Nurturing the Natural Environment

Role and importance of nature in the lives of children

Nature has always played a very special role in the lives of children. The natural environment provides the ambience in which a child's innate sense of curiosity and wonder can blossom. The natural world offers a fascinating canvas for the child's imagination ... sunlight filtering through intricate leaf patterns, the fragile wings of a fluttering butterfly, the magical colours in a dewdrop, the fragrance of a new herb.... hold the child in wonder and awe. Children begin to connect with diverse and interconnected beings and draw inspiration for endless hours of creative exploration and engagement. Children love the open-ended, non-structuredness of this space and the immense possibilities it offers to build an understanding of the world around them. They have the ability of discovering a range of natural materials and evolving innumerable explorations, activities and games. Often these activities happen spontaneously, but they can also be designed and facilitated. Through these children fulfil their various developmental needs and processes - physical, psychological, social and spiritual. A wholesome natural environment is often the place where a young, fragile child can feel a sense of peace, relaxation and interconnectedness with life. It can, thus, be a healing balm for a young, vulnerable child in today's turbulent world, helping to relieve and wash stress, anxiety, confusion ...and bring feelings of inner peace, tranquility and wholeness. Greens in the school can also bring a significant enhancement to the environmental quality of life - reducing the smoke, dust, sound, greyness and hardness of urban life. The importance of this cannot be ignored in the context of the smoky, concrete, grey and often hostile, unsafe outdoors that children in cities like Delhi, Mumbai, Kolkata, Chennai or Bangaluru inherit. In cities where accessible greens and open spaces are at a premium in many areas, a learning, growing environment for children can only be one which is relaxed, secure, healthy, friendly and comfortable.

Is there a better, simpler way to this... than a nearby diverse natural environment?

39  Natural Learning Material
40  Colours, Naturally
41  And some Fragrance Too
42  Inviting more Birds and Bees
43  Mini Herbal Garden using Waste Water
39 Natural Learning Materials

Introduction

The natural world offers a vast array of rich experiences for children. Plants have diverse natural materials ranging from their leaves, pods, fruits, flowers and seeds. The roots, trunk, bark and branches offer a variety of shapes, colours, sizes and fragrances. These are rich resources for your school. This becomes a way of building meaningful bonds with nature. One of the reasons for poverty in our country is lack of understanding of the importance of nature and the importance of maintaining rich soil, forests, grasses, herbs and medicinal plants. In other modules in this manual we have talked about composting and garbage collection, recycling, and the wise use of water.

When you use plants for learning materials, use only those plant parts that have fallen or dried or are very common.

Teaching-Learning Activities

Activity 1: Using Seeds for Games

Classes I, II

Children can collect *inti* seeds, *neem* seeds, *bakain* seeds, seed pods and use them when they play Board Games which are on the floors throughout the school.

Children can also collect seeds and sort them and keep them in boxes in the classroom for counting.
Teacher's Role

• Helping children observe and understand life cycles of trees and plants
• Helping children 'experience and understand interdependence in the natural world
• Helping children develop concern and care for trees and plants
• Helping children become sensitive to biodiversity
• Helping children observe and explore
• Using natural materials as a resource for math, art, science and environmental studies

Suggested Activities

1. Using Seeds for Games
2. Math Activities
3. Art and Craft Projects
4. Interesting Toys Too
5. Collection of Objects Made from Natural Materials

Objectives

1. To collect and use seeds for games, math, patterns, artwork.
2. To use leaves and seeds for math concepts.
3. To use natural materials for art projects.

Activity 2: Math Activities

Classes I, II

1. This is a fun way to engage in **seriation, sorting, classifying** activities with natural materials of different shapes, colours, sizes and textures.
2. Interacting with shapes, arrangement of leaves, **symmetry** and **asymmetry** inherent in the creations of nature.
3. Not just a blackboard activity; **reinforcing mathematical operations** by use of objects easily available around. Addition and subtraction can be done with natural materials like seeds, tiny twigs, etc.
4. Doing multiplication and division using compound leaves or petals of a flower.
5. Pile up the seeds or lay them flat to make both **two** and **three-dimensional shapes**.
6. A simple way to practice **fraction concepts**.

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7. Broken twigs or sticks can also be used for making a variety of geometrical shapes.
8. Make the multiplication tables using seeds or leaves.

Activity 3: Art and Craft Projects
Classes III, IV, V, VI, VII, VIII

a) Children could create their own **zoo of favourite animals** by arranging varied shapes and sizes of leaves, twigs or seeds to create different animal, insect or even people shapes.
b) Making **leaf prints** and bark rubbings. Several children could combine such artwork to create collages.
c) Creating interesting **patterns and motifs** by varied assemblages of flowers, seeds, pods, leaves or twigs.
d) Children can collect stones and paint on these stones. These stones can be used as paperweights or for decoration.
e) Children can gather sand. Then take some paper and glue and write their names or draw with the glue. Then pour sand on the paper. Sand will stick to the glue and the names will appear. The rest of the sand will fall off. This activity can happen in outdoors.
f) Make a collage of materials from nature using seeds, twigs, leaves and grasses. If this is done once a month, children may start doing it themselves. Often lovely patterns begin to develop.

