators. It was employed to assess the interpersonal dynamics among the students within the class. At the end of the baseline session, we provided the students with the Butterflies of Chennai- a field guide to some of the common butterfly species present in the city. In the course of the year, we conducted further activities based on our curriculum, as well as a mid-line survey to receive feedback from students and a post-project survey to compare with the baseline data. The activities conducted were as follows-

| **Term I** |
| --- |
| **Baseline Survey**<br>Material used: Questionnaire survey sheets<br><br>**Thiran Thedal**<br>Materials used: Field guide on Butterflies of Chennai<br><br>**Tree Walk**<br>Materials created and used: Field guide on Common Trees of Chennai, bark survey poster, journals<br><br>**Curiosity Mapping**<br>Material used: Clues and tracks<br><br>**I Notice, I Wonder, It Reminds Me Of**<br>Material used: A guide on Common Bees of Chennai |

| Term II |
| --- |
| **Ants Around Us**<br>Material used: A guide on Common Ants of Chennai<br><br>**Bird Calls of Chennai**<br>Material used: NCF bird flash cards, ebird website for bird calls, speakers<br><br>**Frog Calls of Chennai**<br>Material used: A guide on Common Frogs of Chennai, speakers<br><br>**Nature Journaling**<br>Material used: A4 Sheets, colour pencils and stationery<br><br>**Midline Feedback Survey**<br>Material used: Questionnaire survey sheets |

| Term III |
| --- |
| **Campus Tree Mapping**<br>Material used: A3 Sheet, guide to Common Trees of Chennai, stationery<br><br>**Vedanthangal Bird Trip**<br>Material used: NVF bird guide, poster on bird beaks, bird feet, binoculars<br><br>**Chennai Fish Colouring Activity**<br>Material used: InSeason fish colouring sheets, colouring book<br><br>**Post-project Survey**<br>Material used: Questionnaire survey sheets |

To get a more detailed understanding of the changes in students, we decided to observe them and notes during sessions on the following aspects and qualities-

1. **Curiosity and Wonder**
    - Asking Meaningful questions
    - Pursuing a question
    - Interested in learning new things
    - Pursuing question learning outside the session
2. **Interpersonal Skills & Independence**
    - Collaborating with others
    - Working with different people
    - Resolving problems/solving conflicts
    - Taking independent initiatives
3. **Critical Thinking**
    - Making connections across topics
    - Problem-solving
4. **Nature Connectedness**
    - Enjoying/observing/spending time with nature
    - Acknowledging oneness/dependence on nature
    - Developing the importance of conservation.

Additionally, we noted observations regarding students' doubts, reactions to education materials, and peaks and lows in enthusiasm or interest. The team members maintained these notes regularly, making sure that observations were documented every time activities were conducted. This was our main qualitative data, which was further analyzed into codes (Table 2).

In addition to these observations, we also had direct feedback from students. We selected these students and held a session with them to get their feedback. With their consent, we also recorded some videos of them describing their experiences.

| Code Number | Code | Brief description |
|---|---|---|
| Code 1 | Interpersonal Skills | Instances of students exhibiting social skills, teamwork, or the lack of it |
| Code 2 | Curiosity and Wonder | When were students curious, and when and how did they show wonder |
| Code 3 | Independence | Independent thinking and engagement in activities |
| Code 4 | Critical thinking | When and how did students show evidence of critical thinking |
| Code 5 | Nature connectedness | Observations that show how and when students feel connected to nature |
| Code 6 | Bullying, teasing, and punishment | Instances of conflict or fights |
| Code 7A and B | A) Ability to Comprehend or Ability to understand and use resource material, and B) Engagement with the resource material | The ability to comprehend the information provided to students differed across different individuals based on the situation as well as the activity involved |
| Code 8 | Reading/Writing Skills | Challenges related to students' capacity to read and write, to comprehend and express |
| Code 9 | Gender | Observations that were related to students being boys or girls |
| Code 10 | Use of tools in sessions | Objects like magnifying glass, speakers etc.- how did they lead to curiosity or not. Did it generate excitement? What were some challenges etc. |
| Code 11 | Teachers' involvement | Instances when teachers have shown an interest in the sessions and engaged with it and with facilitators |
| Code 12 | Copying from others | Students copying answers from each other. When did they do it? Why? |

| | | |
|---|---|---|
| Code 13 | Art skills | Any observation related to art skills in terms of improvement or challenges and usefulness |

Table 2. List of codes from qualitative analysis of observation notes.

### Internal training and brainstorming sessions

Through this programme, we have been evolving new activities to link children's natural surroundings in their campus and nearby parks to their literacy and science learnings. To deliver this effectively to them, we conducted internal training sessions anchored by Yuvan so that the team can experience the activities themselves, gain the relevant knowledge to facilitate them, and discuss ways to make them more engaging for children. We have had multiple training sessions each term such as ant observation, identifying and describing local bird calls, identifying and describing local frog calls, and methods of nature drawing. Facilitators then took the knowledge and skills gained in the training sessions and practiced it during the session. These training sessions will also be modeled for future training sessions for GCC teachers.

## Baseline Survey

The baseline survey shows that most students like spending time in nature, although the level of response varied across schools (Figure 7). The baseline survey also showed that students in Chennai associate nature with positive experiences such as rain, feeling the breeze, or the feeling of peace when in green or open areas (Figure 5). As a part of the project, we wanted to understand where students learn about nature so as to describe the role of education and learning spaces in students' lives. Given the increasing use of technology, quite a few students reported television and phones as mediums to learn about nature, even though school, books, and family were also a part of the list (Figure 6).

When it comes to nature connectedness, the baseline survey showed that students associate time spent in nature with reducing stress or processing emotions and that they feel most connected to nature when they have positive experiences such as holidays and night walks (Figure 8) associating connection with events and experiences such as "peaceful environment" "sunset" "walking through the trees" and "the earthy smell when it rains." Children in schools from Nungambakkam and Manikanda, for the question when do you connect with nature, mentioned seeking nature as a mental health buffer. One student in Nungambakkam BHSS said

when his parents hit him, he leaves the house and sits under a tree. Another boy in Manikanda CHS said when his parents hit him, he goes to the lake, watches the water, and throws stones in it to feel better.

| **What do you think of when you hear the word 'nature'?** | |
|---|---|
| "Makes me happy" | "Terrace" |
| "Rain" | "Village" |
| "Feelings" | "Beach" |
| "Getting wet in the rain" | "Land, animals, sky, rain, trees" |
| "A tree that moves with the wind" | "Wind breeze" |
| "Birds chirping" | "Peace, to breathe in clean air" |

Figure 5. Students' responses to the open-ended question, "What do you think of when you hear the word nature?

| **Where do you get to learn about nature the most?** | |
|---|---|
| "Forest" | "Television and park" |
| "Book" | "School" |
| "My family and my school" | "TV, storybook, phone" |
| "Grandmother" | "School, news, zoo, beach, park" |
| "I saw a tree falling down in Sun News and I felt bad that's when I started liking nature" | "TV channels - Animal Planet, NGC Wild, Natgeo Wild" |

Figure 6. Students' responses about mediums of knowledge about nature

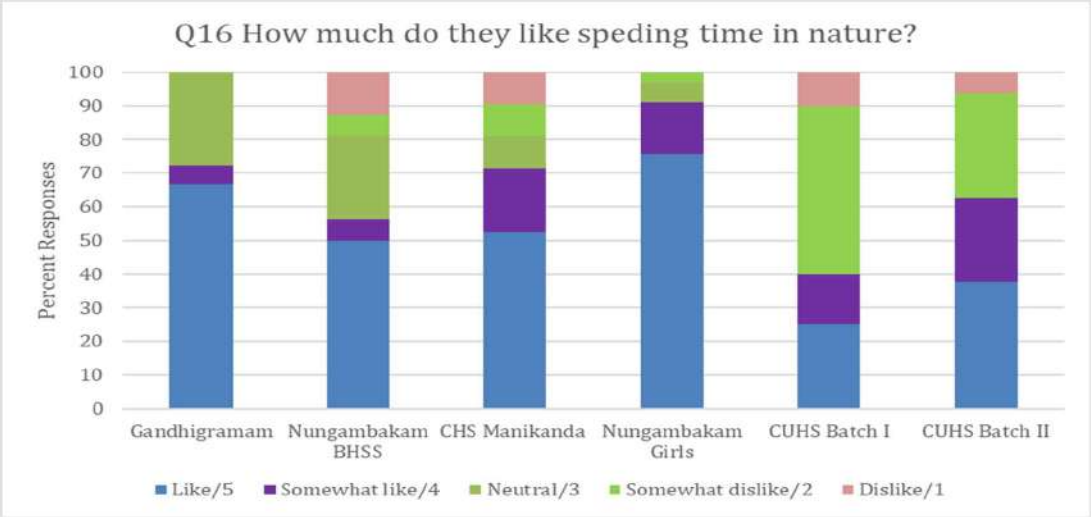



Figure 7. Responses across different schools to the question how much do they like spending time in nature

| **What is the time when you feel most connected to the nature around you?** | |
|---|---|
| "When it rains" | "I like the earthy smell when it rains" |
| "When I am sad" | "I spend my holidays with nature, and I go swimming too" |
| "When I go to my farm/garden" | "Never" |
| "Sunset" | "When in a peaceful environment" |
| "Whenever I play" | "I like to get air in the night" |
| "Park time from 6 to 6.30" | "In my terrace" |
| "When I walk through the trees in Independence Day Park" | "I like to go to parks when I feel sad" |

Figure 8. Students' responses to times when they feel connected to nature.

# Activities

All of the activities we conducted fall broadly into the following segments-

1. **Orientation** was conducted to analyse the students' excitement levels and interest, and had a recap of the previous session to see if they have pursued it at home. Then students were introduced to the session with interesting stories and be oriented on how to go about the session.
2. **Observation and journaling** by the students played a pivotal part in the activity, which required the students to engage directly with local nature, make observations and record their findings in the provided journals.
3. **Reflection** by both the students and the facilitators at the end of each session by discussing the activity and its results.
4. **Distribution of resources** was done either before or after the activity**.** The students were provided complimentary guides to inculcate the habit of observing the environment and local ecology.

That meaningful forms of learning could happen outdoors and through local aspects of the natural world seemed rather new for both children and teachers. Learning, in its conventional sense, was associated with the indoors upon desks and chairs, and fun was associated with the outdoors. This was an important binary beginning to get dissolved during these sessions, and both could happen together. Many children were excited to visit the park or the outdoor space on their campus while simultaneously keen to observe the trees, insects, and other aspects of nature in it. Some had the urge to play at the park and had to be frequently reminded to focus on the activity being done. However, many were engaged with the learning opportunities being offered. In all schools, children requested more sessions or weekly sessions.

The specific activities conducted in this project and their outcomes are described ahead.

## 1. Tree Walk

This activity's primary objective was to acquaint the students with the local ecology and cultivate nature-connectedness. The facilitators briefed upon the "wood-wide-web"- the intricate fungal network that interconnects the roots of trees and plants within an ecosystem. To facilitate a deeper understanding, pictures were presented within the classroom. Each student had a

comprehensive guide to "Common Trees of Chennai" and a dedicated notebook for journaling their observations in the nearby park. Bark Survey Poster was also used in this activity. The kids were given a maximum of half an hour to make their observations. Subsequently, a brief group discussion ensued, wherein the students were encouraged to share their respective observations.

Figure 9. Tree Walk session at Robinson's Park with students from Chennai Urdu High School

During the tree-observation session, many children across schools were moved by the ‘wood-wide-web’ story. They were surprised to discover so many tree species in their locality/local park. During the activity, children’s observation skills could be seen distinctly improving, as is noticeable in their journals. Difficulty and/or reluctance to write and draw was observed in most children - with the children in the North broadly showing more challenges than in the South. These reluctances were observed to decrease as well through the activity. Many children showed intrinsic motivation and interest to learn the spellings and sentence structures in English or Tamil to be able to complete/participate in nature activities. Many children worked in groups and helped each other. Many children’s boldness to share their thoughts, observations, and questions in the significant group discussions at the end of each session increased too, and they began communicating with more openness and courage. Children who already had an interest in learning about the natural world immensely enjoyed these sessions.

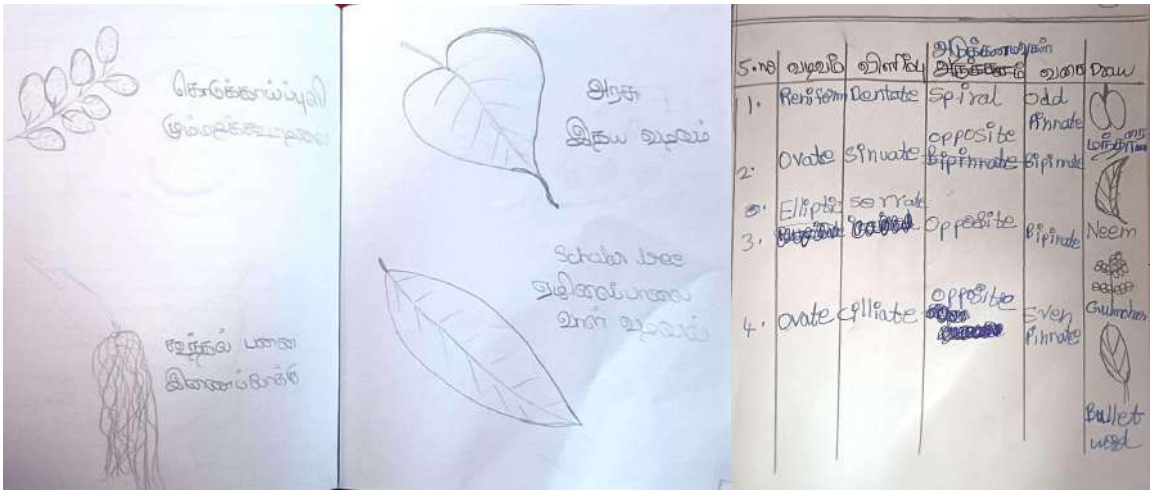



Figure 10. Leaves shape journaling done by students as part of the Tree Walk activity

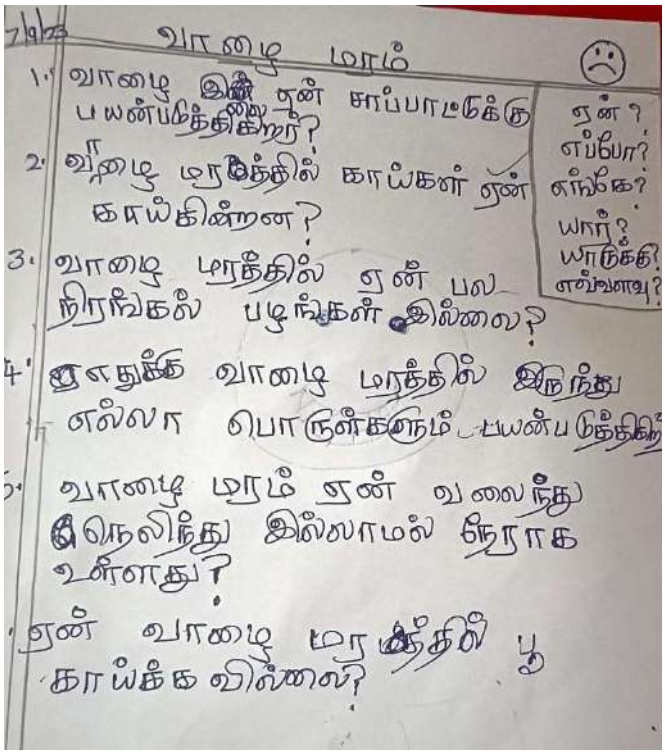
Children's conservation attitudes and connection to nature had starkly increased. Beginning with just awareness of the different living beings, ways to observe slowly translated into forms of care and concern. A student in Nungambakkam Boys was interested in how paint on trees might impact the well-being of trees. Another in CUHS empathized with biting ants and said they are protecting their homes as we might do. At Gandhigram one student made sure others followed the instruction of not plucking leaves on trees.

## 2. Curiosity Mapping

The primary objective of this activity was to foster curiosity in students, prompting them to inquire about their environment and cultivate the practice of posing questions. This principle was elucidated to the students through examples like the process behind significant discoveries like "the impact of music on plant growth" by Jagdish Chandra Bose. The students were introduced to the concepts of open and closed questions. They were taken to the park for the activity after a brief in-class discussion. Their task involved observing a tree of their choice and framing a minimum of fifteen questions. After a dedicated half-hour for this activity, a comprehensive discussion ensued to review the questions to enhance their comprehension of the distinctions and similarities among various trees.

Figure 11. Nungambakkam Boys High School students having a discussion during the Curiosity Mapping activity

Activities like ‘Curiosity Mapping’ and ‘I notice, I wonder, it reminds me of’ directly exercised children’s capacity to question and be curious - a capacity crucial for scientific thinking.



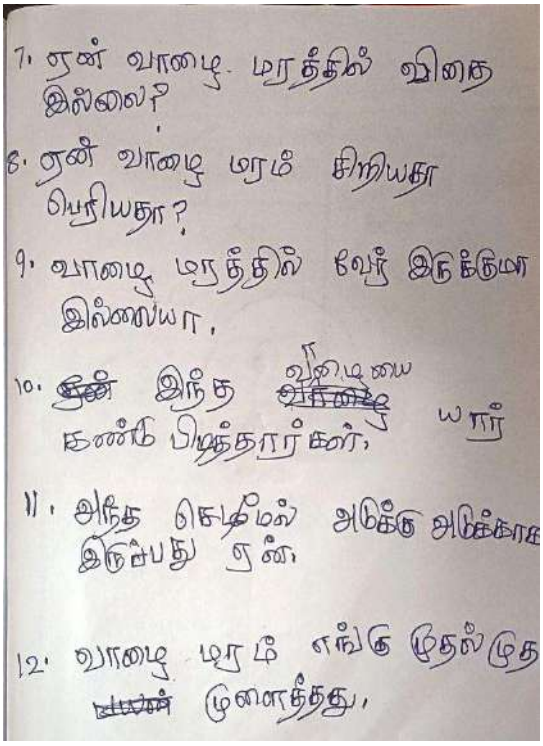



Figure 12. Journal pages of a student's "Curiosity Mapping" activity

## 3. I notice, I wonder, It Reminds Me Of

To instill a sense of fascination and appreciation for nature among the students, a visual representation of the life cycle of the lychee stink bug was presented, accompanied by an explanation delivered by facilitators. Additionally, to introduce and emphasize the concept of "I notice, I wonder, it reminds me of," an image of a praying mantis was displayed in the class. They were encouraged to articulate - their observations, questions that arose from their observations, and previous experiences associated with the image of a praying mantis. Following an illustrative example within the classroom, the students were taken to a nearby park, where they were asked to observe at least four different insects. They were required to document their observations by categorizing them into three sections: "I notice," "I wonder," and "It reminds me of." To enhance the engagement and appeal of the session, the nature facilitators complemented the activity with captivating narratives about various insects, such as bum chums, shield ants, and others. These stories added an enriching dimension to the activity, making it significantly more engaging for the students.  A comprehensive discussion was facilitated after a designated half-hour observation period to encourage the students to share their findings and questions. Clues and Tracks Poster was distributed as resource material.


