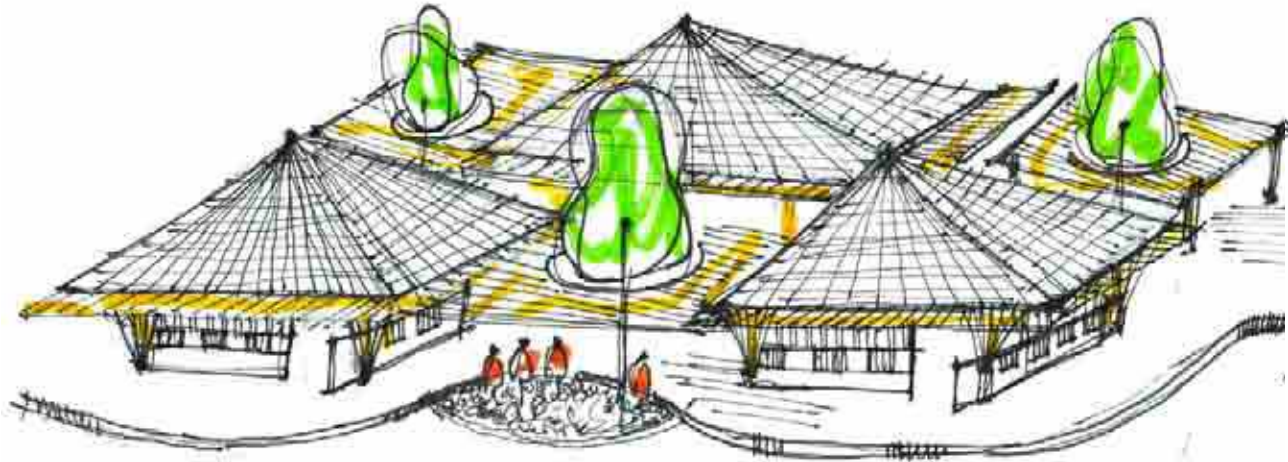


MANUAL FOR PREPARING A MASTER PLAN For Existing Schools



Benny Kuriakose
Shruthi Raghunath
Swathy Subramanian
Aishwarya Chauhan

2019

MANUAL FOR PREPARING A MASTERPLAN

For Existing Schools

English

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Benny Kuriakose
Flat F, Springwoods Apartments,
No: 6, Ranjith Road,
Kotturpuram, Chennai - 600 085
Phone : 044 - 24471172, 24474794

info@bennykuriakose.com
www.bennykuriakose.com

"School is not merely a structure or a building. Neither is it only an assembly of children and teachers. It is a specialised space for children to learn and grow.

It is the place that shapes their thoughts and can see knowledge come alive."

- KABIR VAJPAYEE, ARCHITECT

CREDITS

Authors

Benny Kuriakose
Shruthi Raghunath
Swathy Subramanian
Aishwarya Chauhan

Sketches

Swathy Subramanian

Layout (English Edition)

Basoli Dhirai

Acknowledgements

Tejas Amrutkar
Kishore Kumar
Shrutika Vasant
Vani G
Jayalakshmi B
Haasini Casukhela

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Preface

This manual has been prepared for the teachers, students, parents, engineers and others who are involved in the reorganization of existing schools. Classrooms, library, laboratories, playgrounds etc. are crucial elements of a child's growth in learning and creating future citizens of the society. The guidelines in the manual emphasize good design, quality, safety, cost and its effectiveness in innovations in educational pedagogy.

They are the people who are in the field and if their know-how is better, then one will be able to get a better product. We have tried to give the basic logic behind many of the planning exercises and the “whys” are important to ensure that the renovation and construction of the buildings happen with a better perspective. We have tried to make the manual as simple as

possible so that even a nontechnical person can understand and follow most of the things. We have not dealt since they might not be applicable for most of the schools. This is a reference book of guidelines and not exhaustive. It is in no way intended to replace the architects or the engineers.

We have mostly kept the requirements of the government schools, but at the same time on how to convert the existing schools to very high standards. While many of the guidelines might not be possible in the present schools, the buildings we build now are going to be in existence for another century. Designers and the stakeholders of school buildings need to have a “vision for the future”. To think about the future is very important since substantial investments are going to be made in the school sector in Kerala.

The basis for much of the information for the manual was our involvement with the design and reorganization of some of the schools in Kerala and Tamil Nadu.

The valuable experience in the various facets are covered in the manual to make them available for a wider public and it should not remain only in the memories of the individuals who worked in these projects.

I would like to thank my colleagues in the office who have given their assistance and co-operation in the preparation of the manual.

I would like to thank Dr. M P Parameswaran, Dr. P K Ravindran and Rubin DCruz who have given their suggestions, which have led to the improvement.

Also, Dr. Usha Titus, Secretary, General Education, Government of Kerala has given her valuable inputs and taken steps in publishing this manual.

I hope that the teachers, students and parents will make use of the manual in reorganizing the existing schools effectively and efficiently.

Dr. Benny Kuriakose
Chennai

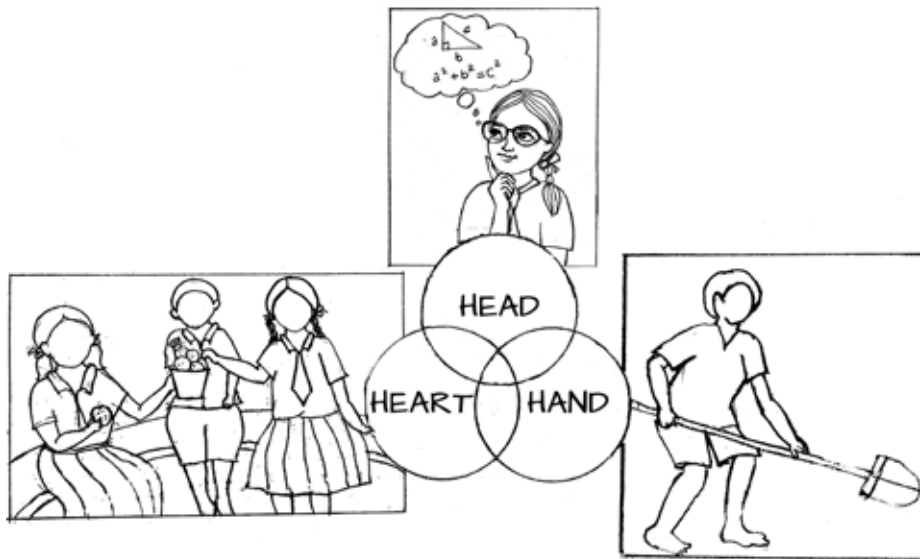
01. Introduction

The Manual for Preparing a Master Plan for Existing Schools is a document containing ideas and techniques for planning a school layout. It includes some important aspects to be considered during the process of designing a school.

The material in this manual talks about planning aspects of a school such as layout, furniture arrangement in a classroom, details of planning a library block within the school, to name a few. It takes into consideration, some simple ideas that may help giving direction to the planning process.

The manual is meant for anyone attempting to create a better learning space for school children. It is not meant to replace an architect.