Activity 4: Interesting Toys Too
Classes III, IV, V, VI, VII, VIII

a) A **leaf flute** to just roll and blow with a *Jamun* leaf.
b) Tie the *Kaner* seeds to make a **seed rattle**.
c) A **leaf fan** to spin around. A mango leaf also makes an interesting fan that works when you walk with it.
d) Non-polluting, nature friendly **leaf crackers**.
e) Amazing **leaf clappers**.
Activity 5: Collection of Objects made of Natural Materials

Classes III, IV, V

Children can bring objects made from natural materials. They should identify the plants from which mats, woven baskets, flutes and ropes are made.

Space for Notes:
40 Colours, Naturally

Introduction

The natural world brings colour and pleasure into our lives. The immense ranges of green, the variety of browns and yellows and reds, the colours of flowers, birds and insects provide a visual treat. These colours can bring delight into the school environment. We do not need any more dull and colourless schools. Each region of India has immense botanical variety. Industrialization, over-population of humans and animals has contributed to the loss of Indian flora and fauna. Our life can only exist if we preserve the natural world. Children need an enthusiastic teacher to introduce them to the colours and beauty of the natural world. You as the teacher can help children learn to treasure their natural heritage.

Teaching-Learning Activities

Activity 1: Nature Walks

Classes I, II

Taking walks around school and the community, MUST be a regular class activity. The walk should always have a purpose that must be discussed with the children beforehand. Some topics could be:

1. Search for various shades of green in leaves.
2. Look for colours of the spring, summer, monsoon and winter season. Make a chart of the colours of each season as the season comes.

Observe the bio-diversity and inter-dependence in nature.
Teacher’s Role

- Bring children’s attention to colour, shades of colour, tones and hues in the school yard or on the road.
- Plan with school staff and children to have colour in the school yard throughout the year.
- Use the botanical varieties and colour to enhance your study of art, science, medicinal plants, climatic and geographical zones.

Suggested Activities

1. Nature Walks
2. Garden Project
3. Botanical Collections
4. Art Projects

Objectives

1. To develop aesthetic appreciation in nature.
2. To notice hues and tones of colours.
3. To develop a school garden of many colours.
4. To learn the names and uses of trees and shrubs.
5. To keep a collection of local flowering trees.

Nature Walks

Classes III, IV, V, VI, VII, VIII

Children must know the flowering shrubs and trees of their region. The principal and teachers need to plan which trees will be studied by the children each year. By deciding which trees are to be studied each year there will be no duplication in the classes. Common trees can be studied in class III and IV and less common in higher classes. By the time they are in class VIII, children will be able to recognize the native trees of their area. Each year, one tree can be studied in detail to watch the development of seasonal changes.

Observe the colours, shapes, forms, patterns, geometry and mathematics in nature

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Activity 2: Garden Project

All classes

a) The importance of beautiful gardens is emphasized. Everyone deserves to live and work in an attractive school and classroom. Children can be a part of the planning and maintenance of clean and attractive surroundings. You do not need a lot of money to keep a school beautiful. Students MUST be involved in the planning of the garden and various projects. They will then keep it maintained. Otherwise, they think this is a job only for gardeners. It is common to see people who do not care for their community, throw garbage into the street or damage it. Do you know of people who make their community dirty? Sometimes holes are dug in streets for weddings or festivals. These adults have probably never cared for public property when they were young. Speeches in school are not effective. Children need to grow up looking after their school and community because it belongs to them. Hopefully positive attitudes towards public property will develop, and remain with them as they grow up.

b) Some plants have strikingly varied colour, shades, shapes or textures of leaves, branches, crown of tree or the tree as a whole. Your region will have striking plants that can be planted in the school grounds.

Activity 3: Botanical Collections

All classes

Children love to make botanical collections. However they also must realize that we cannot indiscriminately harm plants. Maybe you can assign each child a different plant to collect. Rare or exotic plants must never be collected. Classes V, VII and VIII should know what are the rare plants in your region.

If you have completed many activities in this manual, children now realize, that not only leaves, but other plant parts can also be collected. On the same page there should be a drawing of the shape of the tree and also the flower. A note must also be made of the type of soil it lives in. Are the surroundings, dry or marshy or hilly? The flowering and fruit-bearing season must be mentioned.
Activity 4: Art Projects

Classes III, IV, V, VI, VII, VIII

a) Make a colour wheel and search for these same colours in nature. Make a chart of the colour wheel and match natural colours from nature on the chart.
b) Weavers use some natural colours when they dye clothes. Find out from local weavers what colours are used in dying. Make a collection of these colours and display them on a display board.
c) Do an art project using paints that are made from natural colours in nature. You will have to take these flowers and leaves and grind them on a grinding stone. Besides flowers and leaves, some special stones can also be ground to make colour. Sandalwood paste also gives a lovely earthen colour.