Figure 13. Orientation for the “I notice, I wonder, it reminds me of” activity at Chennai High School, Old Washermanpet

Figure 14. Students keenly observing insects for the “I notice, I wonder, it reminds me of” activity at CMS Gandhigram

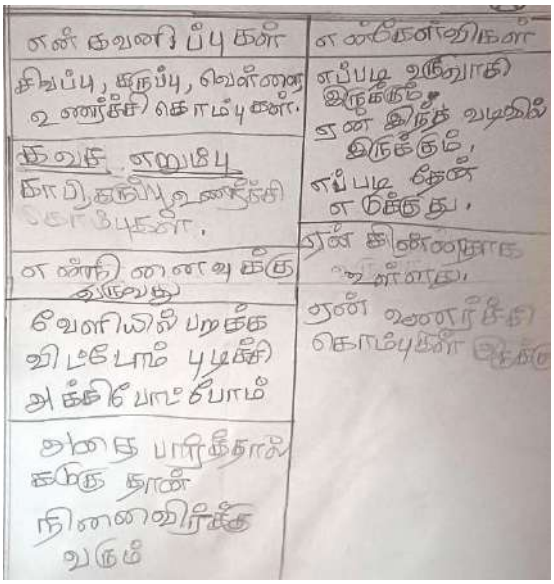


Figure 15. A student’s journal entry of “I notice, I wonder, it reminds me of” activity

Students could undertake critical thinking and nature observation and connect it to scientific concepts. In Nungambakkam Boys School, children could connect the growth and slant of trees to their phototropic movement. Children of all schools could name the physiological parts of trees and insects and use them to identify the species. Debates on what is an insect and what is

a spider or what is a tree and a shrub between the children and the facilitators gave space for rich discussions. Another girl in Gandhigram was interested in linking her observations of trees to their cultural, medicinal, and religious aspects.

## 4. Ant Walk

Plants and insects are one of the most observable parts of nature. Ants are most common and diverse species to observe even in urban areas. For children, observing ants through a magnifying glass can be a very engaging and easily doable activity. The facilitators started the session with stories about the ecological importance of ants, as biological pest control, how they help in soil aeration by transferring air to soil and roots of plants, and bioturbation (transfer of nutrients from one place to another). We also shared common behaviours of common ant species and children learned to draw the morphological structure of ants. The primary objective of this activity was to acquaint the students with simple Nature Journaling techniques and increase their observation skills. The students were given a task to observe around 10 species of ants on the school campus. One example of drawing an ant by using a simple 3-circle technique with the description of the size, colour, behaviour of ants was done in class. We had visual aids related to ant tournaments (fight between two ant soldiers of the same species where the winner takes over the habitat), ants and aphid relationship, and live rafting (a behaviour exhibited by ants in floods when ants want to move from one place to another, all the ants clump together and float in the water protecting the queen, larvae, and eggs in the centre and the workers use their legs as paddles and moves to another location) to anchor and invoke students' wonder and attention.

Figure 16. Students observing and journaling ants during Ant Walk session at CMS Gandhigram


Figure 17. Students journaling ants using tools introduced to them in the Ant Walk activity

Figure 18. Students observing and journaling ants during the Ant Walk activity at Nungambakkam Girls Higher Secondary School


Figure 19. Commons Ants of Chennai, a poster created for the Ant Walk activity

## 5. Bird Calls of Chennai

Students were oriented with the importance of bird calls by giving the examples of many indigenous communities living in and around forests who rely on bird alarm calls to avoid danger such as the presence of a large predator and a lot of incidents where birds tend to find disasters like tsunamis or gas leakage before us. The primary objective of this activity was to increase students' listening skills, identify local bird calls, and improve descriptive writing. We started with an example of a bird call and let the students describe the bird calls and fill in the simple sound observation table having adjectives that described the nature of the call, “Words I hear” or “sounds like”, and the name of the bird. Students were introduced to calls of about 8-10 local bird species such as the Black Kite, White-throated Kingfisher, and Flameback by using their pre-recorded calls. We also had a bird call quiz and winded up by giving them suggestions to listen to local bird calls at their home and also to use the bird flash cards.

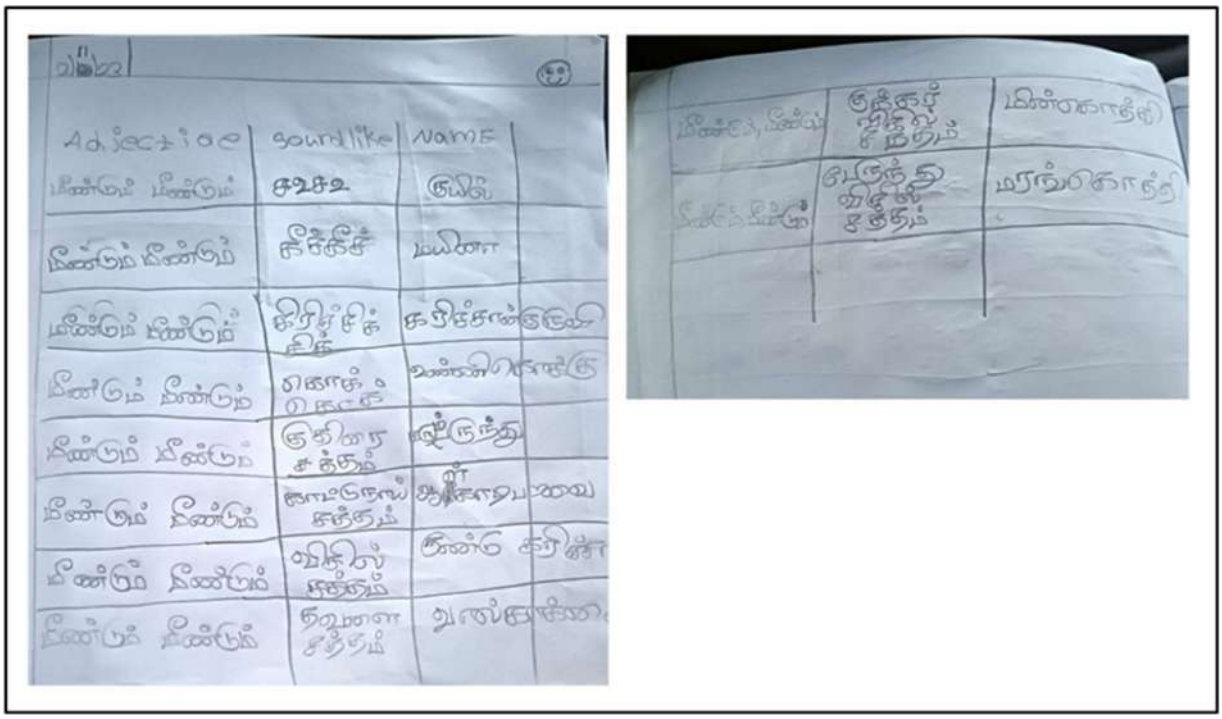



Figure 20. A page from a student’s journal describing different bird sounds that were heard by the student

Figure 21. Students trying to mimic and identify bird calls during the Bird Calls activity at Chennai Boys Higher Secondary School, Nungambakkam

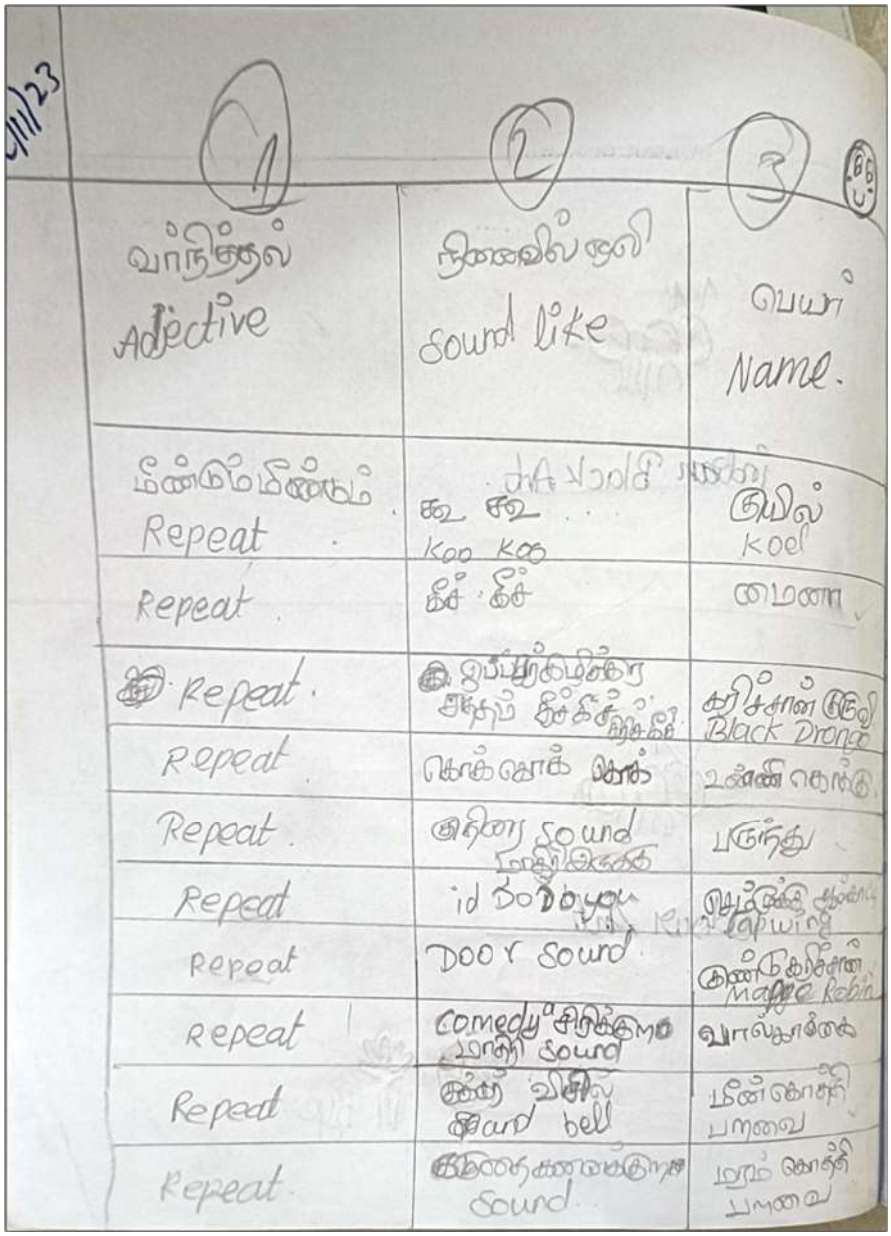



Figure 22. Student's observation table of bird calls showing children describing different bird calls by relating to something they have previously heard for example Black-rumped Flameback sounds like a bus conductor's whistling sound.

## 6. Frog Calls of Chennai

This activity is similar to the bird calls activity. The students were introduced to Chennai's common frog calls for this session. We chose a repetition of the activity but a different species to acquaint the students with the sense of hearing and since it was the monsoon season, students could listen to these calls easily too. About 8-10 local species of frogs such as Jerdon's Bullfrog, Asian Common Toad, and Indian Cricket Frog were introduced to the students and their pre-recorded calls were played. Students were able to identify the frog calls by filling in the observation table having adjectives, "Words I hear" or "sounds like", and the name of the frog. Frog stories using visual aids such as a poster of the life cycle of a frog and images of tree frog's egg sacs were also shared to grasp students' attention.

Figure 23. Educator explaining the different frog calls during the Frog Calls activity at Chennai Urdu High School

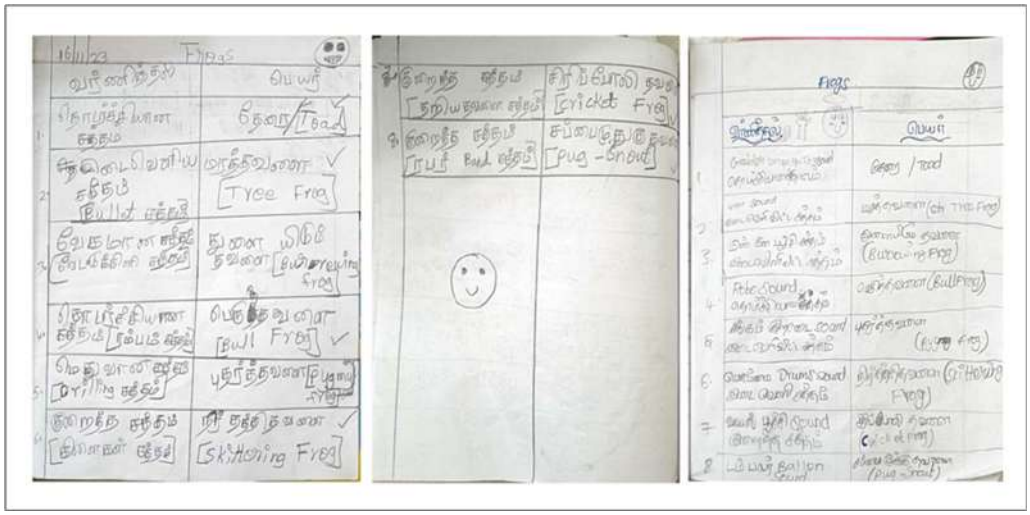


Figure 24. Pages from the student journals showing the frog observation tables

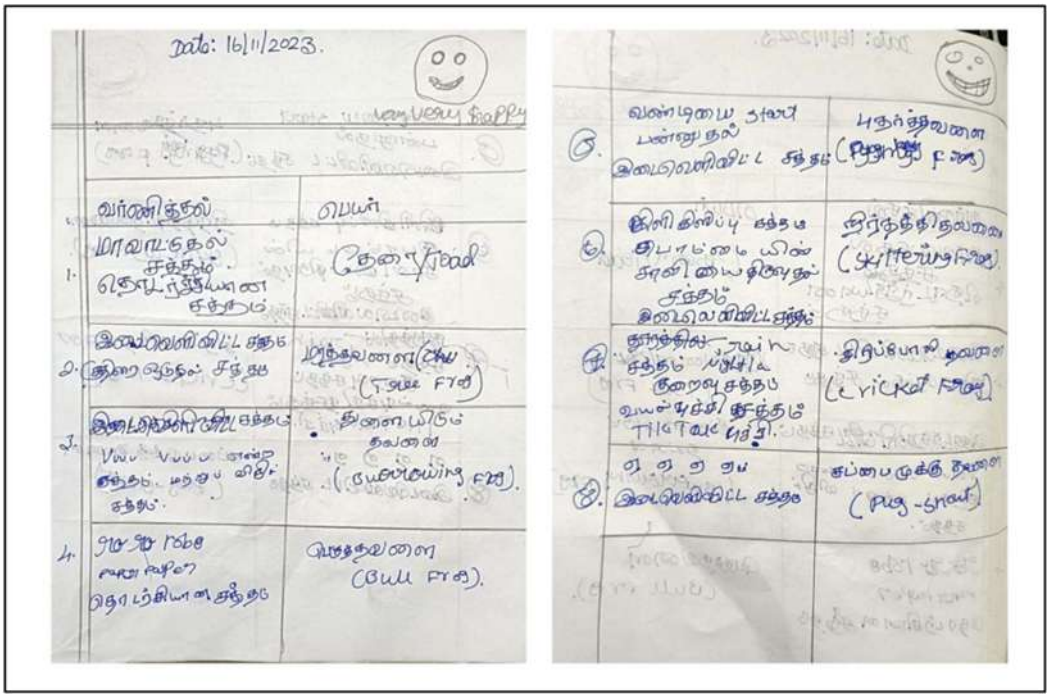


Figure 25. Student's Frog Calls observation table showing children describing different frog calls by using different parameters of sound like loudness, pitch, musicality etc.

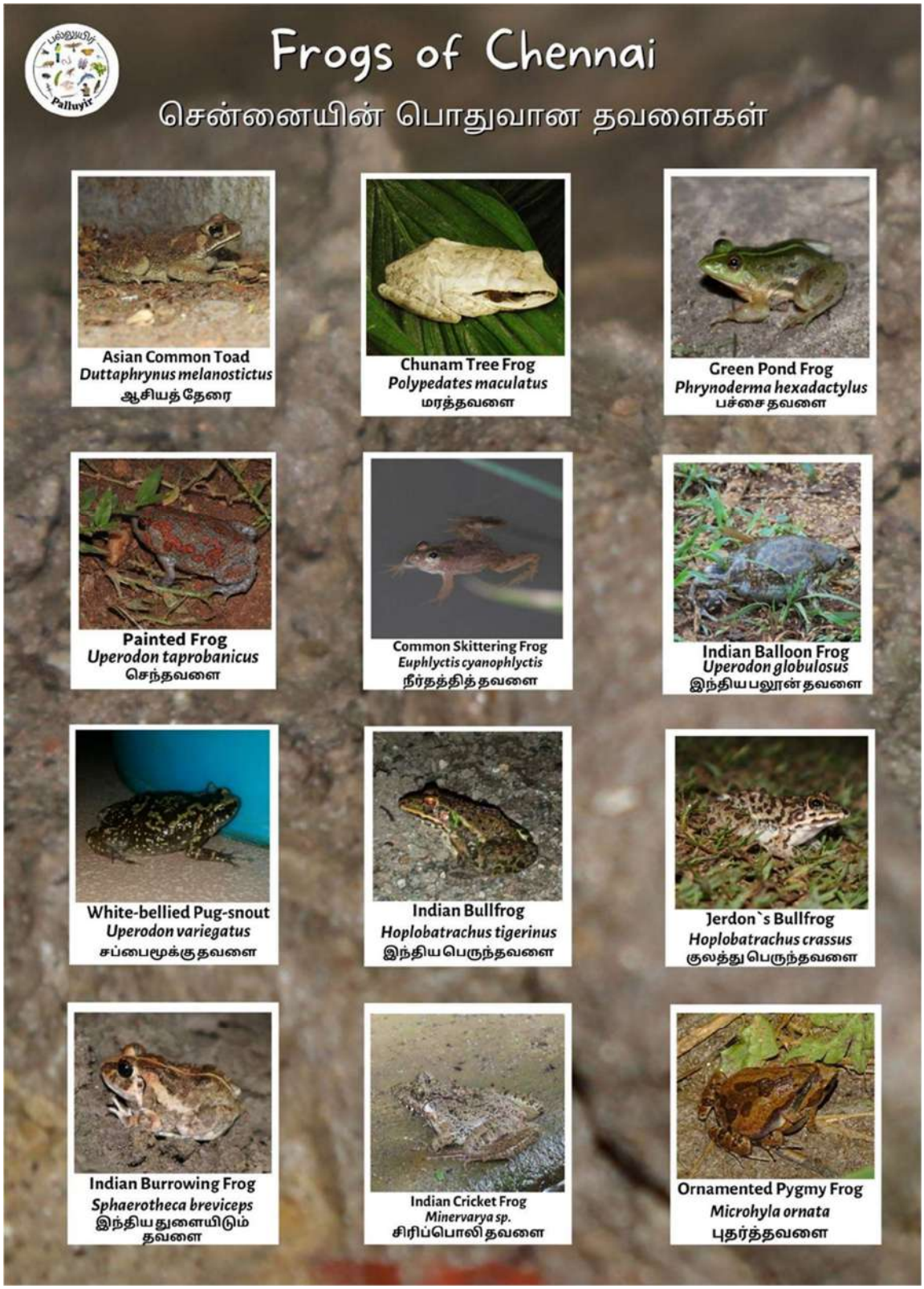



Figure 26. Frogs of Chennai poster created for the Frog Calls Activity

## 7. Nature Journaling- Drawing Butterflies

Students were previously introduced to simple nature journaling techniques. This session has a level of advancement which helps to increase students' observational skills and journaling techniques (sketching and colouring). Students were taught to sketch a common butterfly seen around them (Peacock Pansy) with four basic steps viz.  1. guiding lines 2. guiding shapes 3. broad details, and 4. fine details. Students were also introduced to a few simple colouring techniques. While the students were sketching, we shared a few facts and stories about butterflies such as their flight pattern, behaviour, and colouration to engage students and draw more attention to the activity.