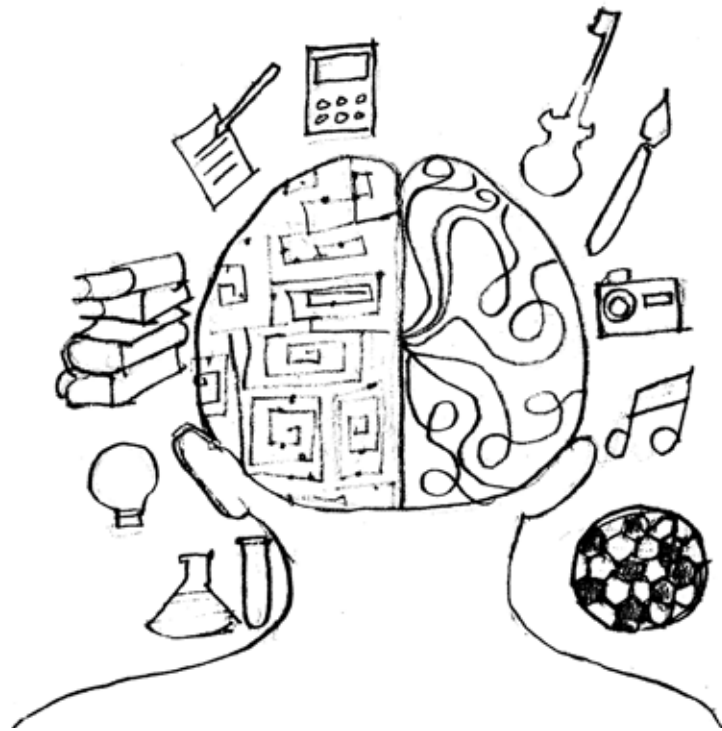
The best way to use it, is as a reference book to look up some ideas for planning a school or classroom layout, as the need arises.



An Ideal School

An ideal school will help the children grow as a whole.

The Head Hand Heart approach refers to a method of teaching that encourages a holistic development of the mental, physical and emotional abilities of a child. Through this approach, the school can ensure an integrated development of every child, making them thoroughly understand concepts by applying them in their daily lives.



For a balanced mental growth of a child, it is important to develop both the left and the right sides of the brain.

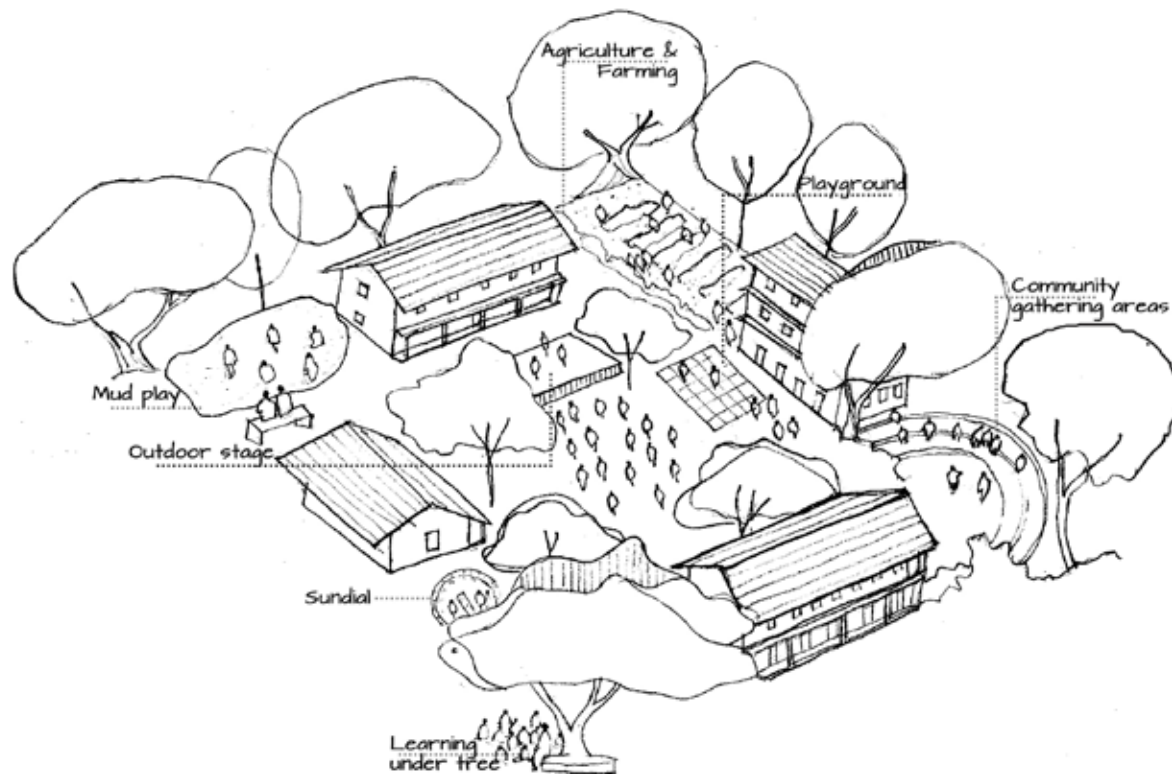
The left side of the brain focuses on logical thinking, reasoning and structured thoughts; whereas, the right side of the brain is involved in creative, innovative and lateral thinking. Implementing activities that involve both sides of the brain can be encouraged in the school, and so designing spaces for such activities becomes critical.



Spaces in a school allocated for alternate

Children are great discoverers of spaces. They like to run, play, jump, hide, climb, talk etc. Apart from academics, the school can focus on physical and creative activities like:

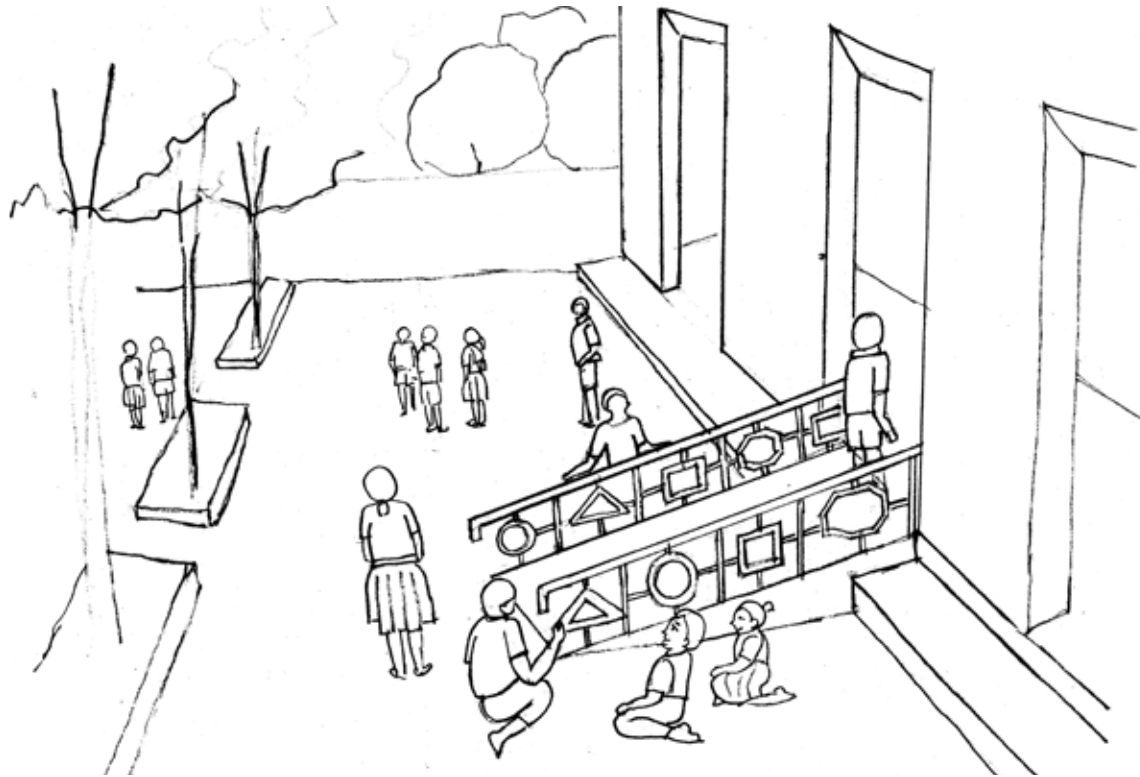
- Sports
- Arts and crafts
- Carpentry, pottery, weaving
- Agriculture and farming