Activity 5: Drawing Trees, Flowers and Shrubs

Classes III, IV, VII

a) To help children notice the striking features of plants, you can have art projects and draw these plants. This can be done when you study 10 trees each year. It can also happen when you study the colours of flowers and scented flowers. Although you must not pluck the flowers of trees and shrubs, you may find it necessary to do so because it is impossible to always go on a nature walk. Also children's attention is often diverted outside so you can pluck some leaves and flowers of common trees and shrubs and have the drawing done in class. THE TEACHER MUST NEVER DO THE DRAWING ON THE BLACKBOARD. Children must try and draw using real specimens. Do not worry about neatness. It is important for children to observe whether flowers and leaves are in whorls or spirals or alternate or composite.

Activity 6: Bark Rubbings

Classes VI, VII, VI

a) The barks of trees have many different shades and textures. It is common to see children draw a tree trunk or branches in only one colour-black or brown. You can help aesthetic development by asking them to take bark rubbing of various trees and notice the differences. They can also draw the bark of various trees. Then ask them to paint the many colours of bark. This will help children learn to mix paints or pencil crayon and observe minute differences. They will realize that the bark of trees have many different shades.
b) Make displays on the pin-up boards of different bark rubbings
c) Make displays of the various hues and shades of bark
41 And Some Fragrance Too

Introduction

The freshness of podina and dhuniya,
The gentle waft of chameli,
The smell of wet earth after a summer shower.
There are so many more....
My friend, the breeze brings to me.

There is a world of distinct and subtle fragrances and aromas which add dimension to experiencing nature. Remember that leaves also give fragrant smells.

Please read the modules on Natural Learning Materials (39), Colours, Naturally (40), Inviting More Birds and Bees (42), Mini Herbal Garden using Waste Water (43). These modules will help you to understand the amazing variety and richness of our natural heritage. They will also understand the relationship between bookish studies and the real world outside. Often children just memorize the textbooks but do not understand concepts. As adult you may recall a childhood memory when suddenly you encounter a fragrance. Why not develop our schools that leave a fragrant memory in the minds children through their life?

Teaching-Learning Activities

Activity 1: Yearly Monsoon Plantation

All Classes

Your school garden project must be a continuous and on-going project throughout the years. Some plants are planted in the monsoons and some are planted during the winters.

Planning for the garden requires the support and encouragement of the principal and the teachers. Often the principal and teachers decide on the plantation and force the project onto the children. India is a democratic society that believes in debate and involvement of all members. Children can learn how to become responsible members of society by being involved in the day-to-day affairs of
**Teacher’s Role**

- To help children find local scented and fragrant plants and plant them in the schoolyard.
- To help children learn to appreciate a myriad of scents and aromas.
- To develop classroom activities using scented plants.
- To discuss traditional uses of scented plants.

**Objectives**

1. To planting of aromatic plants.
2. To find unusual scents and develop sense of smell.
3. To develop smelling activities.
4. To develop sensitivity to our natural heritage.

**Suggested Activities**

1. Yearly Monsoon Plantation
2. Smelling Activities
3. Unusual Scents
4. Traditional Uses of Scented Flowers

the school. You must listen to the voices of the children. If you think they are making a mistake, it may be wise to let the mistake happen. For example, children may want to plant more fruit trees then flowering trees. If they realize five years later that no one ever lets the fruits grow to maturity (too many children and monkeys!), they can always change the plan by keeping one of each species for observation, shade, climbing and flowering. Others can be removed and a greater variety of trees and shrubs can be added. In a democratic process, one can debate, discuss, change one’s mind and make mistakes. In dictatorships, no one learns to be responsible. You, as the teacher, can point out the many alternatives such as ‘Mini Herbal Garden using Waste Water (43)’, ‘Composting (37)’, ‘Colours, Naturally (40)’, ‘Inviting More Birds and Bees (42)’.
Some ideas for monsoon plantation will include:

a) Yearly meeting of principal and teachers to review the project.
b) Orientation of new teachers.
c) Appointment of one teacher to co-ordinate with all classes.
d) Appointment of one teacher to co-ordination yearly documentation in a scrapbook or display. It is important that documentation happens through-out the years. Understanding time spans, continuity of generations and changes in the plantations is important.
e) Student-teacher planning in each class.
f) Implementation.
g) Review.
h) Maintenance, repairs and upkeep on a daily, monthly and yearly basis.

Assigning each plant for care, life-long by each child. Children will learn to take care.

**Activity 2: Smelling Activities**

**Classes I, II**

a) Find fragrant flowers in the garden. Bring them to class. Blindfold children and let them smell the flowers. When they have lunchtime in school they should find the vine or the tree that bears these flowers.
b) Ask children to bring other scented flowers from their garden at home. Put them in a dish of water and decorate your classroom.
c) Ask children to find scented leaves. Crush the leaves. Compare the scents. Which leaves have a heavy scent? Which leaves have a light scent? Describe the scents.

**Space for Notes:**
Classes III, IV, V

a) Compare natural fragrances and artificial fragrances. Ask children to bring powders, soap, incense sticks and other fragrances that are made from chemicals. Could some fragrances be harmful even though they smell good? Is there a difference between scents and perfume? What natural scents are found at home and what artificial scents do we use?

b) Find examples of heavy fragrances such as tube rose, or raat-ki-rani or cloves

c) Find examples of trees and flowers that give fragrances only at night

d) Ask children to smell the fragrances of cacti. Describe these scents.