Figure 27. Students sketching Peacock Pansy during the Nature Journaling activity at CMS Gandhigram

Figure 28. A finished sketch of Peacock Pansy butterfly from a student’s Nature Journaling activity

## 8. Visits to Vedanthangal Bird Sanctuary

Vedanthangal was chosen as a birding site for this project due to its high species diversity and the appropriateness of nesting times. It is an excellent place to begin birding as it allows for the observation of birds up close, making it possible to appreciate their behaviors and characteristics in detail. Vedanthangal Bird Sanctuary is spread across 74 acres in the Chengalpattu district and is a protected site under the Ramsar Convention. Vedanthangal is regarded as an important “Bird and Biodiversity area.” This sanctuary was established in the year 1858, and the name "Vedanthangal," originates from two Tamil words: "Vedam," meaning "hamlet," and "Thangal," signifying a "resting place" or "shelter." The wetland also plays a vital role in nutrient cycling and groundwater recharge, which supports irrigation and agricultural activities in the immediate vicinity. The bird excreta from the sanctuary acts as a natural fertilizer and offers numerous benefits to farmers, including improved soil fertility, enhanced crop yields, and sustainable agricultural practices. This sanctuary provides educational, research, and skill developmental

opportunities.  The sanctuary has proven to be one of the best spots for birding and photography.

Vedanthangal being one of the extensive nesting grounds, was an ideal spot to study the morphological features of different species of birds. The posters used were found helpful in this regard. The students were given a bingo sheet on bird behavior, which was used to observe various behaviors of the nesting birds of Vedanthangal. We also used a poster depicting different birds' beaks and feet. Students were able to differentiate between bird species based on their beaks and feet and learn about their adaptations.

Figure 29. A student using bird field guide during Vedanthangal trip

Figure 30. Roosts of Black-headed Ibises and Painted Storks in Vendanthangal

Students were split into groups of two, each led by two facilitators who guided them to observe and make notes of the characteristics. A binocular was given to each pair of students, and they were asked to spot the birds, observe their traits, and make notes of the same in the observation table provided to them.  They were also asked to analyze the behaviors they witnessed based on the bingo sheet provided to them. The facilitators narrated small stories to make the session more exciting, and the students were encouraged to ask questions. After the activity concluded, students were asked to select a bird of their choice and then tasked with reading out its characteristics. A poster displaying various beak and foot types was provided to aid in comparing and analyzing the birds they had observed. This exercise encouraged participants to actively observe and engage with the features and behaviors of different bird species.

Figure 31. Teachers and students watching birds and identifying the species using the provided material

The new resource material created included a chart of beaks and feet of birds, and the nesting birds' bingo sheet was reused to show bird behaviour

Figure 32. Facilitators interacting with students at the sanctuary


Figure 33. A Bilingual Image showing 15 types of bird beaks


Figure 34. A Bilingual Image showing 6 types of bird feet


Figure 35. Vedanthangal Bird Bingo showing different habits, habitats, and other observations found in and around Vedanthangal.

## 9. Tree-mapping Activity

The tree-mapping activity consisted of an outdoor and an indoor session. We first showed the students a few old and new maps of their school and asked them to spot the differences. After this, a temperature comparison map of the street was shown to help them appreciate the importance of trees. Then the mapping activity was explained to them in detail.

The students were split into small groups, and a task was assigned to each of them. The activity involved 1. drawing an outline of their school campus with all the buildings on the entire sheet, 2. counting and writing names of all the trees on the campus and making note of the exact locations, 3. marking it on the sheet with the legends (various colours, shapes or any creative symbols could be used for this), and 4. adding details such as cardinal directions, accuracy, and land use category. This activity is supposed to help them understand their surroundings in a better way. The comparison of maps helps in knowing the positive and negative topographic changes over time.

Figure 36. Students and facilitators working on Tree-mapping activity


Figure 37. A tree map created by students

## 10. Fish-colouring Activity

This session was conducted indoors. Students were given a colouring book developed by InSeason Fish (marine conservation organisation) based on the marine life of Chennai coast. We shared stories about Chennai's marine life with a few species, such as Olive Ridley Sea Turtle, Jellyfish and Trevallies, Hermit Crabs, and Mantis Shrimp. We started with the facts and stories of an olive ridley turtle, like how it wanders around the Indian Ocean and reaches the same coast for egg-laying every year, the number of eggs it lays approximately, and the difference between a turtle and a tortoise. Following that, we told them about the facts of Figure

38. Students during the fish colouring activity

jellyfish, its poisonous tentacles, and the relationship between jellyfish and Trevallies. They were also told about mantis shrimp and how they hunt their prey using their sharp forelimbs and their colorful appearance in the sea. After listening to all the stories, students started to color their

favorite pages in the InSeason Fish colouring book. At the end of the session, children were invited to observe these species when they visited the beach or the fish market.

# What do students' activity journals tell us?

As a part of the programme, we used journals that are used by each student we interact with. These journals were used by the students to ongoingly record observations and drawings. These journals not only function as a valuable tool to gauge the development of each student and to evaluate their responses to activities but also hold evidence of children's intrinsic motivation to learn language. For example, children learned and recorded new ways of describing sounds of birds and frogs. You can see the efforts taken by them to describe the sound- does it sound like a car, or like a whistle? which in a way also reflects their listening skills or the lack of it. For example, one child would describe the sound differently, whereas another would miss it. At the same time, the journals become a space to practice fundamental writing skills. At times when students were not able to write something, they would seek help to learn spellings and sentence structures from peers as well as us facilitators.

The students' documentation skills improved too. It became easier for them to document and organise the information. Initially, the way students noted down their observations was by writing anything anywhere. With more activities, they understood better how to record their observation. Their describing skills got better. They started going beyond very obvious characteristics such as colour to details about shapes and size. For example, from saying that leaves are green while describing them, they started observing and writing about the shape and size and finer details. It was similar with bird observation. Children also actively asked about how to write descriptions in journals. For example, a student asked about how to write about a tree bark that is patchy. This shows that they are undergoing active learning.

At various places in the journals, it can be seen that the students have tried cross-connecting scientific concepts. There is also cross-connection between languages that they have made, for example, writing ant parts in English and Tamil. We describe some examples below-

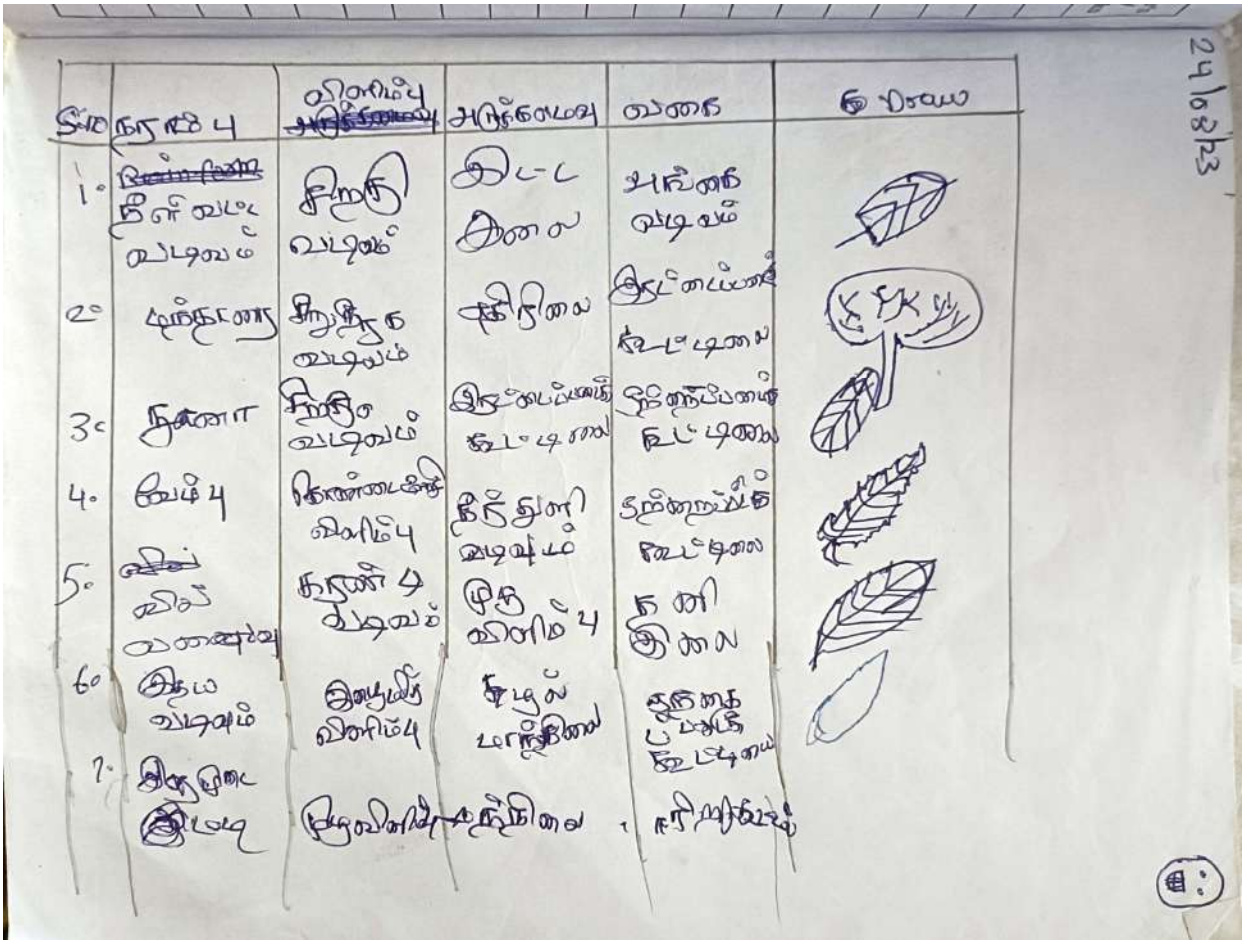


Figure 39. A journal page showing vocabulary used by students during documenting their observations

There is clear evidence of various forms of **descriptive vocabulary learnt and applied correctly** in the journals. By including specific aspects of the species being observed, the students exhibit sharpening observation skills in a scientific way. Clear organizing and representation of information is also seen in the journals in the way students have documented their observations. For example, in Figure 39, the student is able to correctly distinguish between different leaf types, margins, and veinations on the trees they see in the park.

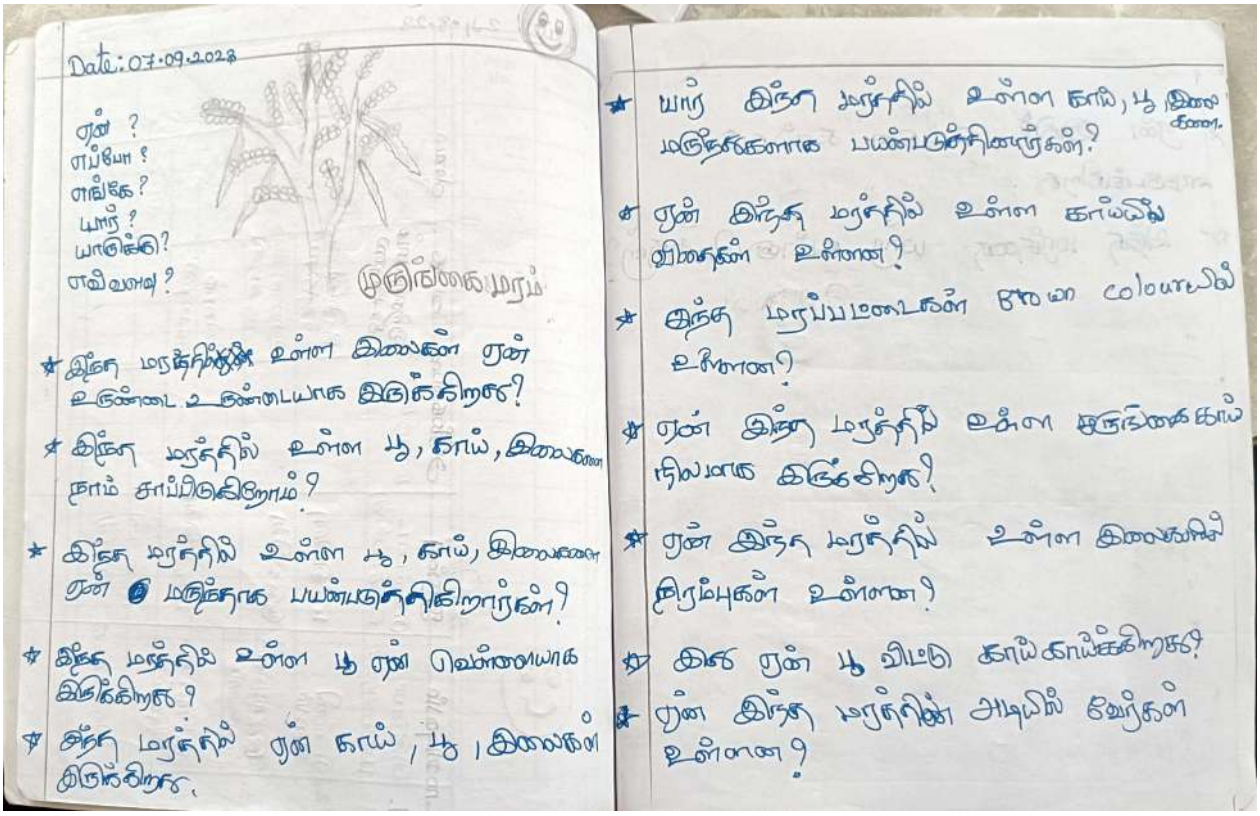



Figure 40. A journal page with a list of questions the student came up with about a tree

In the diversity of questions they are asking, there is **active growth of curiosity**. They are interconnecting observations in the park to science concepts to their own cultural realities. For example, the student has asked 12 different questions about the drumstick tree, one of them is what about the tree gives it medicinal properties? Some are about connecting its form/structure to its function- such as why is the pod long?

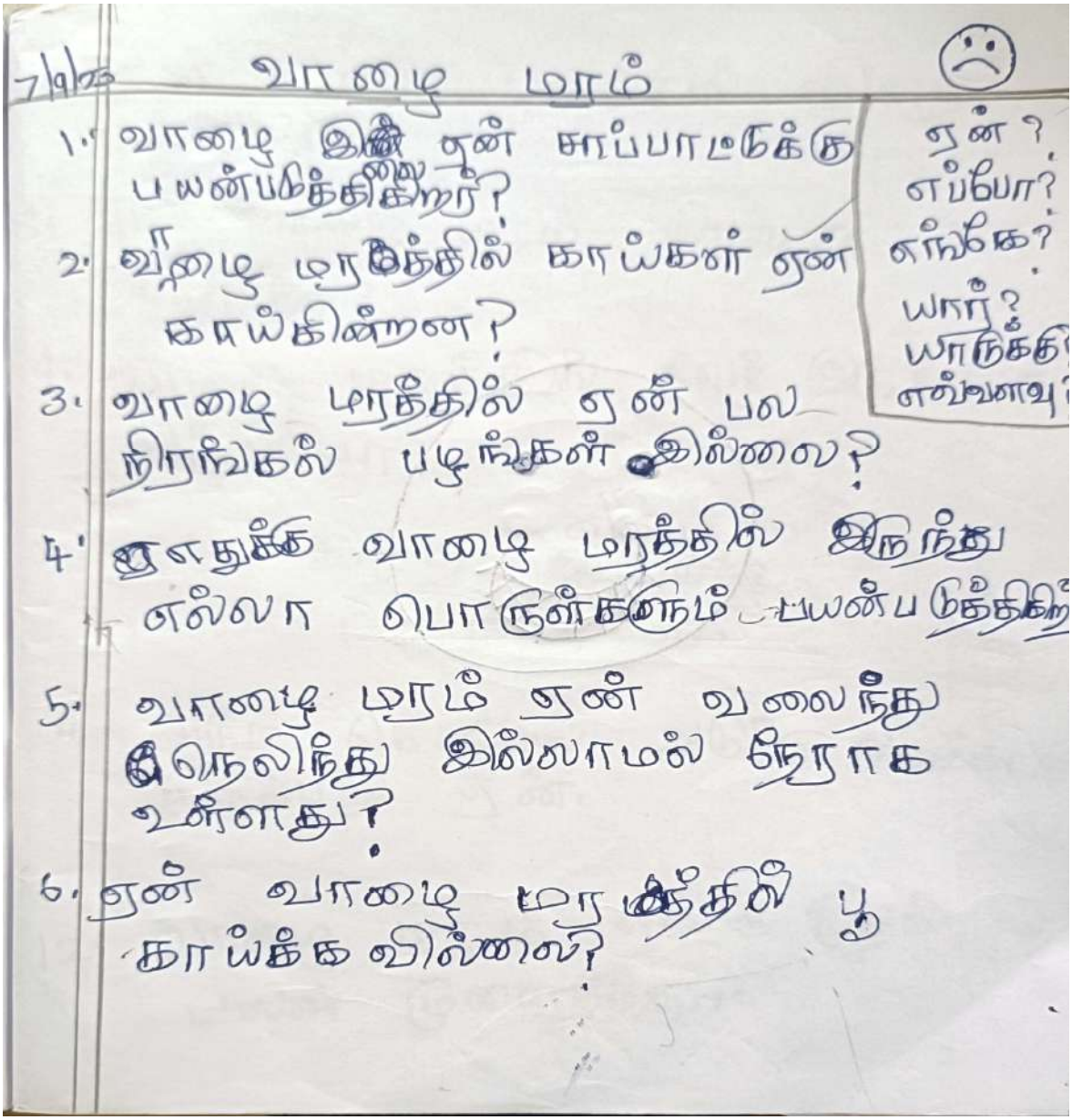



Figure 41. A journal page showing notes made by a student about banana plant

Here, the student is looking at a banana plant and asking questions about the role this plant plays in their daily lives. One **scientific question is followed by a cultural question**, allowing space for the student to think about both these aspects together.