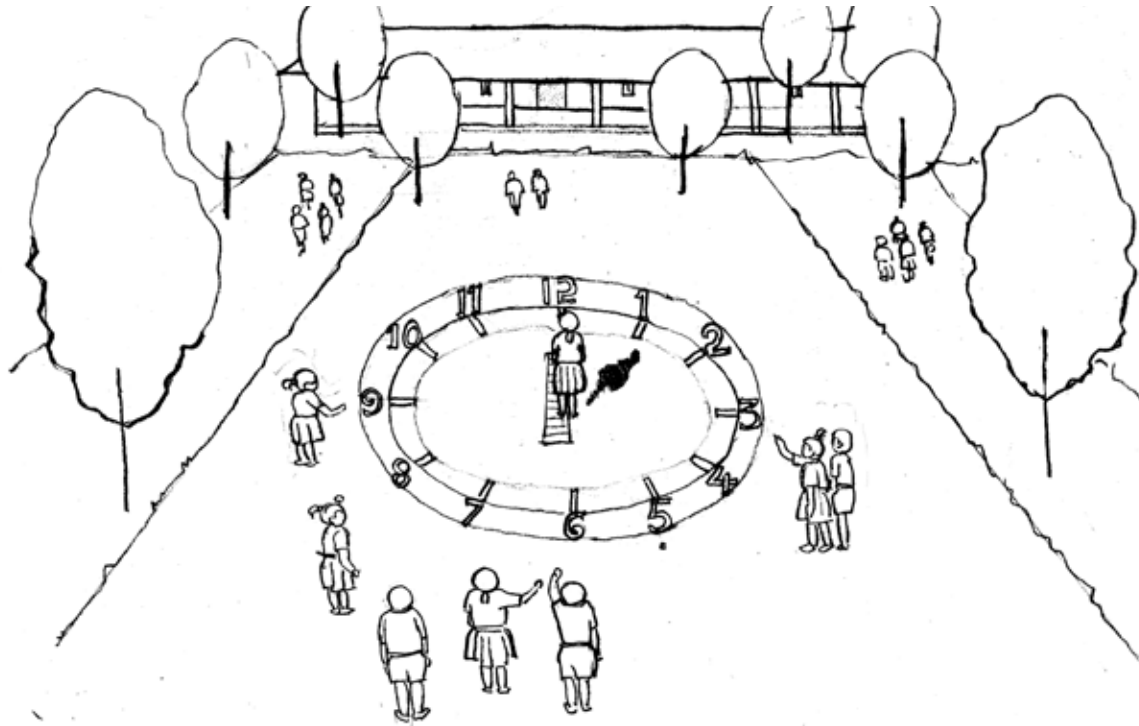
Spaces in a school for implementing activities

The spaces that can be introduced in the school, to acknowledge such behavior in children are :

- Playgrounds
- Workshops and activity areas
- Gardens
- Indoor play areas
- Exhibition spaces
- Theatre



The interaction of a child with the building and its elements can assist in maximizing the learning experience at school.

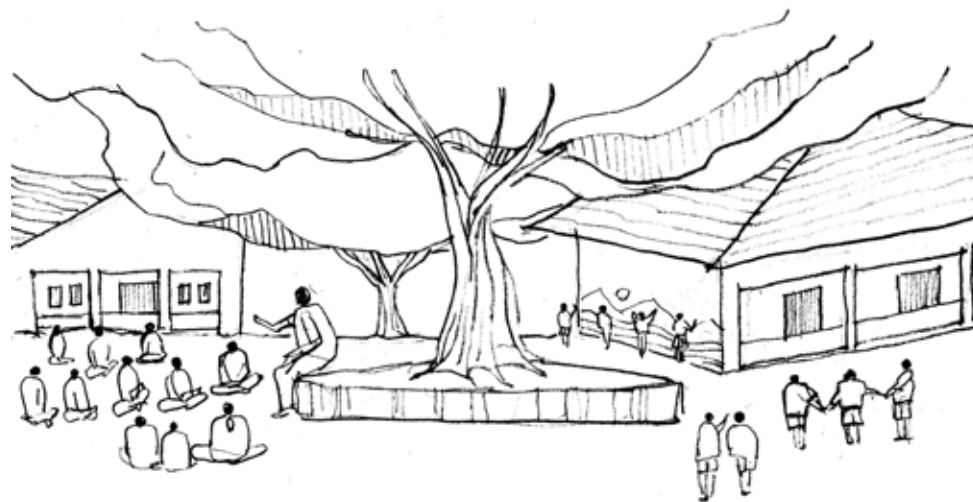


Children using the sundial within the school grounds as a play element, aiding indirect form of learning.



Spaces can be designed in a way that they support different methods of learning.

Their use can evolve to cater to various activities. For example, the spaces can promote individualistic learning as well as collaborative learning.



Spaces that encourage children to learn in any

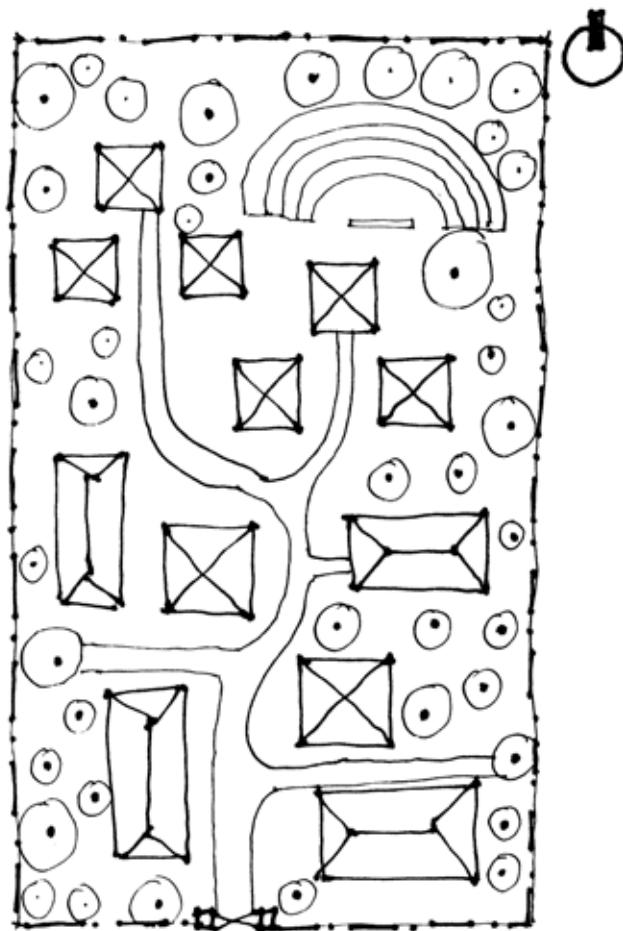
The process of planning a school involves thinking not only about the present, but also its requirements for the next 25-30 years.