Activity 3: Unusual Fragrances

Classes III, IV, V, VI

a) There are many uncommon fragrances. Ask the children to find them. If possible bring samples to class. The scents of many spices are strong. Collect them and blindfold children and let them guess.

b) Herbs have unusual smells. Collect herbs, such as mint, coriander, tulsi, fennel, fenugreek and smell them. Make a display and ask children which herbs are used in their home and how.

Activity 4: Traditional Uses of Scented Flowers

Classes I, II, III

When you notice that Harsingar, Bela and Jasmine are blooming, you can have a class discussion about the uses of these flowers. Children will tell you what their parents do. Some make offerings at the morning pooja, some tie malas in their hair. You can ask children to make a pretty mala with leaves and scented flowers and decorate the classroom.
42 Inviting More Birds and Bees

Introduction

The concept behind this idea is to create a more diverse and fuller interaction with nature within the school. It is about selecting and planting species that would invite more birds, bees, butterflies, insects ... by bringing in or enhancing their natural habitat – primarily through provision of food sources, shade, nesting opportunities and water. Planting and encouraging a diversity of indigenous plants is a good thumb rule – a rather sure way to get many birds, bees, butterflies, etc. Some plants which are exceptional and known attractants of birds, bees...have been listed as suggestions. Additionally if some water could be made available, that is certain to help bring in birds. The wastewater channel, if it’s an open one, could double up as a constant water source for birds. However, make sure that it does not become a breeding ground for mosquitoes.

Objectives

1. Encountering and observing a diversity of beautiful winged (and other) life forms freely in their habitat.
2. Elements of surprise, wonder, discovery, knowing and joy.
3. Learning about the natural habitat of variety of plants and animals, birds and insects.
4. Understanding inter-dependence in the natural world.
5. Understanding the food chain.
6. Understanding the life cycles of different life forms.
7. Developing a general sensitivity towards nature.
8. Providing opportunity for a make-believe (and real !) world of a child shared with plants, animals, birds and insects.

Teaching-Learning Activities

Activity 1: Story telling
Classes I, II, III, IV, V
All children enjoy stories. Many of the tales such as ‘Panchtantra ki kahanian’ or ‘The Jatak Tales’ are woven around trees and animals. Children will enjoy a lot if stories with trees in their school are narrated to them. One such story is given after Activity 2.

Bird on a flower
Bird feeds and pigeon holes
A courtyard for birds
Teacher’s Role

You will notice that once you develop a school garden, there will be more birds and small animals living in the trees around you. India once was a land of beautiful forests. When the forests were cut down, the animals also lost their homes. Your school garden can again become home to small animals such as squirrels and mongoose. If you have a few groves of dense shrubs where children cannot walk some small birds may even build their nests. Birds need a peaceful place to raise their young and therefore a school is not a peaceful place unless you have a few acres of dense shrub and forest. They also have many enemies such as cats and parasitic birds like the koel, cuckoos and magpie.

Nevertheless birds will visit your school and add charm to the environment. Children can bring rice, mustard seeds Jwar, Bajra and scatter the seeds under trees for food. Just as it is important to know your local trees, get a bird book and learn to identify the birds. Generally birds are active in the early morning and again in the evening.

If you have birds in your vegetable garden they will eat some of the insects that eat your vegetables. If you spray your garden with insecticides you will also poison the birds. Are there ways that you can plant fruit and vegetables organically? These poison sprays also harm us and destroy the organisms in the soil. Today scientists are searching for ways to grow crops and vegetables without spraying harmful chemicals.

Wherever possible, one may look towards integrating trees and plants that provide food, shelter, shade for the above and other life forms. It might be useful to provide bird baths and nests on some of the trees suggested here. Making and maintaining them by the children could be an interesting activity. You could even install a Periscope on Wall (32) to peep into a high bird feed secretly!

Suggested Activities

1. Story Telling
2. Observing the Tree Habitat

Activity 2: Observing the Tree Habitat

Classes V, VI, VII, VIII

A single tree can provide food and shelter to many different living creatures. Select a tree in your area, preferably a tree, which is in flower, or bearing fruit, like the Pipal tree in the passage. Observe it everyday for a week and make a record of all the different insects, birds and small animals on, or under the tree.
A Jatak tale of a monkey and a crocodile

On a river side there was a huge Jamun tree, on which a monkey used to live. He was very friendly with a crocodile living on the opposite side of the river. Monkey used to eat Jamun and threw some from the tree for his friend crocodile also. Both friends used to chat and enjoy life. One day monkey gave some jamuns to the crocodile for his wife. The wife ate the Jamuns. She thought for a while and told her husband that when jamuns are so sweet, then how sweet will be the heart of a monkey who lives on the Jamun tree. I want to eat his heart. The crocodile tried to remonstrate his wife but she was adamant.