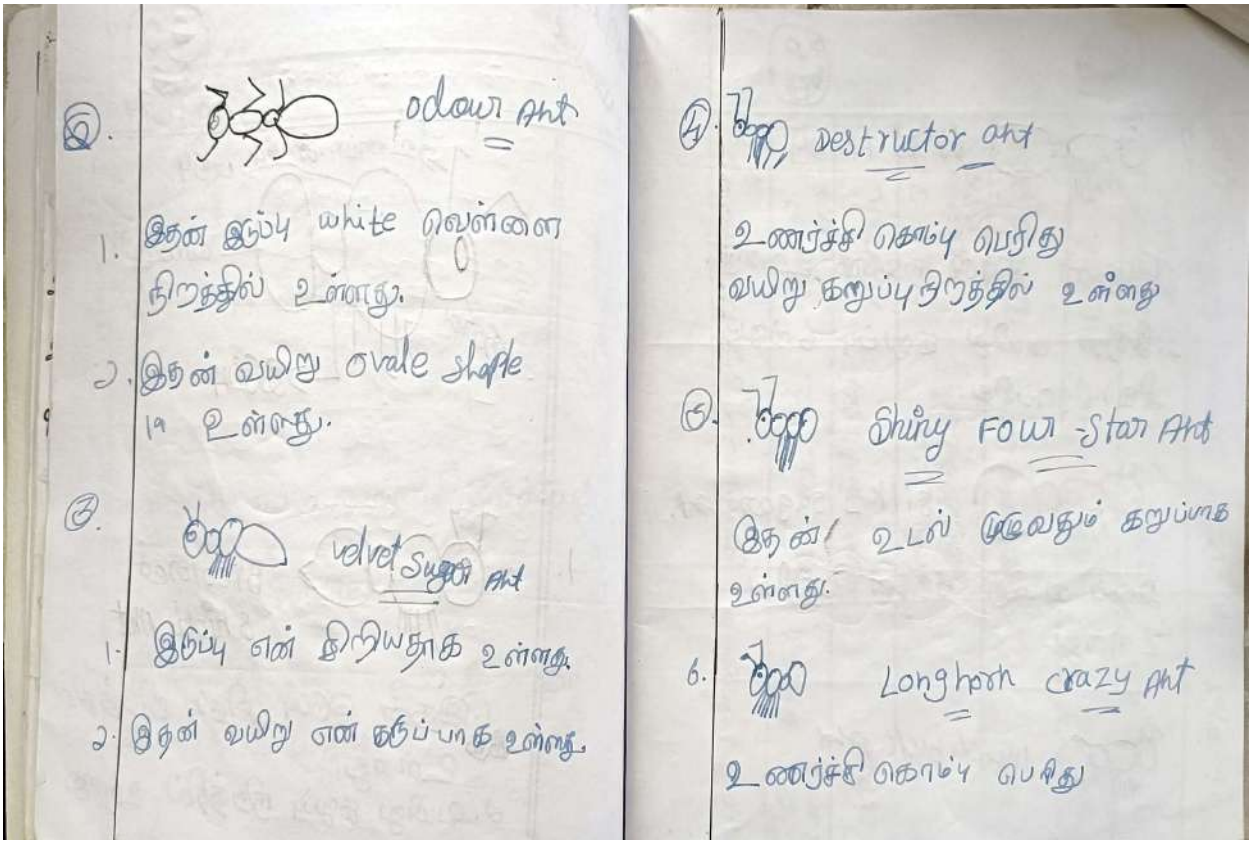



Figure 42. A journal page with descriptions of various ant species

On this particular page, the student makes specific observations of different ant species' anatomical features and compares them between species. These differences are subtle and require close observation through a magnifying glass. This allows students to **connect these characteristics with ecology** later.

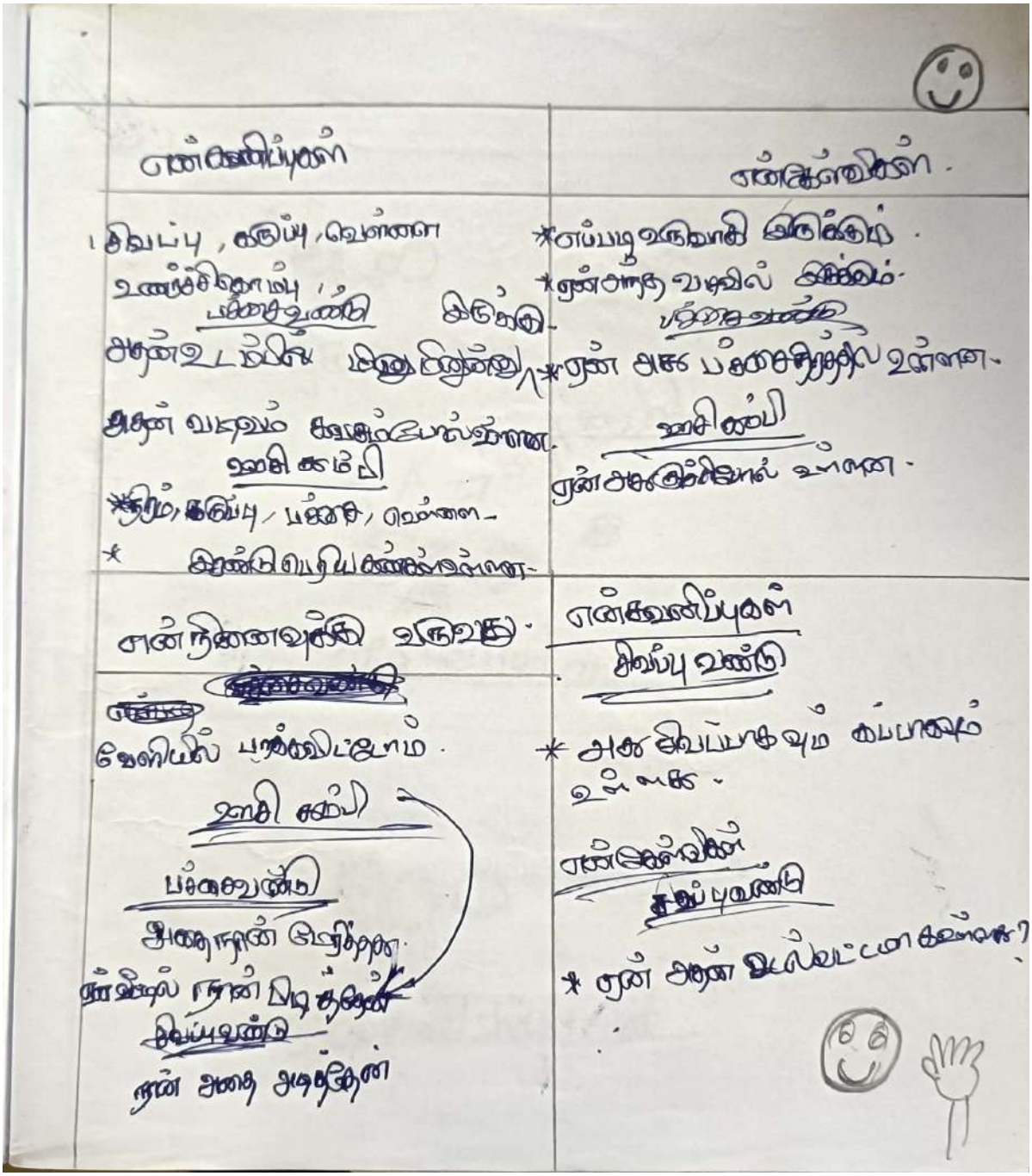


Figure 43. A journal page with notes with organised into four sections

The student says she has caught and killed insects before, but she is now observing them and sharing her **curiosity** on this journal page showing some form of moral reorientation. Her notes also show that there is **organisation of thought**.

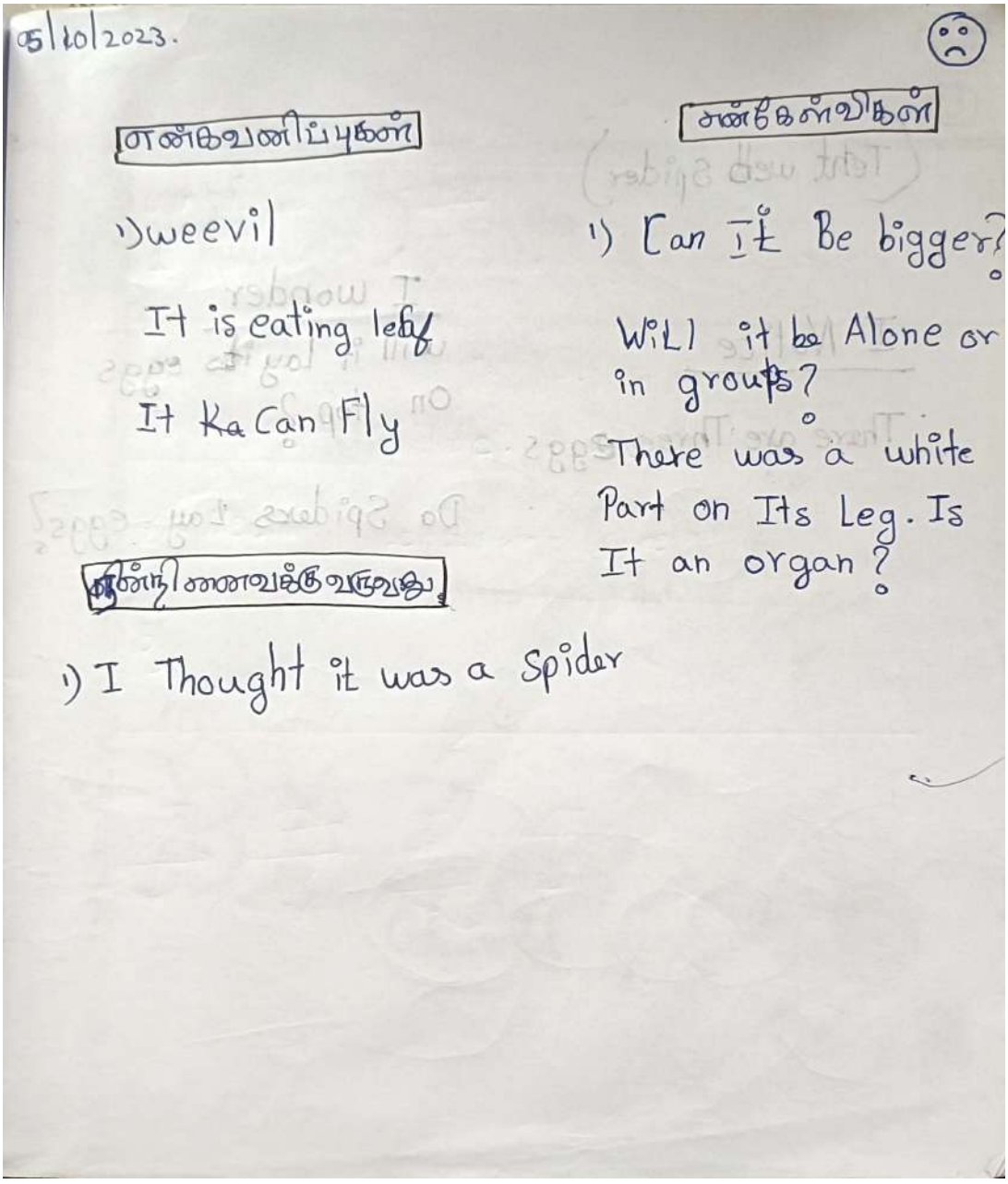



Figure 44. Journal page showing efforts taken by a student to make notes in English while the headings are written in Tamil

There is **active learning of language** when students ask for translations and form sentences to note down their own observations in journals as seen in this page. They get an opportunity to practice their language skills.

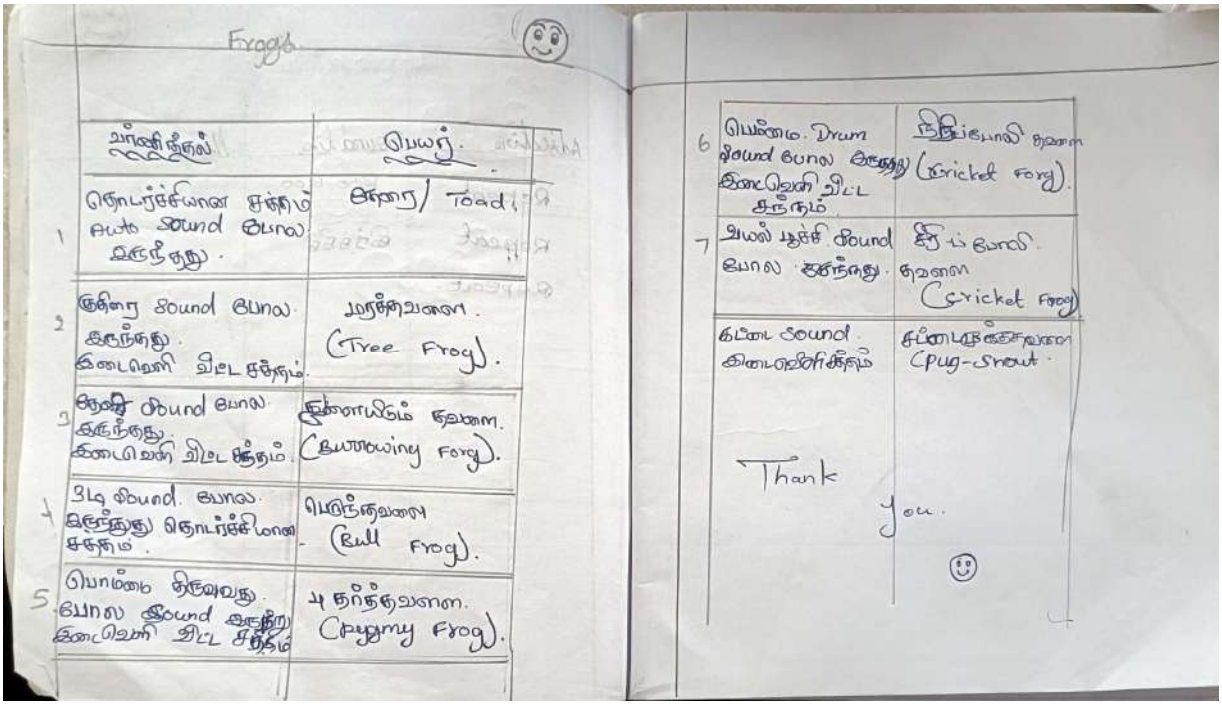
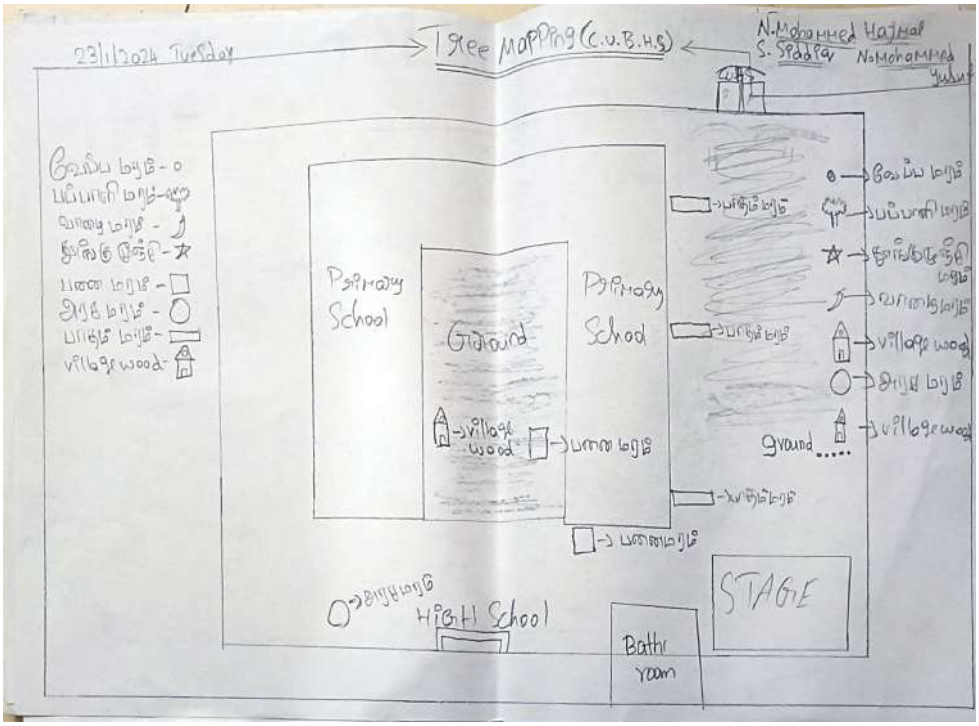



Figure 45. Use of language, both Tamil and English, in describing frog species

One of the most important forms of language learning is its **descriptive use**. Here, the student is learning to describe frog calls by using adjectives and comparisons they are familiar with. For example, “it sounds like an auto” or “sounds like a horse neighing” or “sounds like a wind-up toy”. They are developing descriptive skills while noting down their observations.



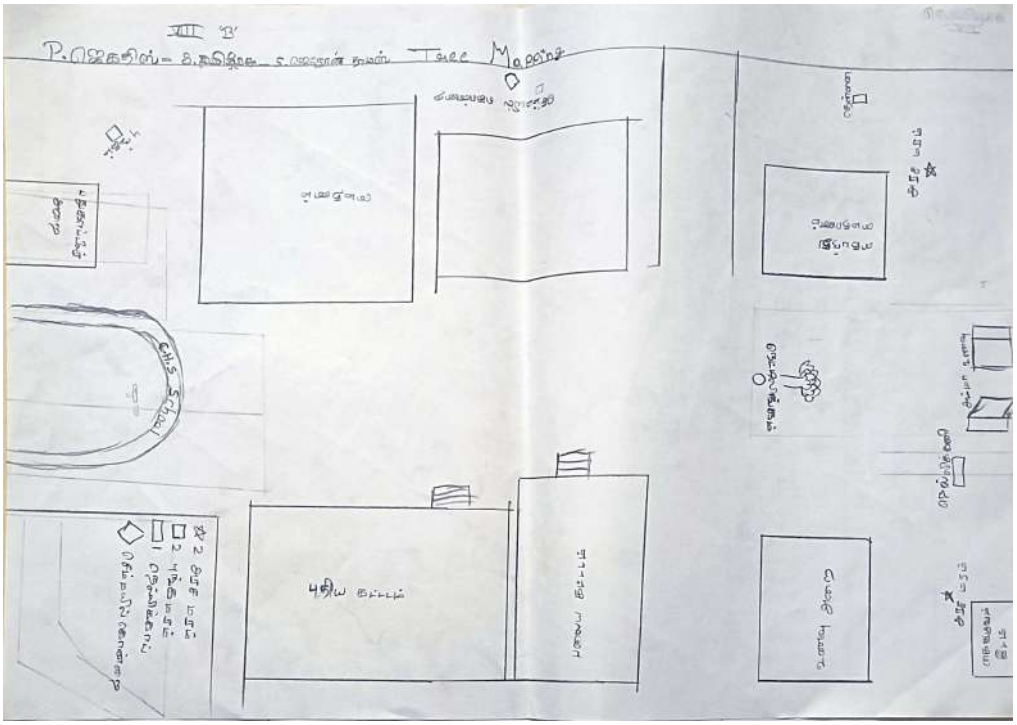



Figure 46. School campus maps made by students

The tree mapping activity allowed students to connect the presence of trees to how it influences human lives in the school campus and in parks. This was one of the activities where students shared the importance of the conservation of trees. They discovered these connections through conversations with us and among themselves. As the journal entry shows, through this activity, they are looking into land use patterns and **learning to represent a landscape**, which are important takeaways from the activity.