Even though this exercise may slow down the process, it is necessary to pay attention to this criterion. The students, teachers and parents, have an important role to play in the design of the school building. The design can aid, influence, teach, and structure the thoughts of students in a school program.

The following chapters discuss about some of these aspects which can help add value to the design of the school.

02. Site Considerations

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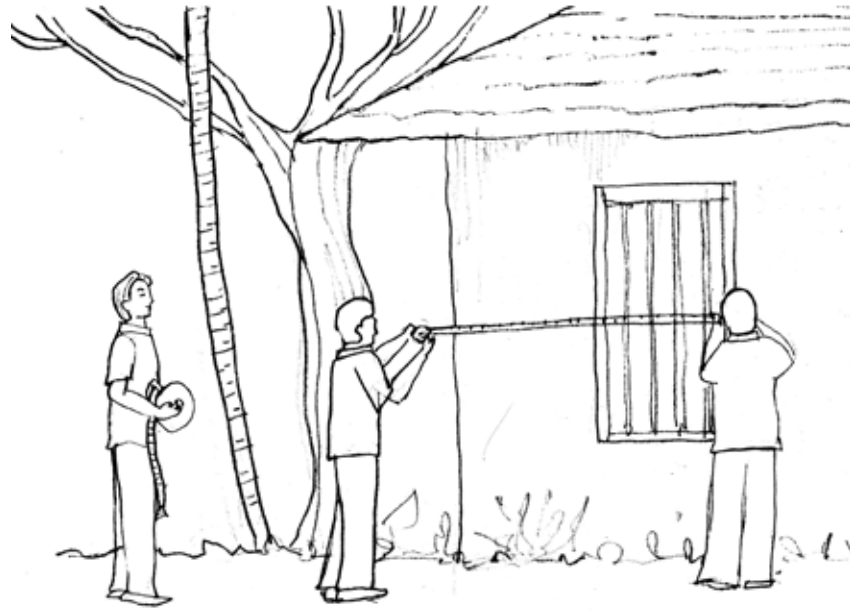


Understanding the Site

Any site should preferably be studied before planning the school layout. It helps in understanding the locational, geographical, historical and infrastructural context of the school.

A master plan is a graphical sketch which contains details about the location of buildings, landscape and other site components, arranged to achieve the best possible configuration.

Studying the site helps in laying out an efficient master plan for the school.



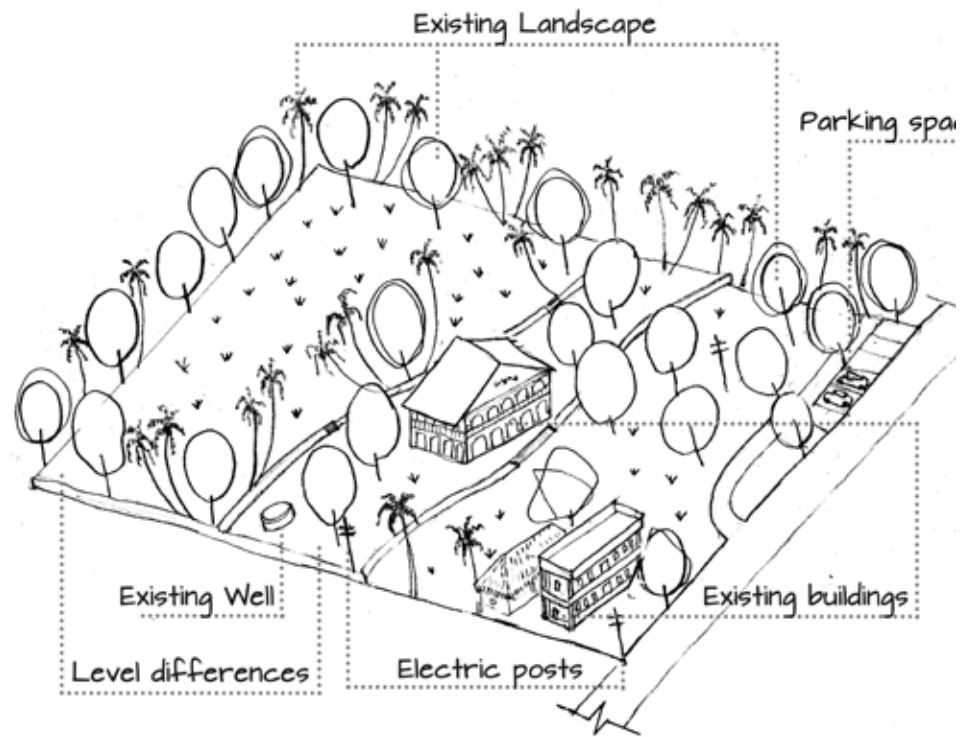
Mapping the Site Layout

It is important to read the existing site to get an idea of the available structures, features, and the spaces that are additionally required to fulfill the school's needs.

Step 1

For schools that are already built, the management can organise a team to measure and draw a site plan of the existing buildings and other site features like landscape, level differences, parking spaces and even elements such as trees, wells, electric posts etc, with accurate dimensions.

It can be challenging to make a site plan and professionals may need to be consulted for drafting it.

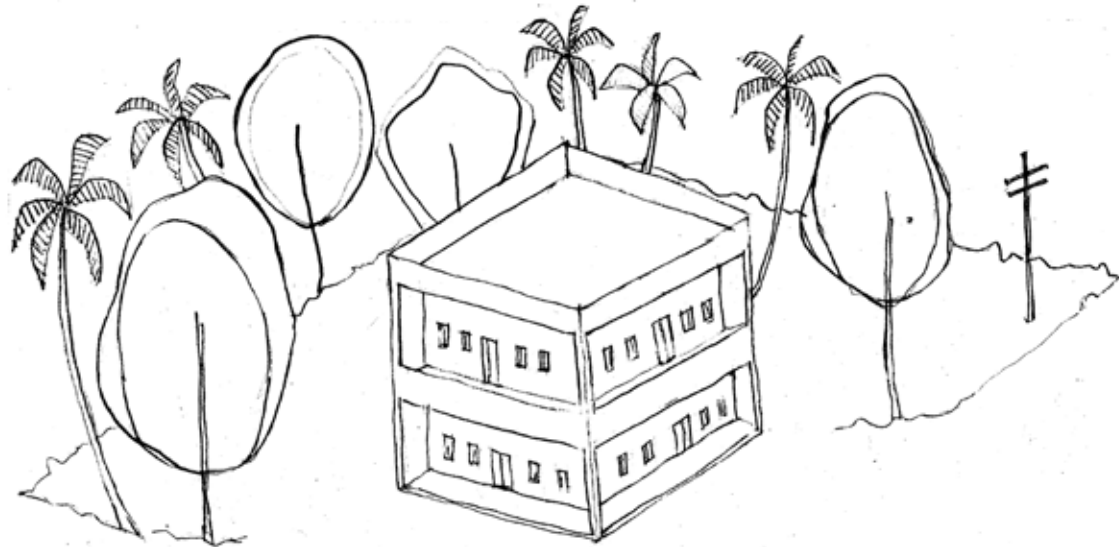


Step 2

The site plan can be used by the school management to identify :

- Buildings to be refurbished
- Buildings to be conserved
- Buildings to be demolished
- Existing landscape to be conserved
- Mapping open spaces
- Spaces for playgrounds
- Spaces where new buildings can come up

Some of the points mentioned above have been elaborated upon in the following pages.