Next day the grief-stricken crocodile swam up to the Jamun tree. He did not show his feelings to the monkey. He told him that his wife was pleased with the gift of Jamuns. In turn, she has invited him for dinner. So the monkey sat on his back to go to his home to meet the crocodile’s wife. In the middle of the stream the crocodile told the monkey that actually his wife wanted to eat his heart. The monkey thought for a while and told the crocodile - ‘my friend I have no problem giving my heart to your wife as food. Unfortunately, I have left it in the Jamun tree. So please take me back to the shore’. The unsuspecting crocodile swam back to the Jamun tree. The monkey jumped to the tree, never to be friendly with the crocodile again!
### Suggested plant species for inviting more birds bees, butterflies...

<table>
<thead>
<tr>
<th>Trees</th>
<th>Botanical Name</th>
<th>Whom does it attract?</th>
<th>What attracts them?</th>
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</thead>
<tbody>
<tr>
<td>Gular</td>
<td>Ficus glomerata</td>
<td>Birds, Squirrels</td>
<td>Fruits</td>
</tr>
<tr>
<td>Pipal</td>
<td>Ficus religiosa</td>
<td>Birds, Squirrels</td>
<td>Fruits</td>
</tr>
<tr>
<td>Pilkhan</td>
<td>Ficus infectoria / rumphii</td>
<td>Birds, Squirrels</td>
<td>Fruits</td>
</tr>
<tr>
<td>Makhan Katori</td>
<td>Ficus krishnae</td>
<td>Birds, Squirrels</td>
<td>Fruits</td>
</tr>
<tr>
<td>Jambil</td>
<td>Syzygium cumini</td>
<td>Birds, Squirrels</td>
<td>Fruits</td>
</tr>
<tr>
<td>Drumsticks</td>
<td>Moringa oleifera</td>
<td>Birds, Bees, Butterflies</td>
<td>Profuse and incessant blooming flowers</td>
</tr>
<tr>
<td>Toti Phul</td>
<td>Erythrina indica</td>
<td>Birds</td>
<td>Flowers</td>
</tr>
<tr>
<td>Palash</td>
<td>Butea monosperma</td>
<td>Birds, Lac insect</td>
<td>Flowers</td>
</tr>
<tr>
<td>Ber</td>
<td>Zizyphus mauritiana</td>
<td>Birds, Children</td>
<td>Fruit</td>
</tr>
<tr>
<td>Shehtoot</td>
<td>Morus alba</td>
<td>Birds, Children</td>
<td>Fruits</td>
</tr>
<tr>
<td>Banana</td>
<td></td>
<td>Insects</td>
<td>Honey and pollen</td>
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<tr>
<td>Siras</td>
<td>Albizia lebbeck</td>
<td>Birds, Squirrels</td>
<td>Pods</td>
</tr>
</tbody>
</table>

### Shrubs

| Calliandra  | Calliandra coloathyrsus         | Parrots               | Flowers             |
| Sthal kamal|                                   | Moth, bees            | Flowers             |
| Murayya     | Murayya paniculata              | Butterflies, bees     | Flowers             |
| Capparis    |                                   | Birds                 | Flowers             |
| Kaina / kedi|                                   | Birds                 | Flowers             |
Introduction

In ‘Colours, Naturally (40)’ and ‘And Some Fragrance Too (41)’ we have discussed planning and developing school gardens. You also need to consider the watering and maintenance of these gardens. Trees may need some assistance at the beginning but soon develop strong root systems and can manage by themselves. However, shrubs, herbs and flowers need to be watered.

There is always waste water in a school. This would usually be near drinking water or wash areas. How can this waste water be used to support gardening activities?

Suggested Activities

1. Observation of the Waste Water
2. Learning Uses of Herbs and Medicinal Plants

Teaching-Learning Activities

Activity 1: Observation of Waste Water

Classes I, II

In Health and Hygiene (38) module, the importance of water is discussed. It is needed for cleaning, for drinking for growing a garden and for crops. Many schools ask children the process of washing hands before eating. Now you can go one step more and ask what happens to water that has been used? Take children for a walk to the school taps or the hand pump. Where does it go? Does it harm the foundation of the school or leave a muddy puddle? How can it be used? Can it be recycled?

Activity 2: Learning Uses of Herbs and Medicinal Plants

Classes V, VI, VII, VIII

Now you will have to ask knowledgeable people and elders in your community about useful herbs and medicinal plants. Some are very common; others may have to be obtained from a nursery.

Channelising the waste water from handpump to herbal garden using mural slope. Remember not to let it stagnate.

Developing the herbal garden in the backyard and giving names to the herbs. Children take responsibility to maintain it.
Teacher’s Role

- To help children understand conservation of valuable water resources by using water from the drinking taps or handpumps for gardening activities.
- To help children understand how stagnant water causes diseases.
- To help plan a herb and medicinal garden.

Objectives

1. To help children use waste water for school nurseries and gardens.
2. To help children learn to use simple technology to transfer the water.
3. To learn about common herbs and medicinal plants.
4. To learn how to follow directions using a map.

Besides planting herbs like aloe vera, lemon grass, *isabgol*, *mehi* and *sauf*, you must ask your parents and grandparents when to use them and in what proportion.