# Midline Feedback Survey

As we entered almost the middle of the span of the year's programme in the second term, we decided to conduct a midline feedback survey to analyse the students' level of engagement, and what they liked or did not like about particular activities carried out so far in the first and second term. This survey not only helped us identify some popular activities among students but also to understand what they would like to do in the future and the level of their involvement. The survey was a short set of six questions, some of which were open-ended and some were multiple-choice. The structure of the questionnaire was explained to them and the students filled in their responses in the presence of facilitators whom they could approach if they had any doubts.

Figure 47. Facilitator explaining how to fill in the feedback survey at Chennai High School, Old Washermanpet

The survey started with a fun and simple question- what was their favourite animal, plant, or insect? The responses show that many students cited ants and frogs as well as trees about which they had learned during the activities conducted under the programme such as the Velvet Sugar Ant and Ashoka Tree. The word cloud below showcases the vast variety of species they mentioned. Many students chose butterflies as their favourite, the other commonly chosen group being trees and plants. The students also seemed to prefer animals and plants that were familiar to them and often domesticated such as dogs and cats. Some students were very specific about certain things that they like such as “a butterfly that has different colours in light and darkness” or a “tree with a worn-out bark”.

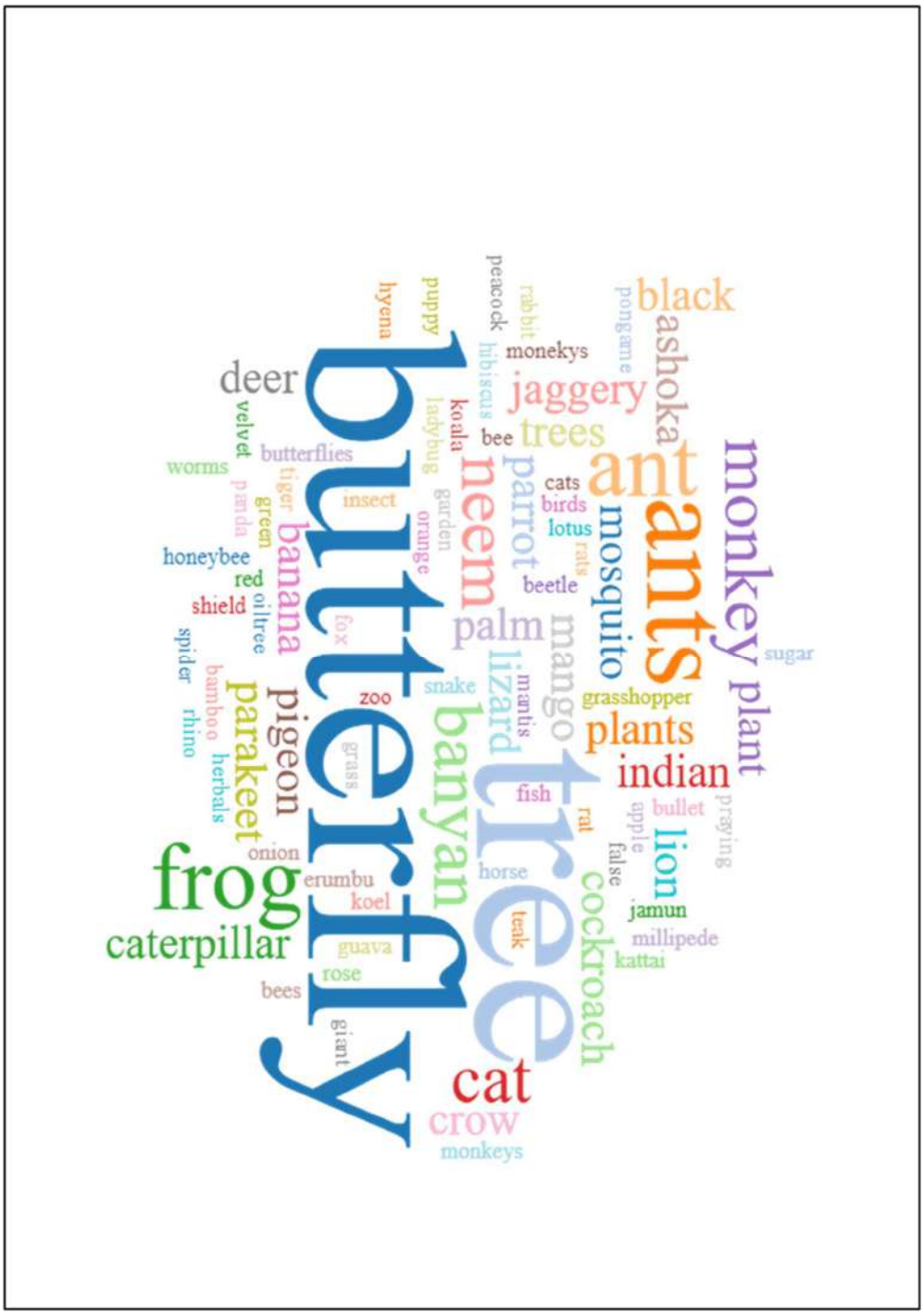



Figure 48. Word cloud of students' responses about their favourite animal, plant, or insect

The responses about what they liked about all the sessions conducted so far with them (first term and second term) are depicted in the graphs below. It is evident from the data, that students liked activities that were focused on observation or experiencing things, and simply

being in the space of the park was very important too. In both the Bird Calls and Frog Calls activities, getting to listen to different sounds was most liked by the students.

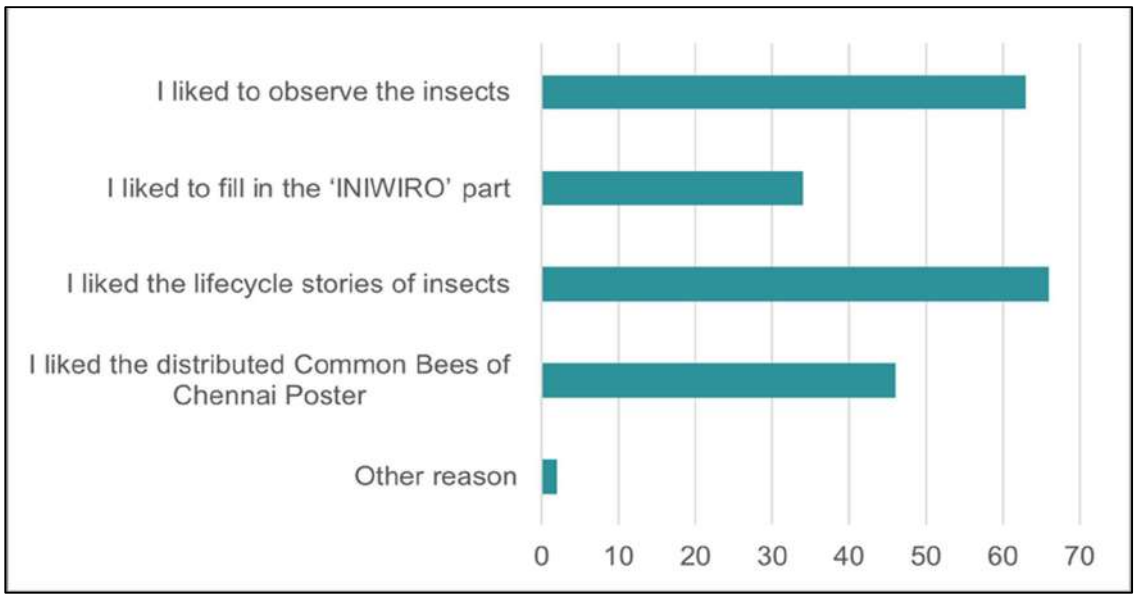



Figure 49. What did students like about the I Notice, I Wonder, It Reminds me Of

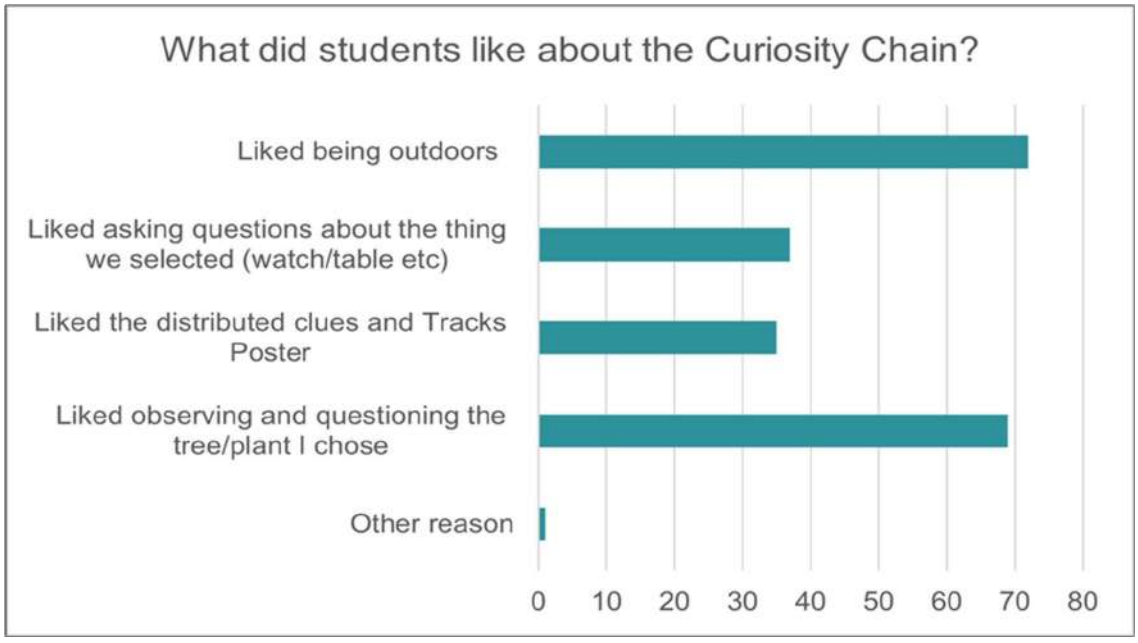



Figure 50. What did students like about the Curiosity Chain activity?

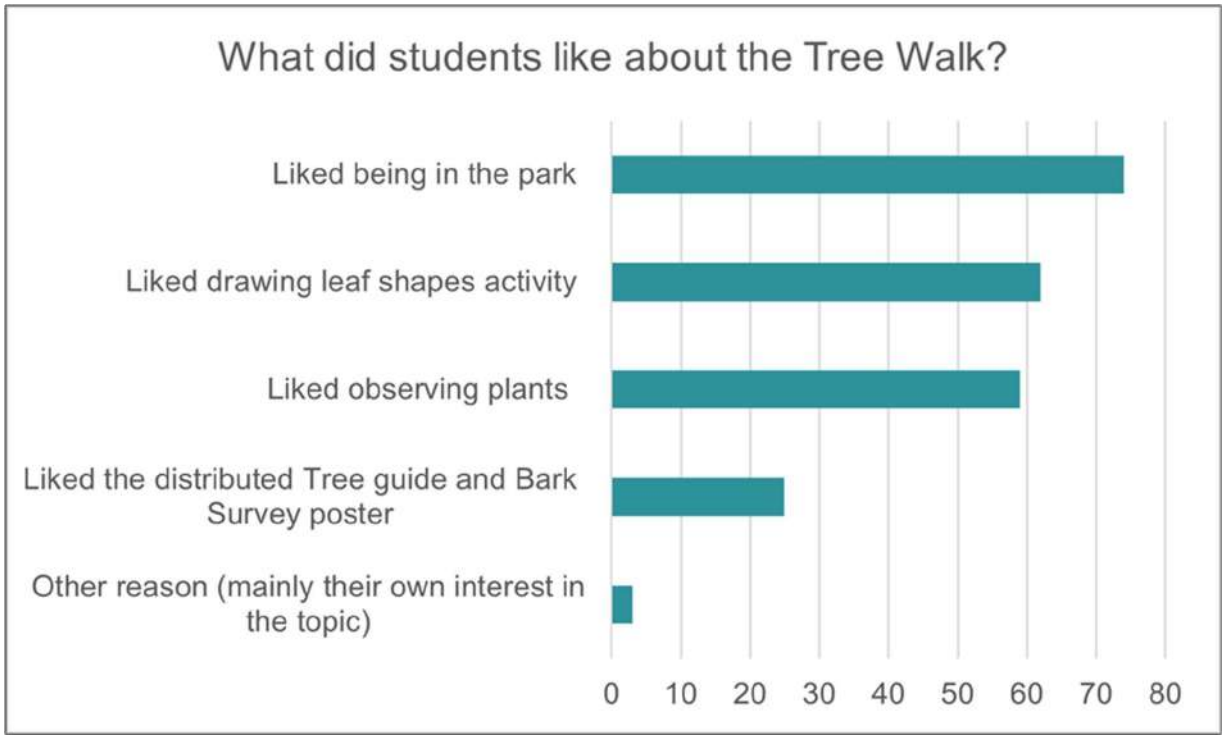



Figure 51. What did students like about the Tree Walk activity?

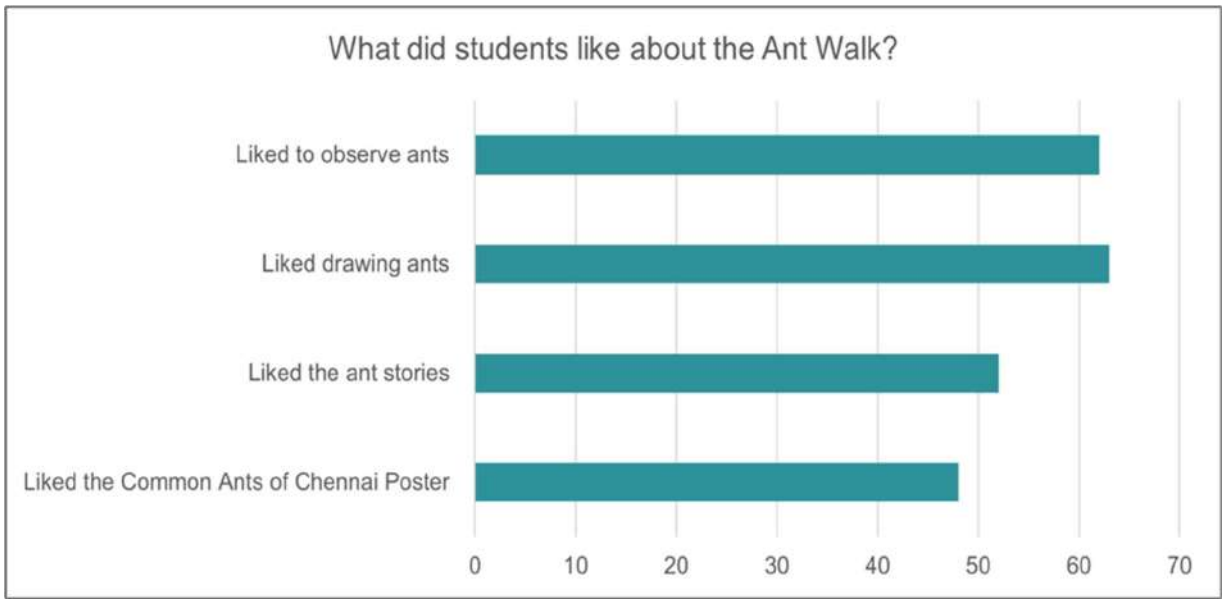



Figure 52. What did students like about the Ant Walk activity?

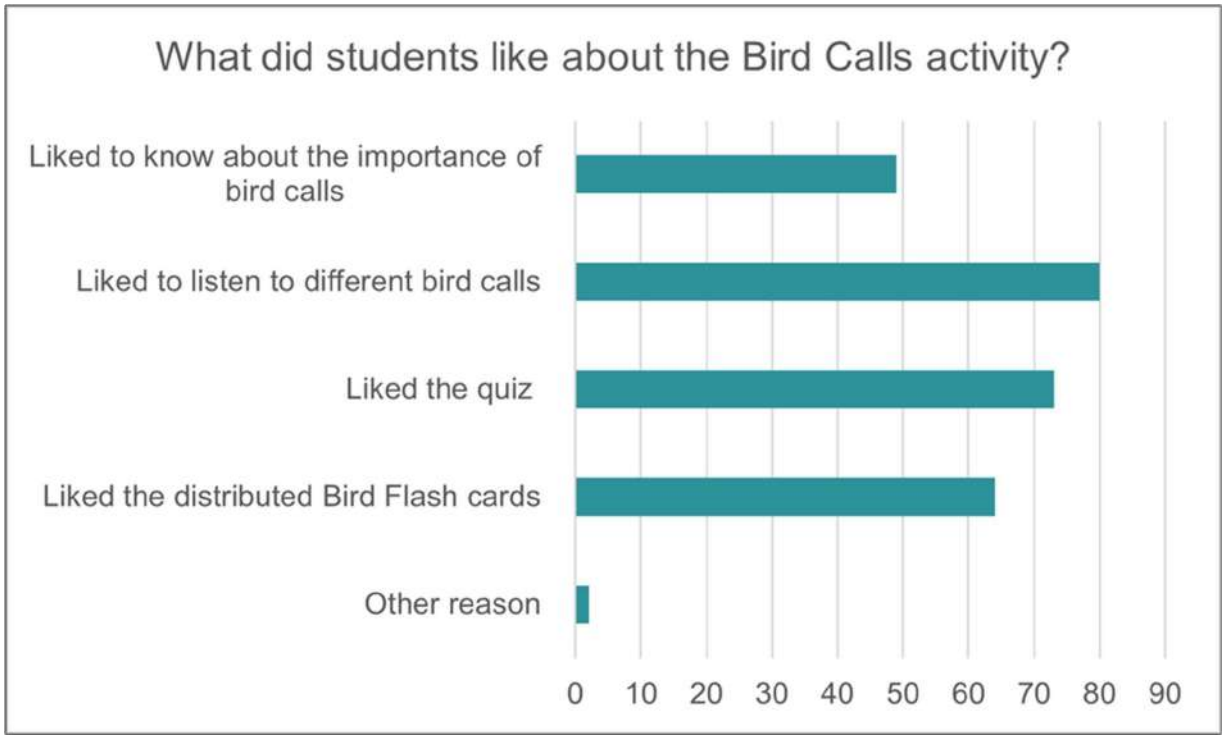



Figure 53. What did students like about the Bird Calls activity?