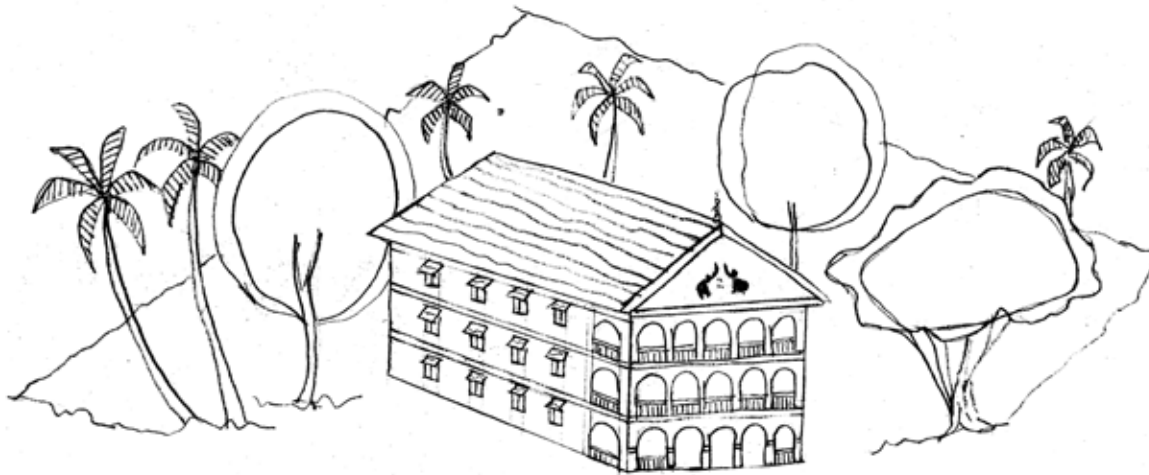


A building on campus that can be retained

Buildings to be Refurbished

Demarcate the buildings that can be re-used. The buildings that are relatively new and in good shape can be retained on the site. These buildings may only need a maintenance check or refurbishment.

They may be utilised for the future requirements of the school.



A heritage building that can be conserved

Buildings to be Conserved

Buildings of heritage or historical value can be retained and conserved.

Demolition of such buildings can be avoided to preserve the cultural heritage and the emotional association of the alumni with the building.

A cumulative decision can be made by the school authorities about maintaining such buildings as per the requirements of the school.

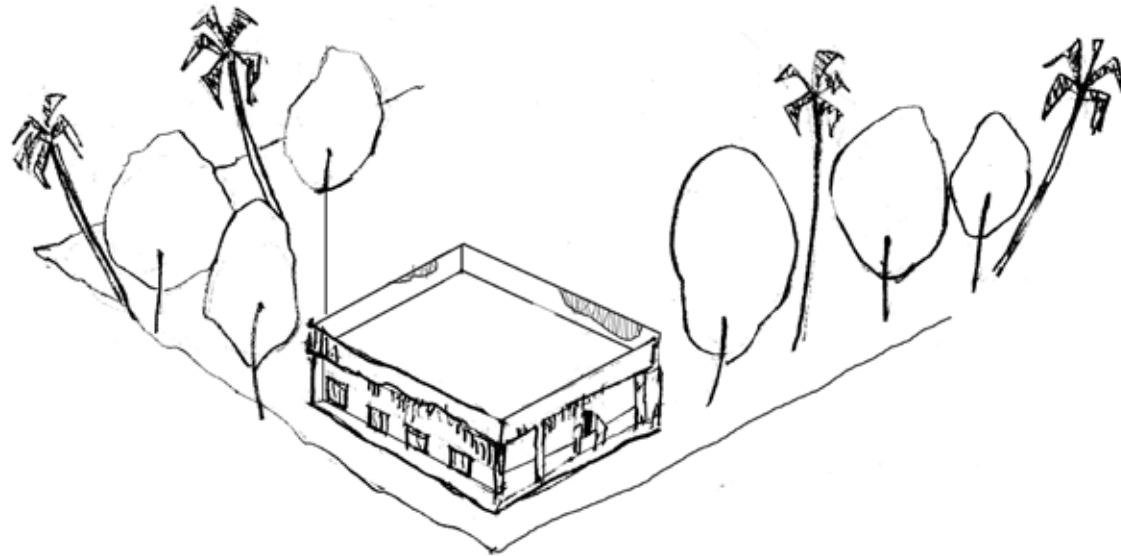


Buildings on site placed in an unplanned manner

Buildings to be Demolished

Some buildings may need to be demolished for reasons like:

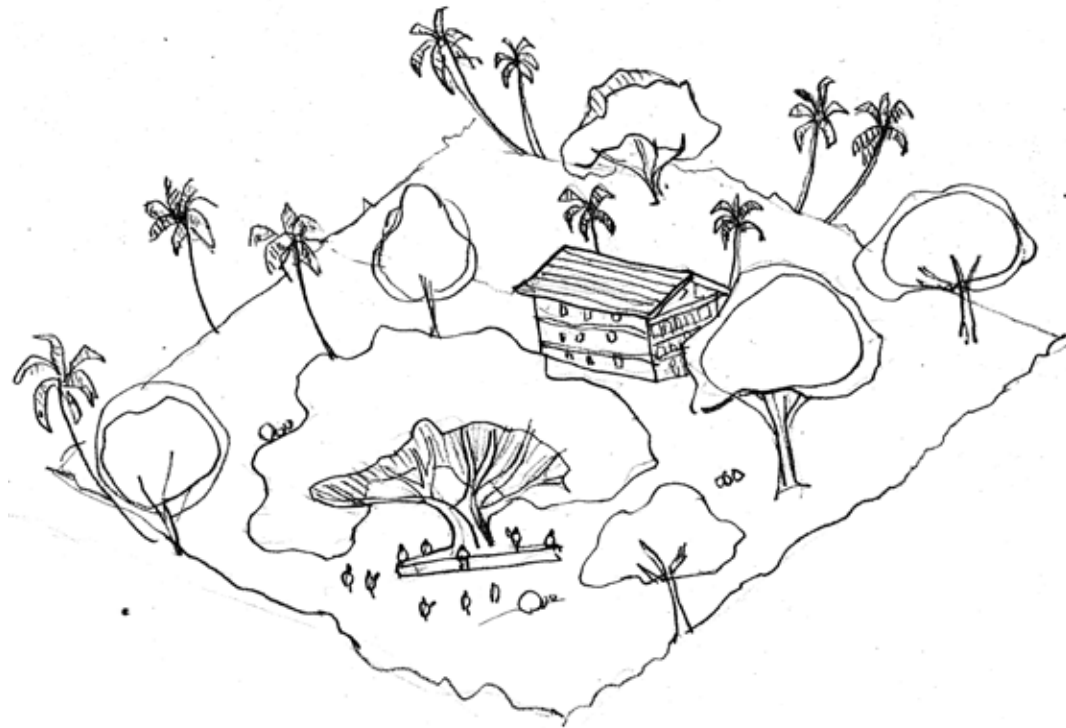
- The building maybe highly damaged and is beyond repair.
- The building is inadequate from the point of view of the present requirements.
- When the buildings are placed in an unplanned manner on the site, leading to lack of sufficient light and ventilation.
- If there is absence of architectural quality.
- When the building cannot be expanded to accommodate the school requirements.