You can start a diary that may become a life time hobby, both interesting and useful.

For example, in Kerala a medicine for dysentery is:

- Roast a teaspoon of cumin seeds and grind them.
- Take this mixture and boil it in a glass of water.
- When half the water has evaporated, let it cool and give it to the patient.

It will be useful to name the herb in local language (mother tongue), as well as its correct botanical name, near its respective location. Additionally, its use for treatment as well as dose may also be given for children to know. People from the community, who are knowledgeable may come and demonstrate its use to the children every few months. Thus, the knowledge of herbs will not be lost and perhaps be carried forward to further generation.
Annexure I

List of books on science activities
by Arvind Gupta, IUCCA Pune

1. Khel-Khel Mein (Hindi); Rs 12/-
2. Little Science / Kabad Se Jugad (Hindi/English); Rs 20/-
3. The Toy Bag / Khilonon Ka Basta (Hindi/English); Rs 25/-
4. Toy Treasures / Khilonon Ka Khazana (Hindi/English); Rs 22/-

These four books (1 - 4) can be bought by sending a Money Order or D/D of Rs 110/- (including registered postage) to

EKLAVYA  E-10 BDA Colony Shankar Nagar
Š Shivaji Nagar  Bhopal 462016

Email: pitara@eklavya.in and www.eklavya.in

Eklavya also publishes very inexpensive activity books. A set of 8 books in Hindi is Rs. 75

1. Matches Ki Tiliyon Kay Khel
2. Varg Paheli
3. Bujo-Bujo
4. Matha pachhi
5. Bhool Bulaiya
6. Darpan se Bhujo
7. Manganit
8. Bhujo Bhujo 2

Other Activity Books are:

5. Ten Little Fingers (English); Rs. 65/-
6. String Games (English); Rs. 40/-
7. Little Toys (English); Rs. 20/-

These three books (5 - 7) have been published by

NATIONAL BOOK TRUST (NBT)  Green Park, New Delhi 110016

(You should be able to buy them in your town in a shop, which sells NBT books)

9. Leaf Zoo; Rs. 20/-
10. Toy-Joy; Rs. 20/-
11. Energy and Self Reliance; Rs. 45 by Yona Friedman and Eda Schaur
12. Thumbprints; Rs. 45 Arvind Gupta

These four books (8 - 11) have been published by

VIGYAN PRASAR  A – 50 Institutional Area, Sector 62, NOIDA (U.P) 210307
vigyan@hub.nic.in

Other reference material that should be in all school libraries

1. Danger School, IDAC document, Other India Bookstore, Mapusa, Goa
2. String Games, Arvind Gupta, NBT
3. Helping Heath Workers Learn-David Werner and Bill Bower, VHAI, India.
4. Apne Haat Vigyan, VSO, Eklavya
5. Ganit Ki Gatavidad VSO, Eklavya
6. How to Make and Use Visual Aids, Nicola Hartford and Nicola Baird, VSO
8. The I Hate Mathematics Book, Marilyn Burns, Cambridge University Press
9. Paper Fun, Eric Kenneway, Beaver Books
10. Paper Shapes, Eric Kenneway, Beaver Books
14. Divasvapna, Gijubhai Badheka, NBT
15. Toto Chan, Tetsuko Kuroyangi, NBT
16. The Child’s language and the Teacher, Krishna Kumar, NBT
17. The Blackboard Book-Orient Longman
18. Unesco Source Book for Science in the Primary School, Harlen, NBT
19. Samajh Ke Liye Taiyari, Keith Warren, NBT
List of Collected Loose Materials for an Active Classroom and Fantasy Centers

1. Boxes of all sizes-cartons, shoe boxes, small boxes
2. Cotton
3. Corrugated cardboard from bulb packages
4. Chalk - different colours
5. Old crayons
6. Old wrapping paper,
7. Cellophane paper
8. Old magazines for collage and cutting and pasting
9. Seeds of imli, amaltas, sharifa
10. All kinds of wrappers-soap, toothpaste, tea boxes, oil bottles, cream boxes, powder boxes
11. Fabric scraps
12. Used syringes (capacity 1ml to 20ml, duly boiled)
13. Old purses
14. Old clocks
15. Old irons
16. Old wedding and greeting cards
17. Old bangles
18. Old socks
19. Old switches
20. Used buttons of different sizes and colours
21. Old used bottle caps, plastic and tin, old baby bottles
22. Old calendars
23. Feathers
24. Old pens and refills
25. Old cameras
26. Old plastic containers and dishes
27. Front and back hard covers of old registers
28. Ice cream containers
29. Clay
30. Old cotton sarees
31. Shells
32. Old sketch pens and pens- to cut into beads
33. Pieces of yarn and string
34. Old lehngas and dupattas
35. Dolls
36. Ice cream sticks
37. Old tea strainers, old flour strainers
38. Old frames of glasses
39. Any things that you think children would like – especially interlocking toys like lego, or puzzles or mechnano or educational aids
40. Used Pencils of different lengths
41. Pens, Sketch pens
42. Small pebbles
43. Rubber bands (smaller size)
44. Strings of different lengths
45. Tailor’s measuring tape
46. Weighing scale with 2 pans
47. Weight bar (100g)
48. Plastic bottles of different capacities
49. Milk measuring cans (1ltr, 500ml, 250ml)
50. Bottle caps of different sizes
51. Defective time pieces and clocks
52. Scissors for cutting paper
53. Used post cards
54. One side blank papers
55. Mirror pieces (properly cut)
56. Used tickets of Train, Bus, Flights, cinema, mela etc.
57. Real cash memos
58. Empty & duly washed bottles of toiletry items
59. Used file covers
60. Magnifying glasses
61. Concave and convex surfaces
62. Candles and match box
63. Glass tumbler / big mouth bottle
History and Background of BaLA