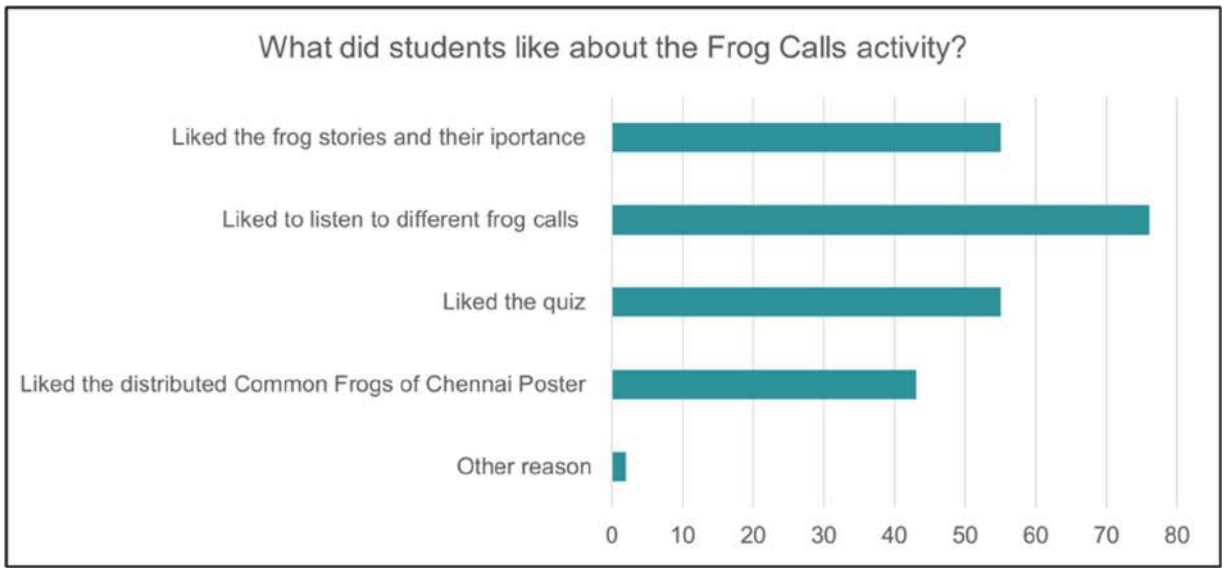



Figure 54. What did students like about the Frog Calls activity?

To receive critical feedback from the students, we also asked them what they did not like about these sessions. Many students responded to this question by saying that they did not like the writing part of the activities. This was the second most common response after the reason that

the activities overlapped with their free time or break or PT classes. This information also helps us to triangulate with our other data from observations made by facilitators that are described further in a separate section in this report. The results of the midline feedback survey will also help us design future activities. The most motivating finding was that very few students said that the reason for them not liking sessions was because they were bored or disinterested. The majority of the students said that they would like to continue with the sessions.

Going beyond what they do with facilitators in schools and parks, many students also did things at home that they had learned during the activities. The most selected responses about what they took home were that they started listening to bird calls and that they told their friends and family about the experiences they had during the activities. The least selected response was that they started nature journaling at home. Given that the tool is newly introduced and requires skills such as writing and drawing, it is not surprising that this is something that they have not done at home as much as some of the other activities.

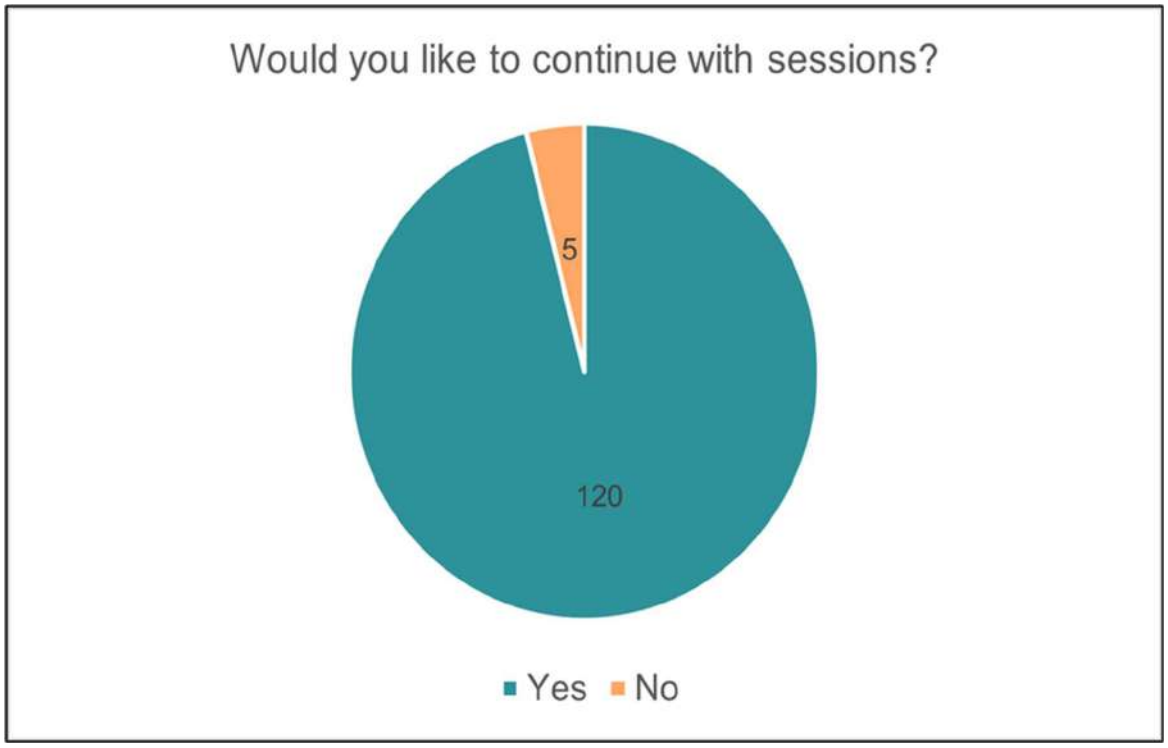



Figure 55. Number of students who would like to continue with the sessions

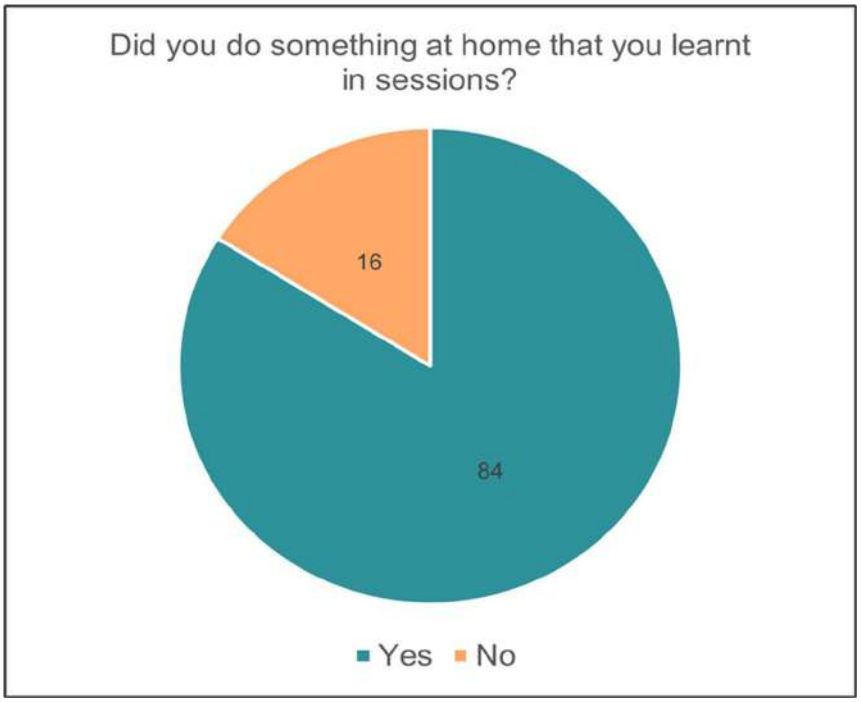



Figure 56. Number of students that did something at home that they had learned in the activities

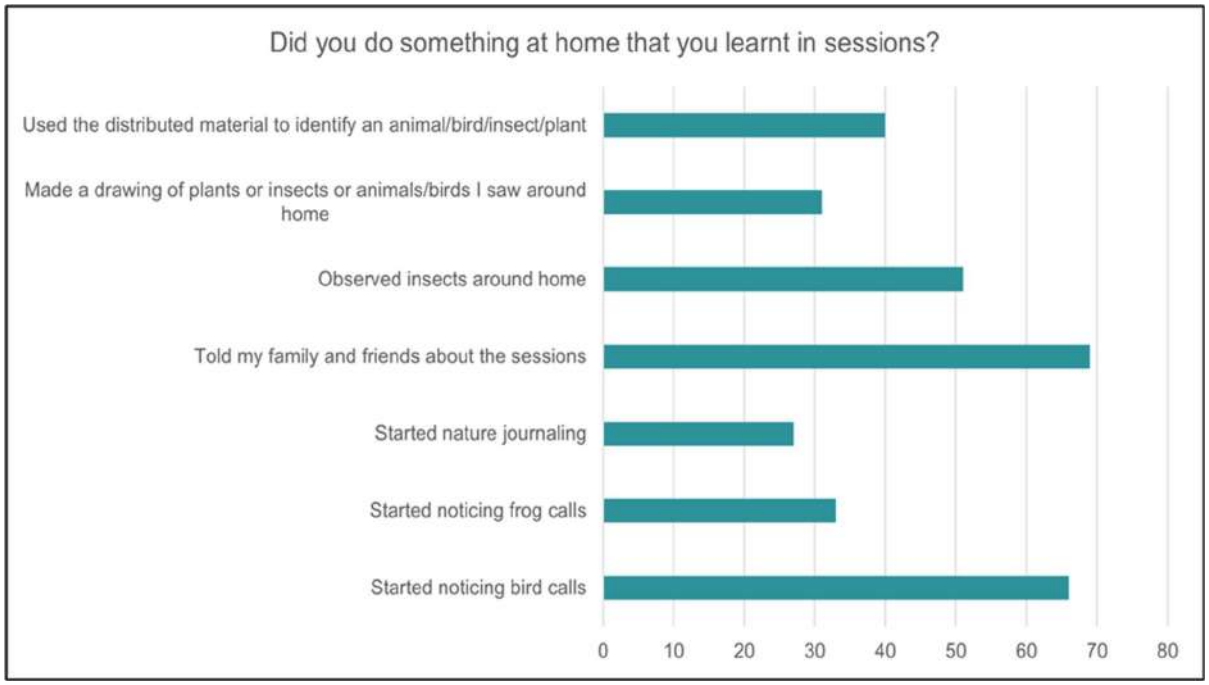



Figure 57. Things that children did at home after going through the activities

Moreover, the questions about what they would like us to do in the future show their level of interest and involvement in these activities (Figure 59). Many students reported that they would like the sessions to be longer but some also wanted a break in between. Many students also said that they would like to go on a trip to the jungle or other places outside. Some wanted the sessions the include more about seashore and marine animals, and some, flowers. Some of the responses showed how much the students have started valuing these activities. For example, one student says, “I would like to teach whatever I learned in these sessions to school students in the future” and another says that programme could be made into a subject. As planned earlier, towards the end of the programme, we would be conducting another round of the baseline survey which would also help us get a clearer idea of the outcomes of the programme by comparing pre- and post-programme changes in students.

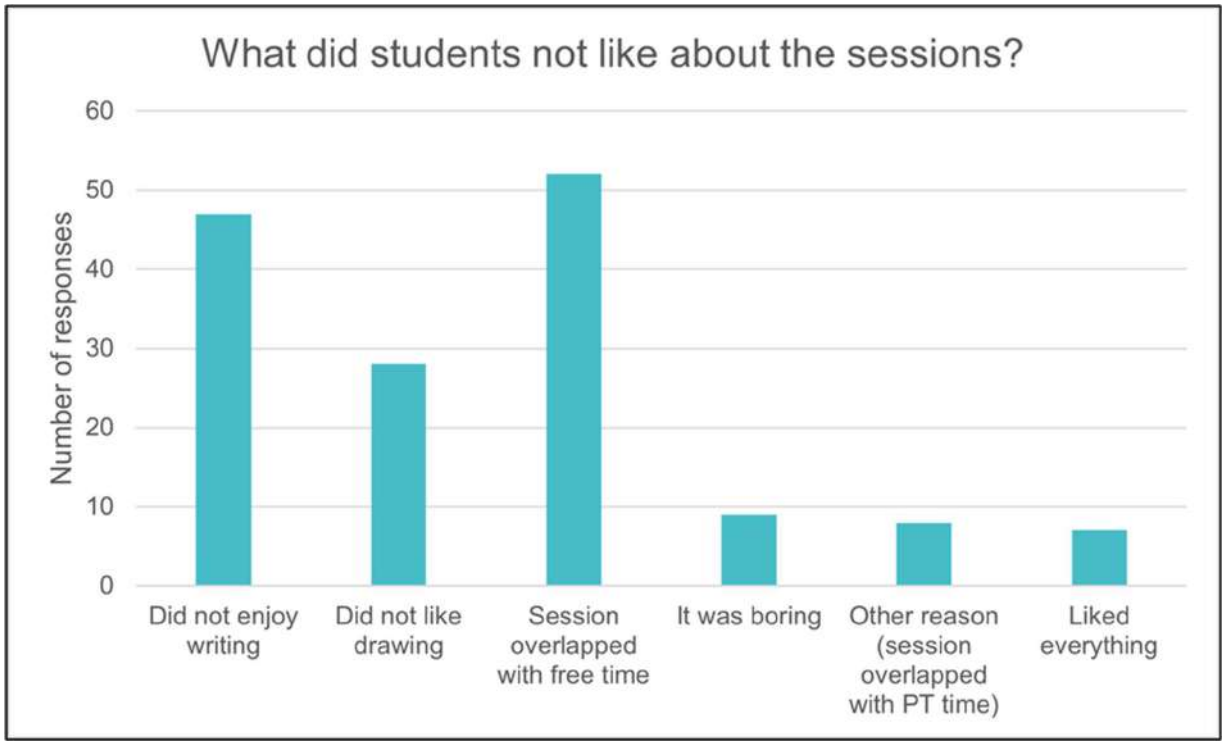



Figure 58. Things that students did not like about the activities

| What would students like to be done in the future? | |
|---|---|
| “It would be good if you took us for a tour” | “Many activities, more details, much interesting news about this, learned about many topics” |
| “Take us to places where wild animals live. Take us to bird sanctuaries/ places where birds live. Take this class at least twice or thrice a week” | “About sea, dolphin, shark and whale” |
| “To make this a subject?” | “To know about animal protection and welfare” |
| “Extend the duration of sessions” | “I would try to create awareness on cutting down trees” |
| “It would have been great if we had one insect sound activity” | “Tell us more about flowers” |
| “I want all the students to get this experience, and I would like to visit different places and spend more time” | “To know about soil” |
| | “I like to teach whatever I learned in these sessions to school students in the future” |

Figure 59. Students’ responses to what they would like to do in the future with the programme

# Post-project Survey

In the baseline (pre-project survey), students mentioned that they get to learn about nature in forests, mountains, on TV/phone, and in schools, while some reported parks too. However, in the post-project survey, many more students recognized parks as spaces for learning about nature. Our project was designed around the school+park space which is replicable in many scenarios, resulting in many sessions being carried out in public parks near schools. It is heartening to see that students' view of this space has transformed. During the post-project survey, many students also said that they get to learn about nature from "Palluyir", whereas earlier the same students had mentioned nothing or trees, park, or other things instead.

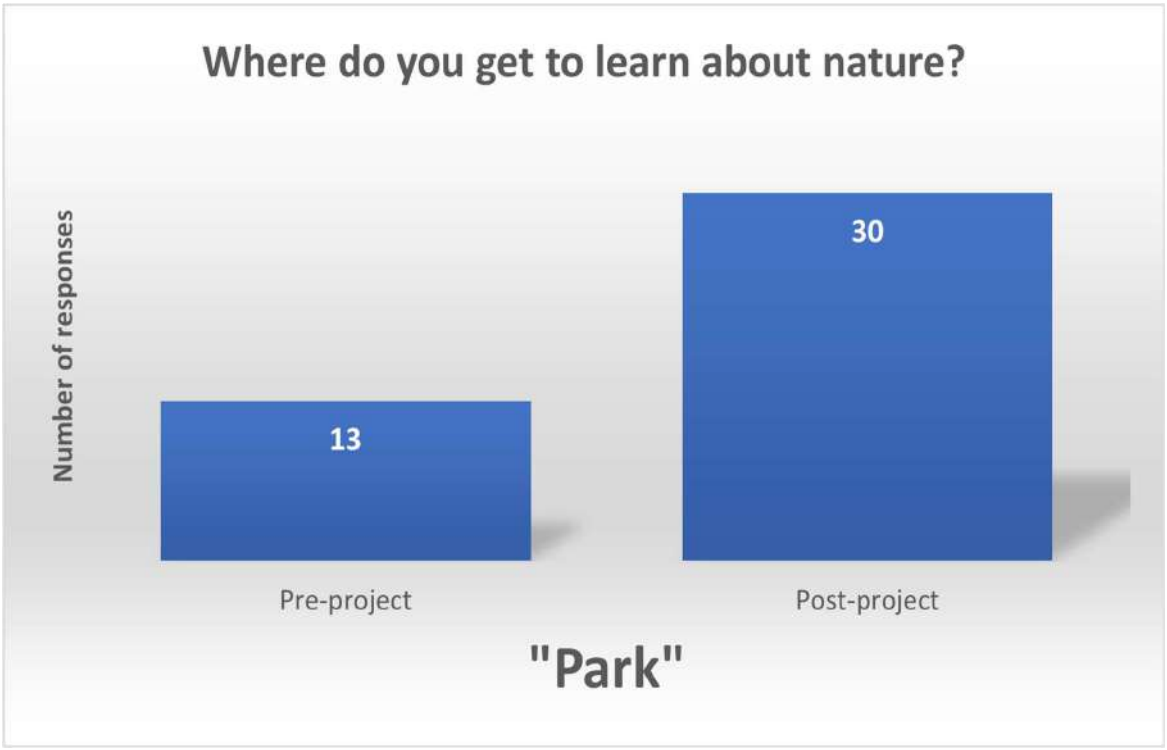



Figure 60. Number of students who said that they get to learn about nature in parks

In the baseline (pre-project) survey, when asked about what they like about being in nature responded with more general words such as "everything" or "animals". Some said that they like to feel the breeze or rain and that they like pets such as cats and dogs. However, in the post-project survey, there were more groups of animals such as insects, and new skills they learned during the project, for example, "seeing birds through binoculars". Apart from these, they

responded with “trees” much more when compared to the baseline as some of our activities were designed around trees.