A building that can be demolished for

For example, an existing single storied building may need to be demolished to accommodate a two or three storied building, as per the requirements of the school.

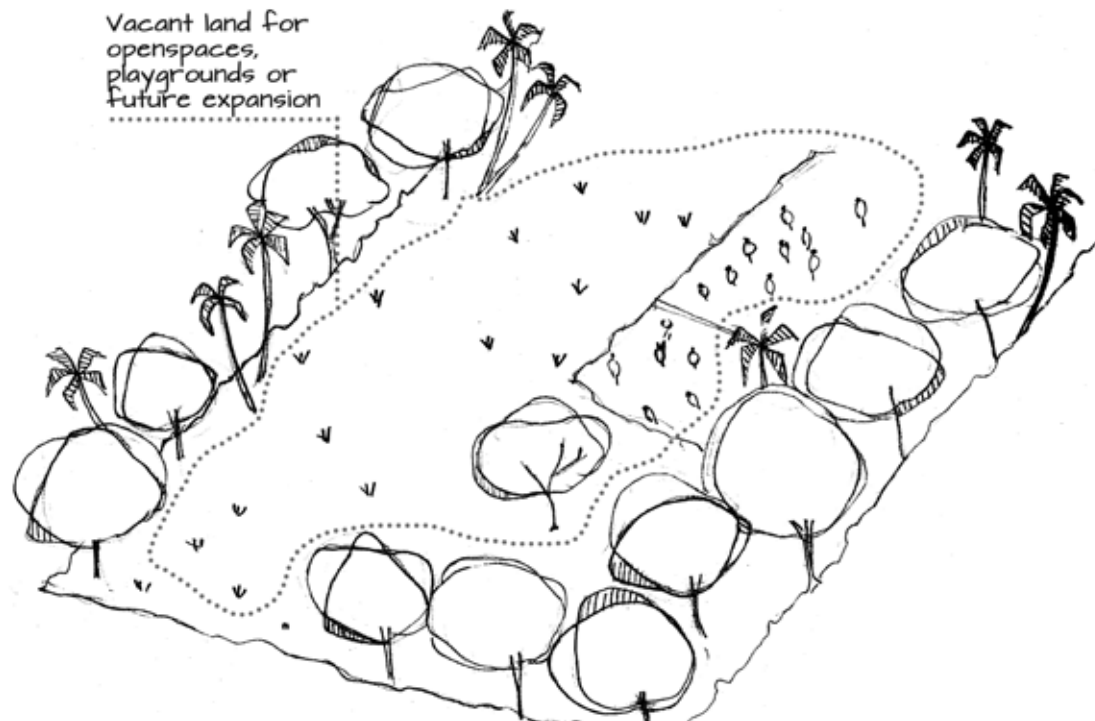
Demolition may also be necessary to bring in sufficient open spaces or playground area for the students.



A tree, being used as a learning aid.

Existing Landscape to be Conserved

The existing trees and landscape of the site can be conserved, as much as possible. They provide a cool and shaded environment for children to play and sit under.



Vacant land for
openspaces,
playgrounds or
future expansion

Vacant pieces of land can be utilised for school requirements

Mapping Open Spaces

While drawing the site layout, demarcate vacant lands on site. These can be used by the school for:

- Constructing new blocks or buildings.
- Creating spaces like open air theatre, play grounds and other outdoor spaces.
- Or, they can be left vacant for future expansion of the school.