Building as Learning Aid (BaLA) is a concept that has its genesis in Lok Jumbish Programme of 1990’s in Rajasthan, India, when it was initially conceived by VINYĀŚ. This interdisciplinary concept explores the possibility of developing the physical built environment of existing as well as new schools to be used as a learning resource in the teaching learning process. Since Lok Jumbish, this concept has been developed extensively and is now being taken up by SSA at the national level and by several states in India, with the technical support of Vinyāś. UNICEF India has played a key role in development and dissemination of BaLA ideas since inception.

What is Building as Learning Aid?

BaLA (Building as Learning Aid) is about maximizing the educational, learning and fun value of a built space for children. It is an interdisciplinary concept that combines architecture, design with child development, child’s aspiration, child’s behaviour, pedagogy of learning language, mathematics and science. It addresses the learning and fun needs of children while keeping in view the four pillars of learning (as propounded by UNESCO for education in the 21st century) – learning to know, learning to do, learning to live together and learning to be. It is also closely linked to the strategic goals of Universalisation of Elementary Education namely Access, Retention, Equity and Quality.

While school buildings are meant for children, they are constructed for them, yet very often do not relate to them in a holistic way. Various studies have conclusively proven that children learn best in a child-friendly, stimulating and aesthetically pleasing school environment.

Schools are specialized spaces for learning. Traditionally, school buildings have been conceived to provide shelter and to support the activity of education. Often they are treated as structures of bricks, mortar and concrete, rather than as enclosures that encompass a learning environment. Very often, insufficient attention is paid to the interface between building design and the design of the teaching and learning program. How the use of space and its constituent elements, including lighting and ventilation, can support more diverse learning activities apart from didactic teaching?

The fact that the physical space could be a resource in the teaching-learning process has seldom been explored seriously. Buildings are also the most expensive physical asset of a school. By innovatively treating the school spaces (e.g. classroom, circulation spaces, outdoors, landscape and natural environment) and their constituent built elements (like the floor, wall, ceiling, door, windows, furniture, open ground) a range of learning situations and materials can be integrated such that they can actively be used as a learning resource. This resource could complement teaching process and supplement textbook information, much beyond providing wall space for posters and decoration.

A three-dimensional space can offer a unique setting for a child to learn because it can introduce a multiple sensory experience into the otherwise uni-sensory textbook or a black board transacted by a teacher. These could be visual, tactile, olfactory sensory cues in the built environment or especially designed kinaesthetic movement inside or outside that provides a unique learning experience to children. It can offer the potential of making abstract concepts more concrete and real from the child’s perspective. Dimensions, textures, shapes, angles, and movement can be used to communicate some basic concepts of language, science, mathematics and environment, to make learning a truly enjoyable and memorable experience for children.

Building as a Learning Aid (BaLA), aims at using the built elements like the floor, walls, pillars, staircases, windows, doors, ceilings, fans, trees, flowers, or even rainwater falling on the building as learning aids. For example, a window security grill can be designed to help the children to develop gross motor movement for pre-writing at early grade or to understand fractions at a higher grade; a range of angles can be marked under a door shutter on the floor to explain the concept of angles; or ceiling fans can be painted with colour wheels for the children to enjoy ever-changing formations and understand

\[ \text{This concept was originally developed by Vinyāś, Centre for Architectural Research & Design. BaLA is a copyright of Vinyāś.} \]

\[ \text{Learning: The Treasure With-In, Report to UNESCO of the International Commission on education for the twenty first century, UNESCO, 1996. The four pillars of education, Pages 85 -97} \]
rotational symmetry; moving shadows of a flag-pole to act like a sundial to understand different ways of measuring time; planting trees that shed their leaves in winters and are green in summers to make a comfortable outdoor learning space.

The idea of BaLA has emerged out of the needs of India’s own larger socio-economic-cultural and education situation. It looks at optimising the resources available. It is about creative use of what is around. The process of implementing BaLA has the potential to enrich and unleash the creative potential of a school and its inhabitants, in settings that are also culturally sensitive to their own socio-economic and cultural situation at home. It further increases the ‘learning opportunity time’, at their own individual pace (during school and beyond school hours), in settings that the inhabitants are physically and psychologically comfortable with.

In essence, BaLA is about first identifying various potential settings for learning for children and then equipping them with age-appropriate learning resources for them to engage with. In the process, the entire indoor, outdoor space becomes resource for learning and fun.