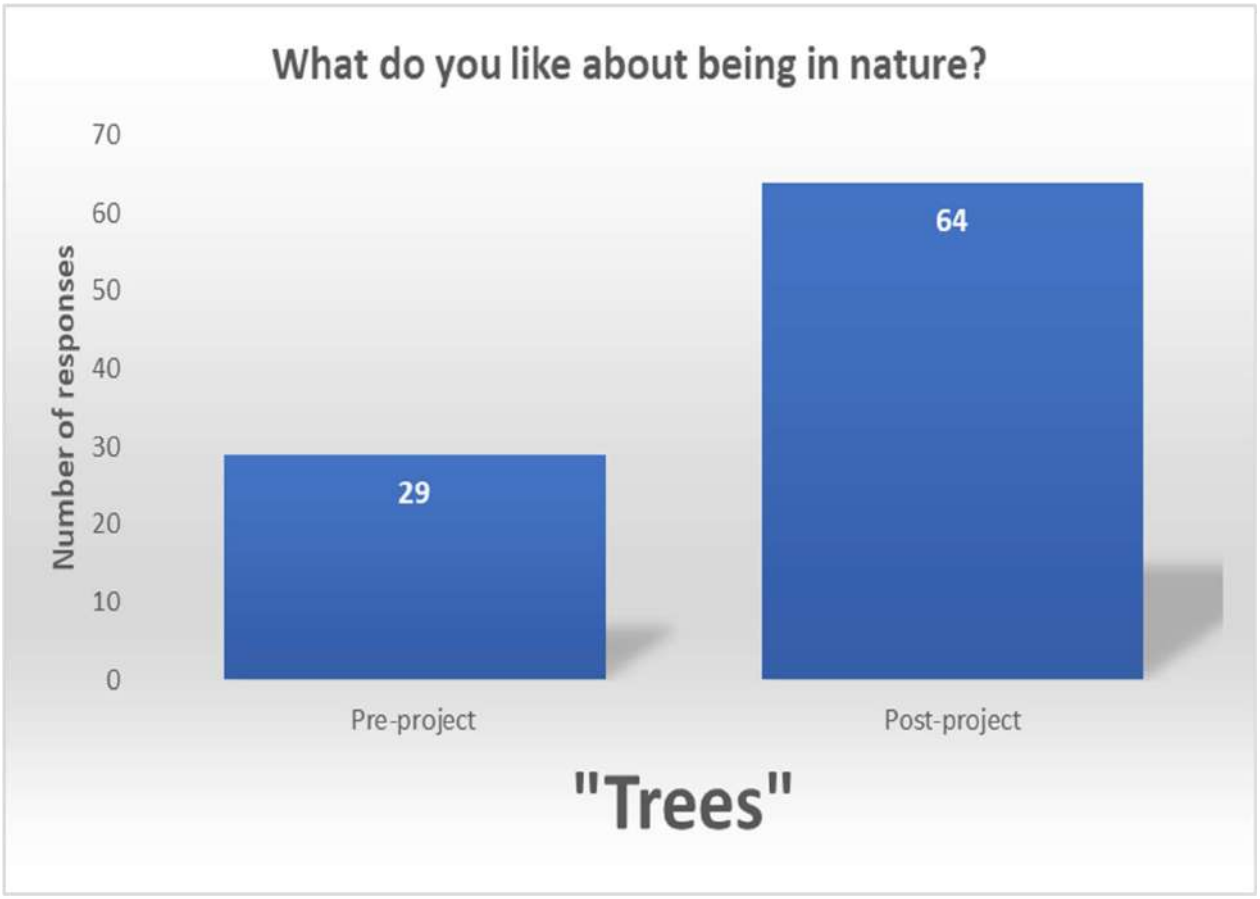



Figure 61. Number of students who said that they like trees

We observed engagement with nature hold tremendous equalizing scope, especially in developing language skills – whose social relevance cannot be overemphasized. Noam Chomsky, in his famous essay on language, says that all humans are born with the potential to learn language, and what inhibits it is a poverty of stimulus. The famous Hart-Risley study delved deeper into this poverty of stimulus and found that children in their language-sensitive period (a time when the window of learning language is open) who were spoken to by their caregivers more than 20 million words by the time they were 5 years old, are well socialized later, while those children who are spoken to less than 8 million words via stories, conversations, cuddling speech, reading to or any interaction – typically struggle later in life socially and cognitively. Philosopher Wittgeinstein said that the limit of an individual’s world is the limit of their language and this is telling of why the latter group of children find it difficult to navigate life –

lesser language implies smaller imagination, thinking, feeling and possibilities in their world-perception.

We saw in this study that local nature comes crucially to children's aid here, if connections can be built with it. As of now, only a small body of literature exists on this, and among them is a review by Tanya Richardson and other researchers called 'How does nature support early language learning' – compiling and analyzing twelve studies from across the world showing that engagement with local nature and its 'context richness' improved children's motivation, creativity, curiosity, play possibilities, interpersonal communication among other capacities crucially supporting language learning.

On a Likert scale, when asked how much they liked observing animals and plants around them, the students showed a more positive response during the post-project survey.

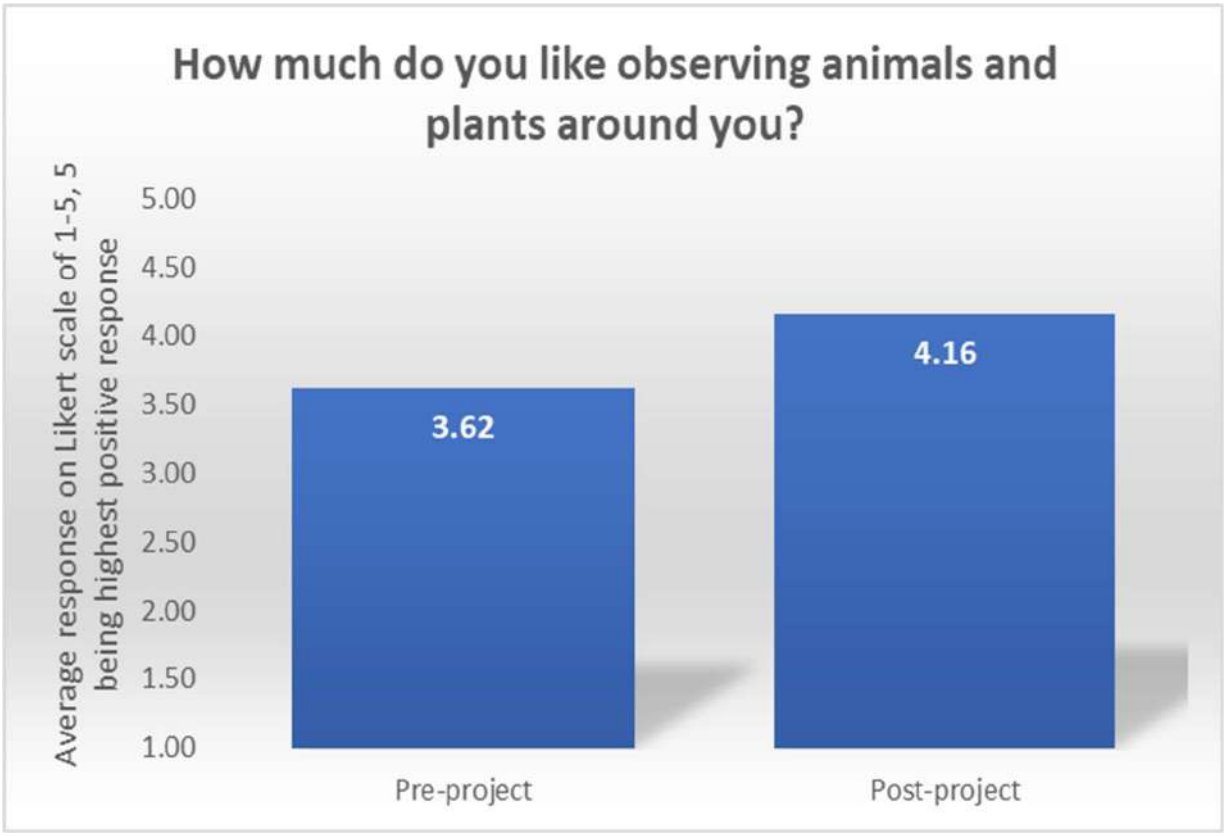



Figure 62. Average response on Likert scale about liking observation of animals and plants

45.37% of students who showed a more positive response than the baseline to this question.

Similarly, when asked how much they liked learning about animals and plants around them, there was also an increased positive response.

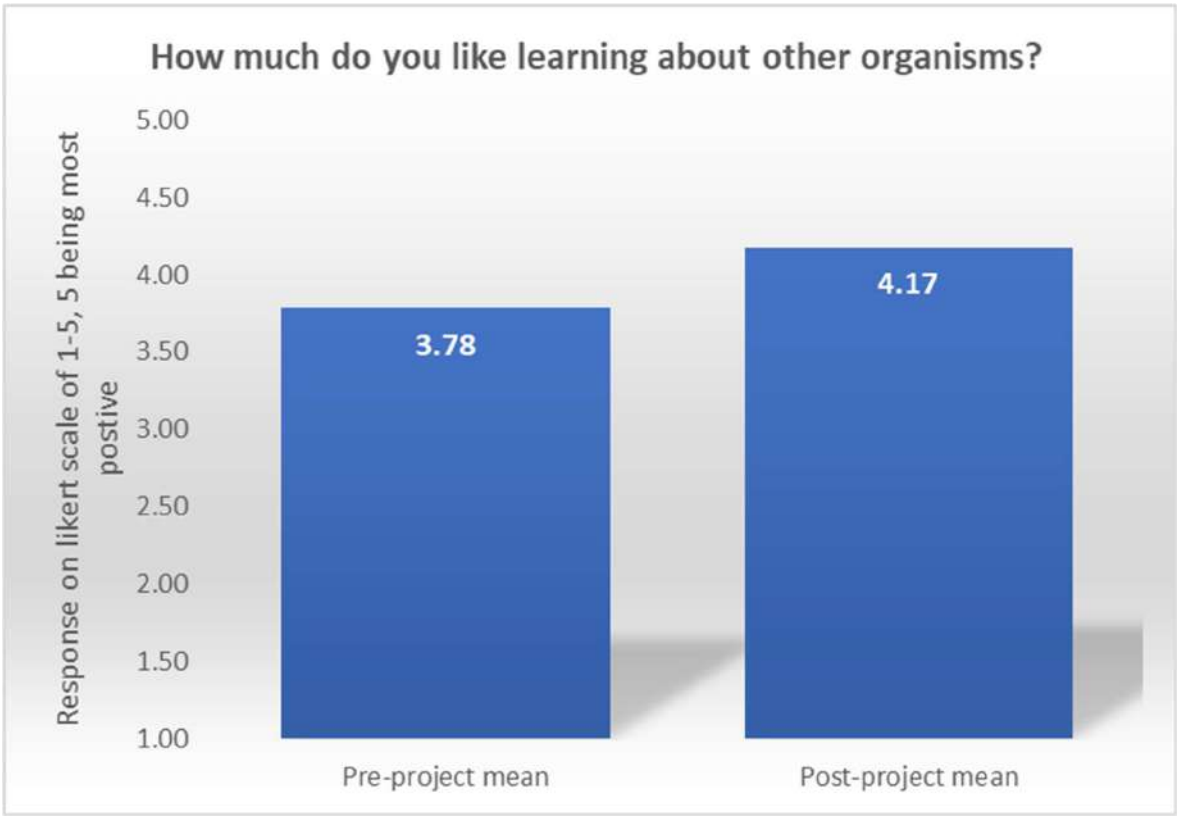



Figure 63. Average response on Likert scale about liking to learn about other organisms

Along with the post-project survey, we had also interviewed some students to provide us with feedback. As this was just after the Vedanthangal trip, many students mentioned enjoying it. By that time, the students also knew that our project had come to an end and we received a few loving notes too. Some of the feedback is shared below-

“The things I like -going to Vedanthangal, going to the park, to see things at Vedanthangal, I liked all the things you did, anna.”

A boy listed down his points-
“1) You got us to so many nice places
2) you brought to a park
3) You showed us lots of trees

4) you showed us lot of birds
5) I like that you taught us many things
6) I want you all back”

“I really really liked learning about biodiversity. Thousands of thanks for taking us on small trips. Forgive us if we made any mistakes. Next year please come to 9th class, I request you all. And please teach us more. Thank you so much.”

“I like that you teach us about the significance of birds, trees, butterfly and bees. I like all your sessions. I learn more things when you people come. I really liked the session where we observed birds. I liked learning more in all your sessions. I request you, please teach these things to other kids also.”

“I told my family members that Palluyir showed me a new path. I really like the name Palluyir. If I get to attend this class again, I will be really happy. Please come back next time also.”

“Take us to Vandalur zoo. I liked drawing butterflies. I liked observing ants. Vedanthangal birds were really great. I liked learning about plants. Take us to the beach.”

“I liked how they taught us about birds in Vedanthangal. I liked “meenkothi Paravai” (Kingfisher). I like Neem Tree, Banyan and Coconut Tree. I like to learn about leaf types. Now I stop others from plucking leaves, “*Na vandhu en frnd sembrathipoo ella pichina Maram Chedi Pikadha, Maram Chedi Vandhu Pesum, Nammaku Udhavum, Kathuveesum sonen*” (When my friend was about to pluck the leaves of a hibiscus, I told her not to pluck, I said do not pluck leaves of plants and trees, plants and trees talk, it helps us, and gives us air). I did not like the writing part But I liked to learn what you taught. I also liked how you took us to the park and taught trees and plants.”

Many students also named specific facilitators, showing that they had developed a connection with them. A student said, “Akka you are my favourite. I felt very happy when you were here. You are not teaching us now, even then classes are great, but it’s not like you taught us, it would be nice if you come back again. I miss you.”

“I want you take nature ed classes for 9th class like you did for 8th.”

# Facilitators' Notes

By using the practice of keeping regular notes of our experiences of sessions with children, we attempted to understand more qualitative aspects of how they were responding to local nature-based learning. Specifically, we were looking at qualities such as sense of wonder and curiosity, interpersonal skills, critical thinking as well as what worked and what did not.

The facilitators' notes show that **interpersonal skills** improved over time, especially when it came to interacting with facilitators and doing teamwork with fellow classmates. There was a tendency to work with friends rather than someone new. Even when the students were not asked to form groups, they would split and form pairs or groups, often sticking to their friends. Social interactions prove to be challenging for new students or students who need special attention. Such students are also not accepted by the class easily and are even made fun of. We noticed this pattern which reflected in our notes. We focused more on such students by personally explaining activities and encouraging participation. We also experienced how this can change too. Initially everybody ignored and bullied a student but later when he finished the activity before others; others came to him and asked for help, it made him happy
With time students started coming to us more freely to ask for things. For example, a student came to us with the Palluyir logo and asked if we would conduct beach sessions for them after realizing there were marine organisms too on the logo. At the same time, students' circles of friendship in a school seem to have a strong influence on their performance as well as critical thinking abilities. Some students could observe even the most intricate details and pose questions because of one or two very keen students in the group.

There were instances where students ask their peers if they have doubts or need help. Even Though there were incidents where students had misunderstandings with each other they tried to solve it by themselves. There was one incident where students encouraged equal participation of all students in the class. Towards the end of one session, a girl student started to gather a group of people and started to teach them what she learnt. There were incidents where teachers also engaged in the activity and asked questions although at times, **teachers** were not always helpful. Especially the Vedanthangal trip where most of the teachers who were actively observing the birds keen on knowing what bird it was and questions on their behaviours. The teacher being engaged, curious and asking questions greatly helped the students. The teachers also helped in maintaining the order during the sessions. Overall, the teachers' involvement

during the sessions was very much helpful to the facilitators such that they can conduct the session smoothly.

By the time of Vedanthangal trip, which was towards the end of the project, students were more open in sharing their thoughts and reasoning. When we asked the question about how paddy field and the birds are related, they said birds feed on insects, they said that bird's step on the rice fields and make it even more fertile "p*aravaigal adhu medichu manna padha paduthum*" and that the birds' fecal matter is important for the fields. They also said that water from the wetland moves to paddy field through soil underground, indicating that they have an understanding of how water movement is an integral part of the ecosystem.

We observed that the students seem to have an innate **curiosity** to observe nature around them. They knew about the importance of trees and were seen to have noticed the trees in their neighborhood. In most sessions, they were familiar with many species and right away were able to identify certain species from the posters and also tell us stories about them (e.g. brood paratism by the Asian Koel). They were excited to take and show us tadpoles that they spotted on the school ground too. Certain children, when asked to pick team names for the quiz, wanted to choose a frog's name from the poster. Some children said that they catch butterflies and said they didn't think it hurt the butterfly. Post the session, they seemed have developed love for the things they observed, as they started watching without disturbing the species.

When students actively wanted **material** such as the butterfly guide, or the tree guide, or the bee poster, that action reflected their curiosity. The material also seems to help sustain curiosity as it is distributed at the end of the activities. Material also helped them remember what they have observed earlier. For example, a student pointed at the carpenter bee and honey bee on the poster and shared that he has seen it in their neighborhood. Questions to educators about the subsequent sessions also showed that students were curious. An indicator of sustained interest and curiosity was when students completed all the required activities in the session on time and submitted their work. Insects as a group seem to be connected to curiosity as being something that elicits wonder and fear. In terms of tools and **equipment**, what really proved useful to increase the level of engagement with students were magnifying glasses, binoculars, and speakers. Students liked using these tools, and even though some wanted to play with them, it also increased enthusiasm levels for observation of nature.

**Stories** proved extremely useful in generating interest as well as critical thinking in students. For example, the story of how ants communicate using different chemicals was used in the orientation of Ant Walk activity and it amused many students. Some students were later able to identify ants we saw in the previous session, showing us how they well they had retained that skill and information. Insects such as butterflies and ants proved to be very useful for enhanced engagement and encouraging curiosity. They liked the ant stories and while we talked about the ant tournament, they asked if it is like single one-on-one match. They also asked if other ants around would be cheering on for the fighting ones.

Students show a lot of excitement when they **discover** something on their own. For example, when we started with the map comparison during Tree Mapping activity, a student identified that it's their school's picture and everybody got excited and observed the map more closely. When asked to compare different maps, they told us that trees became less in number and their school was modified so some trees were missing. A student said that roads are extended so they lost few trees. Followed by this, we asked about the importance of maps to which they answered by saying that it is used for getting directions, to reach new places etc. The students soon formed a team on their own and worked on the mapping activity. In the Tree Mapping session, a sense of discovery and wonder was seen in a lot of children because they were finding something new and fascinating right within their compounds. A place where they have been living for so long. It is a different sense of discovery when they go out into an entirely new place versus find something utterly new where they have been for many years. That sense of discovery was apparent in most of the students. Greater interest in students made them independently do the activity. They would also choose to sit alone separately from the rest of the students and write observations in their journals. Without the educators prompting them, some girl students from one of the schools not only participated in the activities but volunteered to be a part of the game designed around the butterfly field guide.