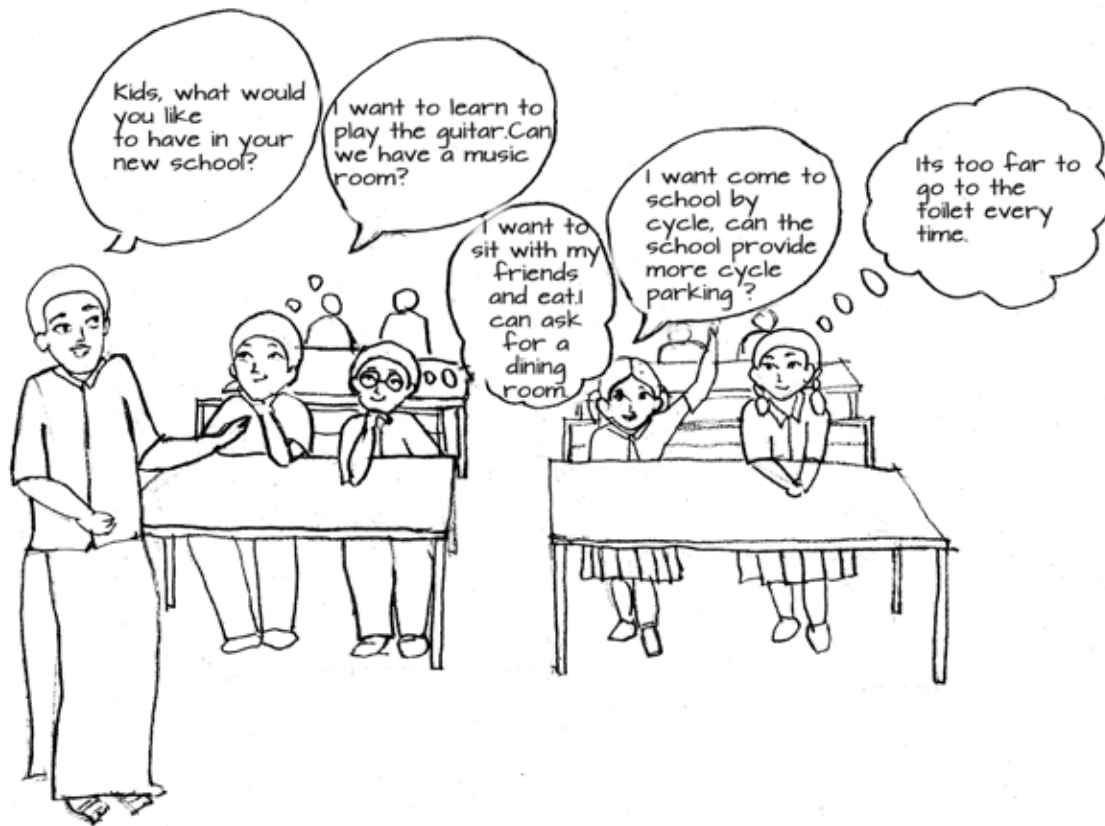


Overall School Requirements

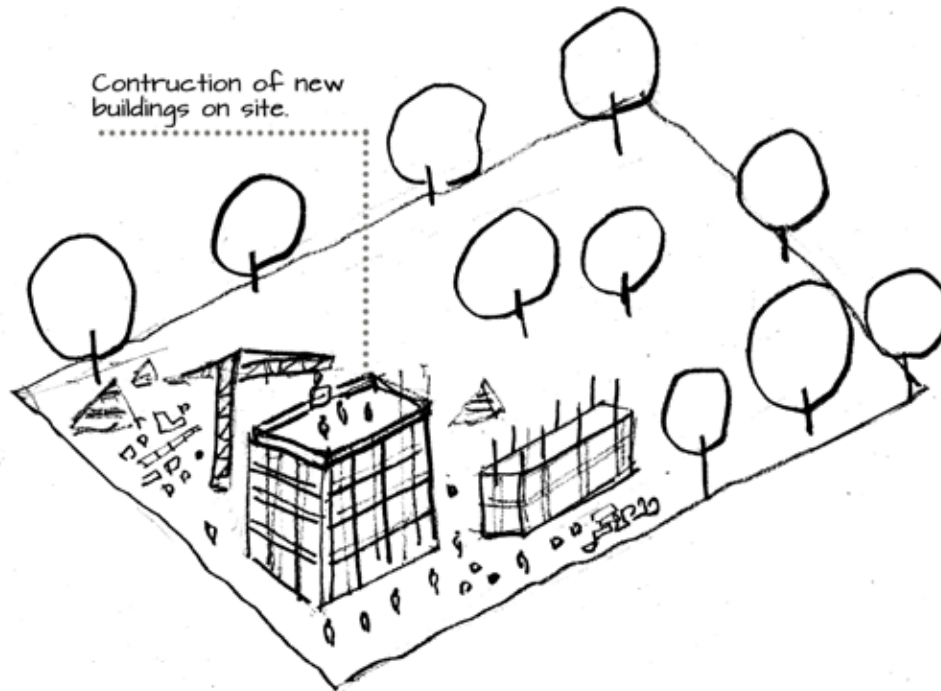
The overall requirements can be listed out by the management for the present as well as the future needs of the school.

All the components of a school play a significant part in enhancing the role of a classroom.

It is important to note that the space requirements for physical fitness activities of the children like sports grounds and play areas are not lost while suggesting functions for the vacant lands.







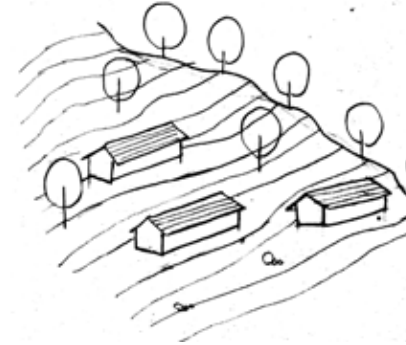
Construction of new buildings on site.

Construction of New Buildings

While constructing a new building, some aspects like topography, building orientation, building scale etc. can be taken into consideration for planning the school



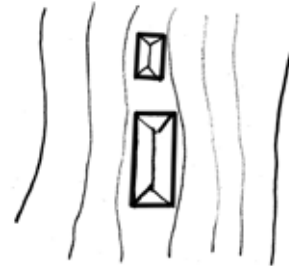
Wrong



Right



Wrong



Right

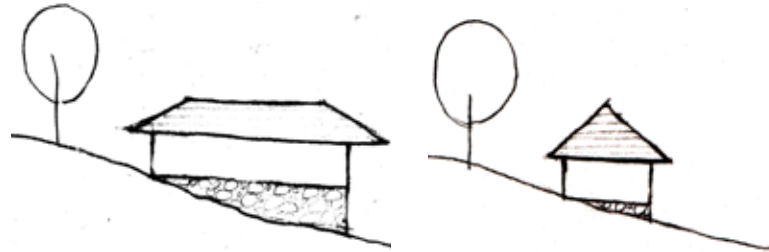
Orientation of the buildings on a

Location and Topography

In the school layout, it would be wise to consider the existing topography and slope of the land to integrate the school building with the landform.

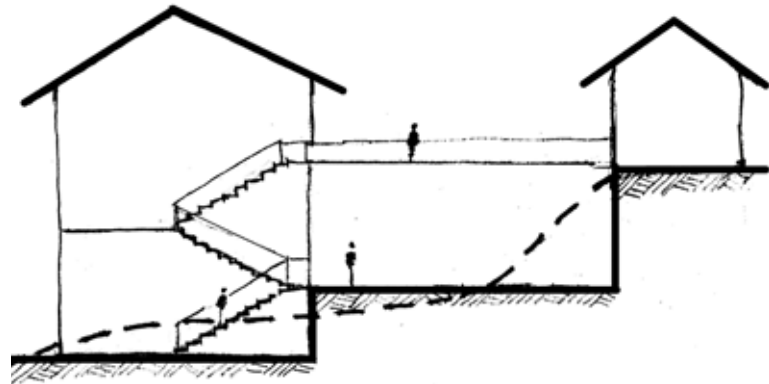
Since Kerala has an undulating topography in most areas, it becomes important to understand the nature of land before planning the school layout.

The orientation of the building should preferably be parallel to the slope of the contour. This would reduce the foundation costs, compared to a building that is designed against the slope.



Wrong

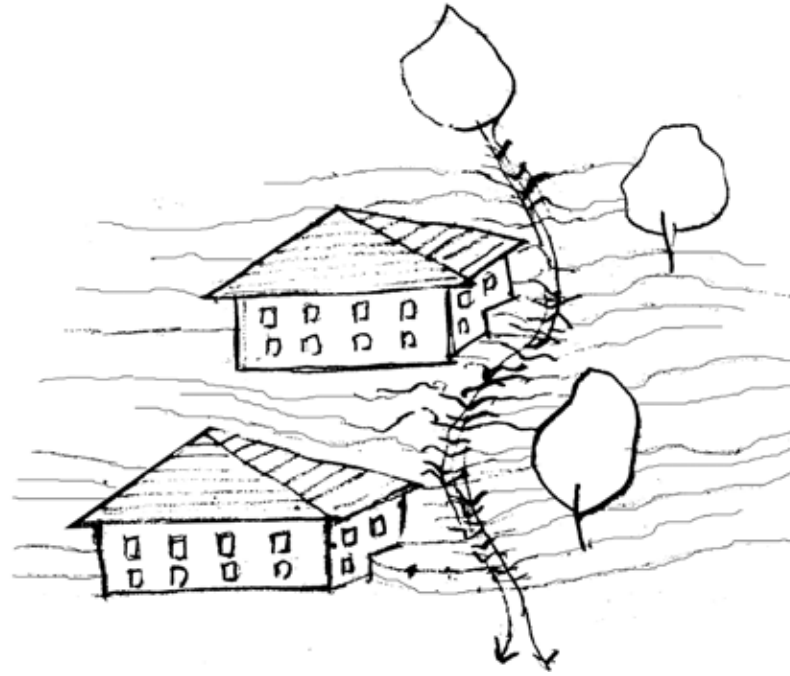
Right



**Use of levels of land
on site**

If the slope of land is such that the level difference is not much, the land need not be cut and filled to form a flat surface; instead it can be leveled to form terraced surfaces.

In such a case, a level difference within two buildings can be treated by adding a flight of stairs between them.