BaLA is based on integrated child-development theory that addresses the social, emotional, cognitive, physical and spiritual development, through use of spaces.

Children learn in a continuum. They learn beyond the four walls of a classroom. Cognitive skills taught in a classroom are important. But the social, physical and emotional needs are equally important for the life and also for the development of later cognitive skill. For example, only when a child understands the concept of up and down by jumping, climbing and innumerable other activities, can he/she apply this skill in the subtraction by understanding which number has to be ‘up’ and which ‘down’. She/ he will need the value of perseverance, when she/he gets the subtraction wrong again and again. And these skills are not necessarily learnt in a classroom.

Outdoor and semi-outdoor spaces can be a great resource for the social, emotional and physical development of children by providing them diverse and appropriate settings for play, socialization and interaction. BaLA tries to align the design of outdoor spaces (like backyard, front yard, terraces, incidental pockets of spaces) and semi-outdoor spaces (corridors, balconies courtyards etc.) with the learning needs of children. These needs vary across grades, across gender, and across abilities and have to be provided accordingly. BaLA aims to maximise the educational value of an existing built resource – inside or outside.

Broadly, indoor classroom BaLA ideas may be grade-specific (but usable for different subjects), BaLA ideas in semi-open spaces and outdoor spaces may suit multi-grade requirements in varying degree, according to the spatial use. However, each new situation offers its own unique possibilities.

Building, by definition, has a strong nuance of permanence in its very nature. Education and learning are processes that are always evolving and changing in their nature, especially for children. This dichotomy needs to be resolved in BaLA. BaLA resolves it by providing multiple-use (multi-grade as well as multi-subject) in most of its elements. Thus, unlike a usual Teaching-Learning Aid, the same BaLA element, even through permanently located in a building can be used by children and teachers of the same grade for multiple activities/subjects or by children of different grades in different ways. This gives it the inherent ‘looseness’ and ‘flexibility’ and lends itself to creativity also.

To achieve the above, the both process of design and implementation of BaLA are critical.

Today, BaLA is an integral component of Whole School Development Planning under RTE to be implemented across the country through SSA.
About Vinyās and BaLA

Vinyās is a centre for architectural research and design, based in New Delhi. It undertakes innovative, application oriented, interdisciplinary research and design, builds capacity, provides policy support and disseminates ideas. Vinyās has advised and provided consultancy to the Government of India, UNICEF, UNESCO, UNDP, the World Bank, DFID, GTZ, Aga Khan Foundation, Rajiv Gandhi Foundation, HUDCO, apart from several NGOs and private institutions on matters related to education, building design, conservation, tourism, training, construction, policy, etc. Their work has been listed amongst the 32 Great stories of Change: Inventive Indians in 2009. Vinyās conducts workshops and training programmes for administrators, architects, engineers, teachers and masons in participative design and construction practices. It is also the original inventor of the concept of Building as Learning Aid (BaLA).

BaLA is about maximising the educational, learning and fun value of a built space for children. Vinyās developed this concept to address the enhancement of physical learning environment of schools and other spaces meant for children in rural as well as urban areas in different parts of the country. Vinyās has so far developed over 150 design ideas for implementation in varied situations for schools and other spaces for learning and fun for children. However, this has now grown substantially, with inputs and creativity of school head teachers, teachers, engineers, administrators, architects, across the country.

Vinyās has provided technical support to design, implement BaLA in thousands of SSA schools across the country in states ranging from Jammu and Kashmir, Himachal Pradesh, Uttrakhand, Punjab, Delhi, Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Chhattisgarh, Bihar, West Bengal, Orissa, Karnataka, Tamilnadu, Kerela, etc. through technical support materials, orientation, workshops on capacity building of education planners and administrators, pedagogues, teachers and civil engineers. The comprehensive documentation used in this manual from across the country is a testimony to this. This technical support has been solely provided by Vinyās, in partnership with Department of School Education and Literacy (DoSEL), under Ministry of Human Resource Development, Government of India (MHRD), EdCIL, UNICEF, Rajiv Gandhi Foundation and respective State governments. In past few years, Vinyās has oriented or trained over 7000 Children, Teachers, School Headmasters and Principals, Cluster and Block Resource Coordinators, District Civil Engineers, Architects, Education Administrators, Policy Planners and Ministers on BaLA across the country.

Government of NCT of Delhi also awarded Vinyās for outstanding partnership in implementing BaLA in its schools in 2009.

Principal constituents of Vinyās have also contributed in the text on physical environment in the National Curriculum Framework 2005 for NCERT that incorporates the BaLA ideas for schools. Principal Architect of Vinyās has also written a book on BaLA, which has been widely read across the country and was supported for publication by the World Bank in 2005. BaLA ideas are also part of the revised SSA Framework for implementation developed after enactment of Right of Children to Free and Compulsory Education (RTE) Act 2009. A publication was brought out by Government of NCT of Delhi in 2008 for implementing BaLA in over 900 schools of Delhi. The technical component of this comprehensive document was also authored by Vinyās.