The I Notice, I Wonder, It Reminds Me Of activity showed us the ability students have to come up **questions** about everyday things. A student wrote 27 questions by herself on just one plant. Even with plants like banana, the students asked- Why are we using every part of the Banana plant? Why is banana a plant and not a tree? A student asked why banana fruits are in a single colour but not in multiple colours? In one example, a student brought a dead beetle and showed it to one of the facilitators. She encouraged him to ask questions about the beetle. He asked three questions- Why is it headless? Where will it be on a tree? How will it fly? She made him

observe the beetle closely, pointing at the number of legs, its wings and the black spots on its green body. Then he asked her if he could draw the beetle on his notebook. She helped him draw. He looked happy and ran to another facilitator to show his drawing. Often, it took just bringing their attention to one specific thing and explaining it closely developed curiosity. For example, after explaining one leaf identification in detail, the students were able to grasp the idea of how to observe and were able to observe different types on their own. One of the students was very keen on learning the written spelling and language to be able to write the questions. He came up with keen observations. For instance, he asked why the leaves of the False Ashoka tree were drooping rather than standing straight.

Although **language** proved to be a barrier to engagement in various activities, some of the children pushed through the language barrier and came up with words and phrases to put forth their thoughts. The sessions involving descriptive writing (ant walk, frog and bird calls) were very engaging and the children came up with very imaginative and creative descriptions for them. They keenly observed anatomical, visual and behavioral patterns of ants and were able to describe it quite well. When nudged with a few questions, they were able to think and reason out things like why spiders choose certain spots to cast their webs. The significance of writing in the learning process is evident, as students were able to connect with the notes they took during the sessions and cross connect with other activities. Some found difficulty with spellings in both Tamil and English, prompting some to seek correct spelling. Some students struggled with articulation, taking time to form proper questions or sentences. The conventional emphasis on 'thooya thamizh' in the education system hindered them from freely expressing their thoughts. Some were conscious about their handwritings and made their classmates write. While some opted for drawing over writing, which signifies diverse approaches to written expression.

The ability to describe bird calls seems to be an effective way to learn **language**. A lot of students asked us for spellings and words to help them describe what they were hearing. Even the students who otherwise did not want to write, were keen on noting down something to capture and express what they were hearing. Implementing more language learning activities, such as the bird call quiz, has proven effective in fostering cooperation and engagement among children. Encouraging descriptive language without providing predefined words might help the children learn a language better. The shift from activities that heavily involved writing to a more auditory-focused exercise provided a refreshing break from monotony. The introduction of a new kind of activity every week might help evoke a sense of curiosity and lead to successful

sessions. Additionally, the students were also able to mimic bird calls beautifully and it made facilitators happy.

Children often used other **familiar things to describe what they were observing**. A student observed bicolored shield ant and was able to do the I notice and I wonder part and when a facilitator asked what are you reminded of when seeing that insect he said "*ennaku kaduku nyabagam varudhu akka*" - 'I am reminded of mustard seeds". During Vedanthangal trip, we had a discussion and asked each student on what bird caught their attention most of the said Spotted Owlet. One student when we asked how will you compare the size to it, he said it's about cricket ball's size. One of the boys who was said to be very naughty observed birds very well. He was able to observe Grey Heron and describe it well, he also observed the Open-billed Stork and was able to identify it the bird guide with the colour he mentioned as "*cement colour la irukura parava*" - the cement-coloured bird.

We also believe that there socioeconomic and cultural influences that shaped the student's connection to nature. Children in schools from Nungambakkam and Manikanda, for the question -when do you connect with nature, mentioned seeking nature as a **mental health buffer**. One student in Nungambakkam said when his parents hit him, he leaves the house and sits under a tree. Another boy in Manikanda said when his parents hit him, he goes to the lake, watches the water, and throws stones in it to feel better.

**Nature connectedness** was more apparent in some students. One of the students was enthusiastic and keen. He was able to spot ants carrying out larvae, knew the difference between a dragonfly and damselfly and asked us a lot of other relevant questions. He told us that he learned most of this from the discovery channel. Some students also exhibited a sense of empathy while interacting with each other and their surroundings. For example, a boy asked one of the facilitators why the ant bite us, another boy who was around was quick in responding by saying, "if I come and stamp over your house and destroy it, won't you come and hit me?" During Vedanthangal trip, a girl student after observing bird roosts said, "*paravaigal dha onna iruku namba dha adichkrom*" - which means- all the birds are together but we humans are only fighting. On another occasion, a student stopped another from plucking a leaf, comparing it with the pain that one experiences when someone pulls out a strand of their hair.

The facilitators' notes also helped us understand and document many experiences such as these, including how important it is to form session schedules at school so that other events do not overlap with other events that students might be interested in. At the same time, they also became a way for us to reflect on our work and to share it with the team during the weekly meetings.

# Cyclone-related Challenges

Cyclone-related damage added to our challenges during this project. Due to heavy rains from the Northeast monsoon, several sessions got postponed during November 2023, and due to the cyclone and flooding in December, our second-term sessions were pushed into the third term. Rains impacted outdoor space usage, so we had planned bird calls and frog call identification and description sessions, which were done indoors. The cyclone also flooded Palluyir's office space in Velachery, causing several lakhs worth of damage to electronics, furniture, stationery, and printed materials meant for children. We have had to request funding from several entities to repurchase and reprint these materials and move our office to a less flood-prone area.

With help from the Rainmatter Foundation and some crowdfunding, we were able to move our office space and also replace all the damaged and lost materials. The journals of students from three schools, however, were submerged and irretrievable. For these schools, we used worksheets which are distributed and collected back from children during the sessions.

# Concluding Remarks

A clear outcome and direction that came from the programme was that observation of local nature created a strong motivation to learn and in general be curious in most children. Specifically, these motivations could be seen towards language learning and scientific concepts, but also towards other people's perceptions, group work, new ideas, and ways of seeing. This seemed to be connected to the diversity of relevant and meaningful stories and stimuli nature can offer, and multiple learners/ways of learning it supports simultaneously. It also can provide very rich 'language nutrition' and intellectual/cognitive stimuli more than what they usually receive in their learning contexts.

We had to built a good amount of rich material to make parks and school campuses interesting for children. As a team, we learned how to maximise nature connection in whatever is available

around, even if it is little patch of vegetation on the roadside. Getting children interested in everyday nature, we have to use a lot of visual aid, we also had to put together stories around very common things such as trees and ants. This was one of the biggest achievements of the project.

In the material we distributed, the students had something to take back home such as knowledge and familiarity with bird calls, frog life cycles and calls, names, and characteristics of different ants. Through all of these main activities conducted in the second term, we saw clear evidence of improvement in the drawing skills, listening skills, and writing skills of students. Challenges to this pedagogy included crafting an effective way of integrating it with the existing schooling system, and the children's existing socio-political landscape.


Figure 64. Interpretation of Peacock Pansy, a butterfly species, as drawn by students

Lastly, through this year's study, it has been clear that engagement with local nature is showing marked improvement in children's language skills and motivation to learn language. Therefore, with GCC's help, an NBL component can be added to the *Ennum Ezhuthum* policy for

foundational literacy and numeracy started by the government. We believe this will add more momentum to the success of this policy.

The participating teachers have been finding the sessions very meaningful. It is challenging to integrate them into the activities given their packed schedules. However, we now look forward to exploring opportunities so that interested teachers can participate more actively in nature-based learning. We have drafted a detailed curriculum for teachers to help them implement NBL in a self-directed way for different classes aligned with different skills and academic objectives Lastly, the current study, if scientifically published, will also add credibility across the state and at the policy level to adopt NBL for well-being of all children.

# Our work in Media

1. Corporation school students engaged in nature-based learning in public parks - The Hindu

Corporation school students engaged in nature-based learning in public parks

October 16, 2023 10:40 pm | Updated 10:40 pm IST – CHENNAI

GEETHA SRIMATHI

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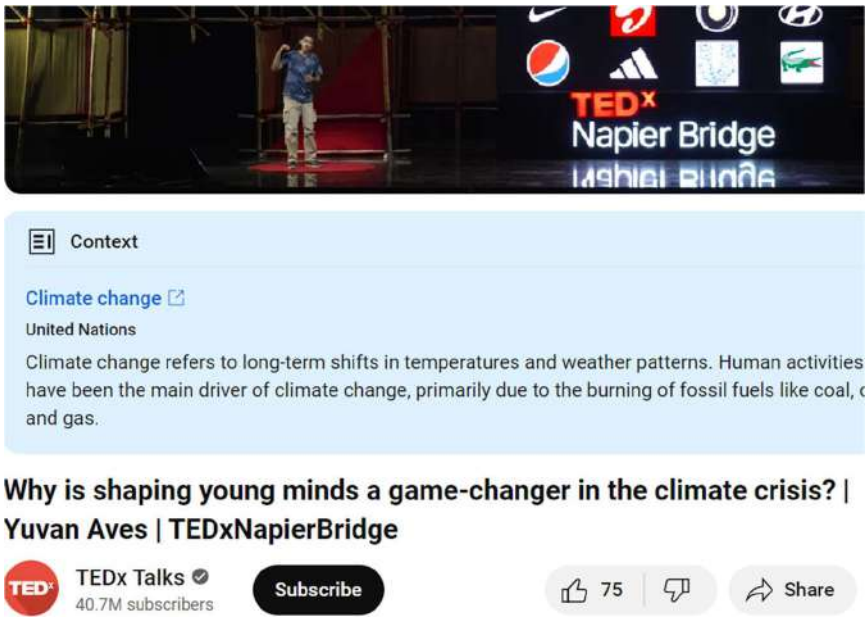
2.

3. Why is shaping young minds a game-changer in the climate crisis? | Yuvan Aves | TEDxNapierBridge (youtube.com)




4. https://www.newindianexpress.com/xplore/2024/Feb/10/nature-based-learning-breaking-ground-in-tamil-nadu

5. https://timesofindia.indiatimes.com/city/chennai/nature-based-learning-programme-transforming-childrens-attitudes-towards-nature/articleshow/107789755.cms

# A for ant walk, B for bird, C for classes in the wild

Asha Prakash / TNN / Feb 18, 2024, 09:24 IST

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# Annexure I

Baseline (pre-project) and post-project survey sheets

Name: Today's Emoji:
Date:
Class:

Put a tick (✔) on how much you like the following (1 lowest, 5 highest)-

| S.No | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1 | Learn and experience new things | | | | | |
| 2 | Ask questions about things around me | | | | | |
| 3 | Pursue the questions I ask/try to find answers to my questions | | | | | |
| 4 | Learning subjects unfamiliar to me | | | | | |
| 5 | Listening to different opinions and perspectives | | | | | |
| 6 | Working with classmates I am not used to | | | | | |
| 7 | Working on my own | | | | | |
| 8 | Interacting with everybody in my class | | | | | |
| 9 | Resolving issues between friends | | | | | |
| 10 | Taking up responsibility on my own | | | | | |
| 11 | Making connections between different topics | | | | | |
| 12 | Taking up challenging problems/ideas | | | | | |
| 13 | Finding out whether what I learn in school is true in the real world | | | | | |
| 14 | Applying concepts I learn in school in my daily life | | | | | |
| 15 | Think about different aspects of a concept (social,ecological,economic etc) | | | | | |
| 16 | Spending time in nature | | | | | |
| 17 | Learning about other organisms | | | | | |
| 18 | Observing animals/plants around me | | | | | |

19) What do you think of when you hear the word ‘nature’?

20) Where do you think you can go if you want to be with/see nature?

21) What is the time when you feel most connected to the nature around you?

22) Where do you get to learn about nature the most?

23) What do they like the best about being in nature?

24) How many Trees have you seen/do you know? Write their names

# Annexure II

Midline feedback survey sheet

Name:
Class/Standard:
School:
Date:

1. What's your favorite animal or plant or insect that you have seen recently?

2. Which session did you like the most? (can select multiple) (MCQ) and why? (MCQ) (select from options below)

**Tree walk**

a) I liked observing plants
b) I liked drawing leaf shapes activity
c) I liked being in the park
d) I liked the distributed Tree guide and Bark Survey poster
e) Other reason_____

**Curiosity Chain**

a) I liked asking questions about the thing we selected (watch/table etc)
b) I liked being outdoors
c) I liked observing and questioning the tree/plant I chose
d) I liked the distributed clues and Tracks Poster
e) Other reason _____

**I notice, I wonder, it reminds me of**

a) I liked to observe the insects
b) I liked to fill in the 'INIWIRO' part
c) I liked the lifecycle stories of insects
d) I liked the distributed Common bees of Chennai Poster
e) Other reason _____

**Ant walk**

a) I liked to observe ants

b) I liked drawing ants

c) I liked the ant stories

d) I liked the Common Ants of Chennai Poster

e) Other reason _____

**Bird Calls**

a) I liked to know about the importance of bird calls

b) I liked to listen to different bird calls

c) I liked the quiz

d) I liked the distributed Bird Flash cards

e) Other reason _____

**Frog Calls**

a) I liked the Frog stories and Importance

b) I liked to listen to different frog calls

c) I liked the quiz

d) I liked the distributed Common Frogs of Chennai Poster

e) Other reason _____

3. What did you not like about the sessions? (MCQ)

a) I did not enjoy the writing part
b) I did not enjoy the drawing activity
c) Session extended the school time or overlapped with free time
d) It was boring
e) Other reason_____

4. Did you do anything that you learned in sessions back at home? Yes/No What was it?-

a) Started noticing bird calls
b) Started noticing frog calls
c) Started nature journaling
d) Told my family and friends about the sessions
e) Observed insects around home

f) Made a drawing of plants or insects or animals/birds I saw around home
g) Used the distributed material to identify an animal/bird/insect/plant

5. Would you like to continue having these activities? Yes/No.

6. What would you like the sessions to have in the future?

பெயர்:
வகுப்பு:

பள்ளி:
தேதி:

1. சமீபத்தில் நீங்கள் பார்த்த, உங்களுக்கு பிடித்த விலங்கு அல்லது தாவரம் அல்லது பூச்சி எது?

2. எந்த நிகழ்வை நீங்கள் மிகவும் விரும்பினீர்கள்? ஏன்? (பல தேர்ந்தெடுக்கலாம்)

**நம்மை சுற்றியுள்ள மரங்கள்**

அ) நான் தாவரங்களை கவனித்தலை விரும்பினேன்
ஆ) இலை வடிவங்கள் வரையும் செயல்பாடு எனக்கு மிகவும் பிடித்திருந்தது
இ) நான் பூங்காவில் இருப்பதை விரும்பினேன்
ஈ) வழங்கப்பட்ட மர கையேடு மற்றும் பட்டைகளிலே தேடிப்பார் போஸ்டர் மிகவும் பிடித்திருந்தது
உ) வேறு காரணம்_____

**கேள்வி சங்கிலி**

அ) கடிகாரத்தைப் பற்றிய கேள்விகளைக் கேட்பது எனக்குப் பிடித்திருந்தது

ஆ) எங்களை வெளியில் அழைத்துச் சென்றது எனக்குப் பிடித்திருந்தது

இ) நான் தேர்ந்தெடுத்த மரம்/செடியை கவனித்து கேள்வி கேட்பது எனக்கு பிடித்திருந்தது

ஈ) வழங்கப்பட்ட குறிப்புகள் மற்றும் தடயங்கள் போஸ்டர் மிகவும் பிடித்திருந்தது

உ) வேறு காரணம்_____

**நான் கவனித்தேன், நான் ஆச்சரியப்படுகிறேன், இது எனக்கு நினைவூட்டுகிறது**

அ) நான் பூச்சிகளைக் கவனித்தலை விரும்பினேன்

ஆ) 'INIWIRO' பகுதியை நிரப்புவது பிடித்திருந்தது

இ) பூச்சிகளின் வாழ்க்கை சுழற்சி பற்றிய கதைகள் எனக்கு பிடித்திருந்தது

ஈ) வழங்கப்பட்ட சென்னையின் பொதுவான தேனீக்கள் போஸ்டர் மிகவும் பிடித்திருந்தது

உ) வேறு காரணம்_____

**எறும்புகள்**

அ) எனக்கு எறும்புகளை கவனித்தல் பிடித்திருந்தது

ஆ) எறும்புகளை வரைவது எனக்கு பிடித்திருந்தது

இ) எறும்பு கதைகள் எனக்கு பிடித்திருந்தது

ஈ) சென்னையின் பொதுவான எறும்புகள் போஸ்டர் எனக்கு பிடித்திருந்தது

உ)வேறு காரணம் _____

**பறவை ஒலிகள்**

அ) பறவை அழைப்புகளின் முக்கியத்துவம் பற்றிய தகவல்கள் பிடித்திருந்தது

ஆ) வெவ்வேறு பறவைகளின் சத்தங்களைக் கேட்பது எனக்கு பிடித்திருந்தது

இ) எனக்கு வினாடி வினா பிடித்திருந்தது

ஈ) வழங்கப்பட்ட பறவை அட்டைகள் எனக்கு பிடித்திருந்தது

உ) வேறு காரணம்_____

**தவளை ஒலிகள்**

அ) தவளை பற்றிய கதைகளும் முக்கியத்துவமும் எனக்கு பிடித்திருந்தது

ஆ) வெவ்வேறு தவளை அழைப்புகளைக் கேட்க பிடித்திருந்தது

இ) எனக்கு வினாடி வினா பிடித்திருந்தது

ஈ) வழங்கப்பட்ட சென்னையின் பொதுவான தவளைகள் போஸ்டர் எனக்கு பிடித்திருந்தது

உ) வேறு காரணம்_____

3. நிகழ்வுகளில் உங்களுக்கு பிடிக்காதது எது?(பல தேர்ந்தெடுக்கலாம்)

அ) எழுதும் பகுதி எனக்கு பிடிக்கவில்லை

ஆ) வரையும் பகுதி எனக்கு பிடிக்கவில்லை

இ) நிகழ்வு பள்ளி நேரத்தை நீட்டித்தது அல்லது பொழுதுபோக்கு நேரத்துடன் சேர்க்கப்பட்டது.

ஈ) சலிப்பாக இருந்தது

உ) வேறு காரணம்_____

4. நீங்கள் கற்றுக்கொண்டதை வீட்டில் செய்து பார்த்தீர்களா? ஆம்/இல்லை என்ன அது ? -

அ) பறவைகளின் சத்தத்தை கவனிக்க ஆரம்பித்தேன்

ஆ) தவளை அழைப்புகளை கவனிக்க ஆரம்பித்தேன்

இ) இயர்கையைப் பற்றி எழுத ஆரம்பித்தேன்

ஈ) இது பற்றி என் குடும்பத்தினரிடமும் நண்பர்களிடமும் சொன்னேன்

உ) வீட்டைச் சுற்றியுள்ள பூச்சிகளைக் கவனித்தேன்

ஊ) வீட்டைச் சுற்றி பார்த்த தாவரங்கள் அல்லது பூச்சிகள் அல்லது விலங்குகள்/பறவைகளை வரைந்தேன்

எ) கொடுக்கப்பட்ட கையேடுகளை விலங்கு / பறவை / பூச்சி / தாவரத்தை அடையாளம் காண பயன்படுத்தினேன்

5. இந்தச் செயல்பாடுகளைத் தொடர விரும்புகிறீர்களா? ஆம்/இல்லை விரும்புகிறீர்கள

6. எதிர்காலத்தில் இந்த நிகழ்வில் என்ன இடம்பெற வேண்டும் என்று