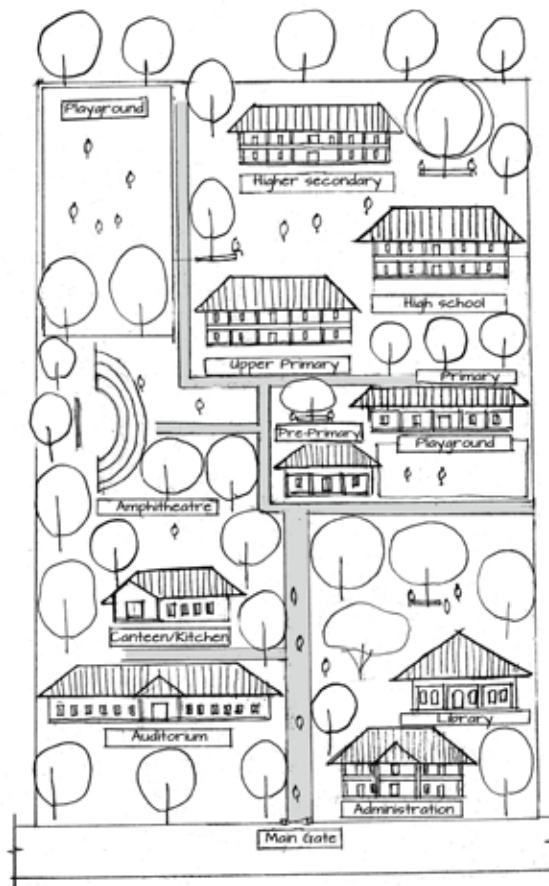


Natural channels formed by the flow of rainwater.

While planning the school layout, one may consider the natural slope of the site for effective drainage of water.

The water drain will always take the course of the natural contour and topography of the land.

When a building is planned on such a site, the channels formed during monsoon may need to be cautiously considered.

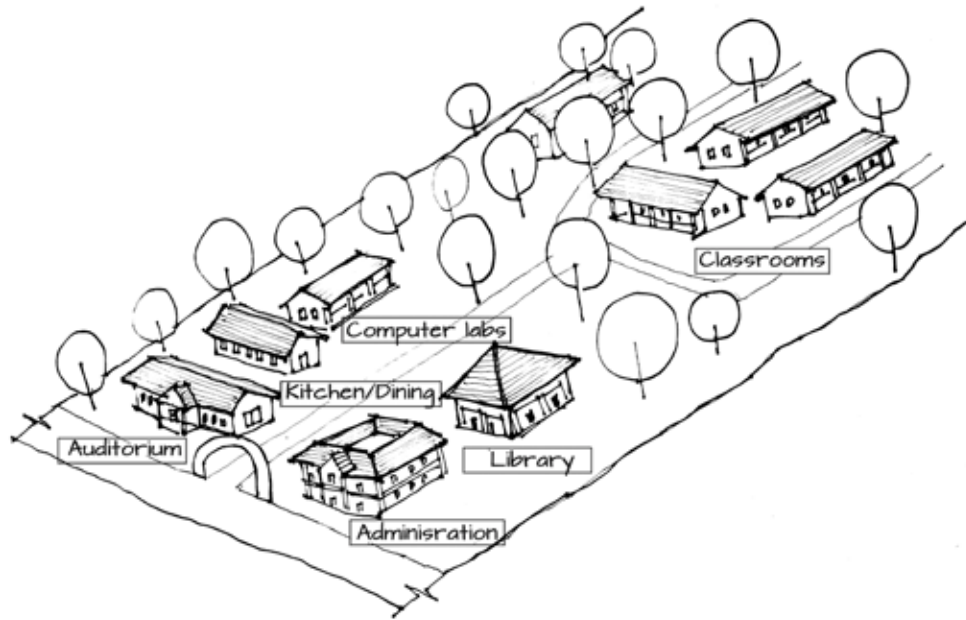


A sample master plan of a school layout.

Planning of a School Layout on a Site

The public and private spaces within the site can have a passive transition from public to semi public to the private space.

This is done to minimize the disturbance caused by the visitors within the private areas. One way of bringing this transition is by grouping the buildings based on the function, nature of the building and the end users of the space.



Position of public and private spaces in the layout.

The public spaces like administration office, auditorium, library, kitchen, dining, computer labs, can be close to the main entrance of the school, so that these spaces can be easily accessed by students, teachers, as well as parents and visitors.

These are spaces that can also be used by the community, post school hours or even during weekends.

Spaces like classrooms, workshops, laboratories, playgrounds, and other student amenities can be placed towards the interior of the site, so that their functions are not hindered by any disturbances in the public spaces.



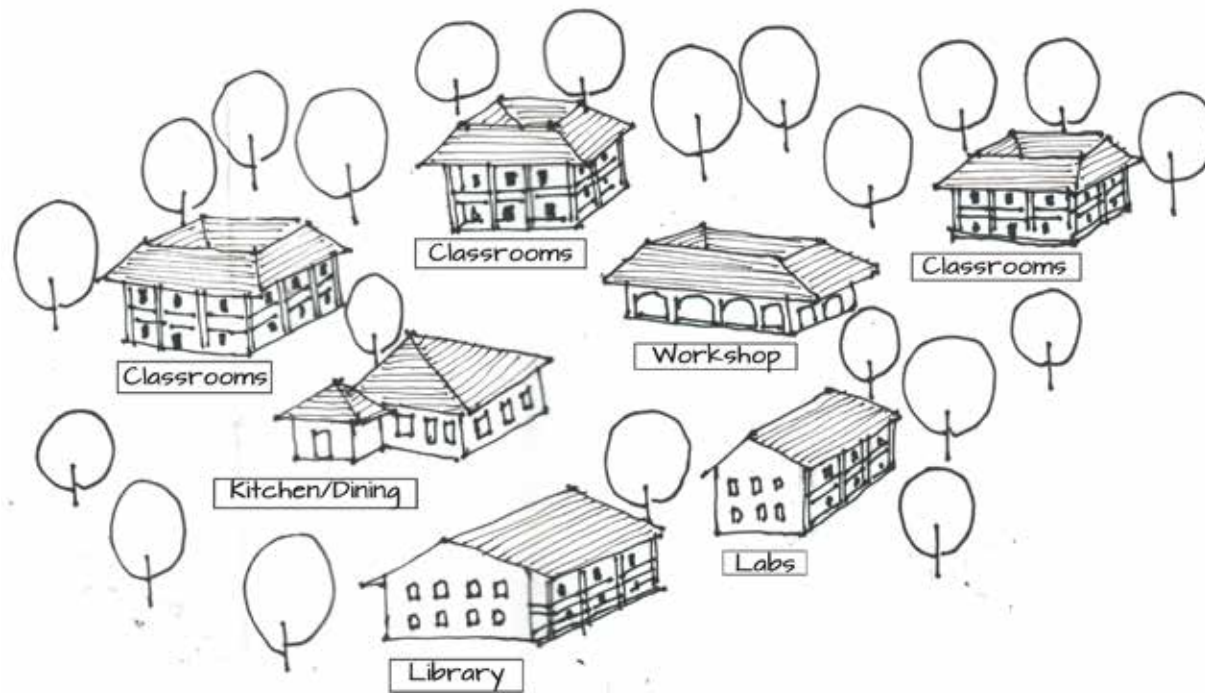
Pre-primary students being dropped at the hands of the teachers.

The classrooms of the pre-primary, primary, secondary and the higher-secondary can be in separate blocks.

The pre-primary block may be planned such that it is at a walking distance from the entrance of the school.

A drop off zone can also be provided where the parents can hand the children over to the care of the teachers. This ensures that pre-primary kids do not have to cross areas of heavy vehicular traffic.

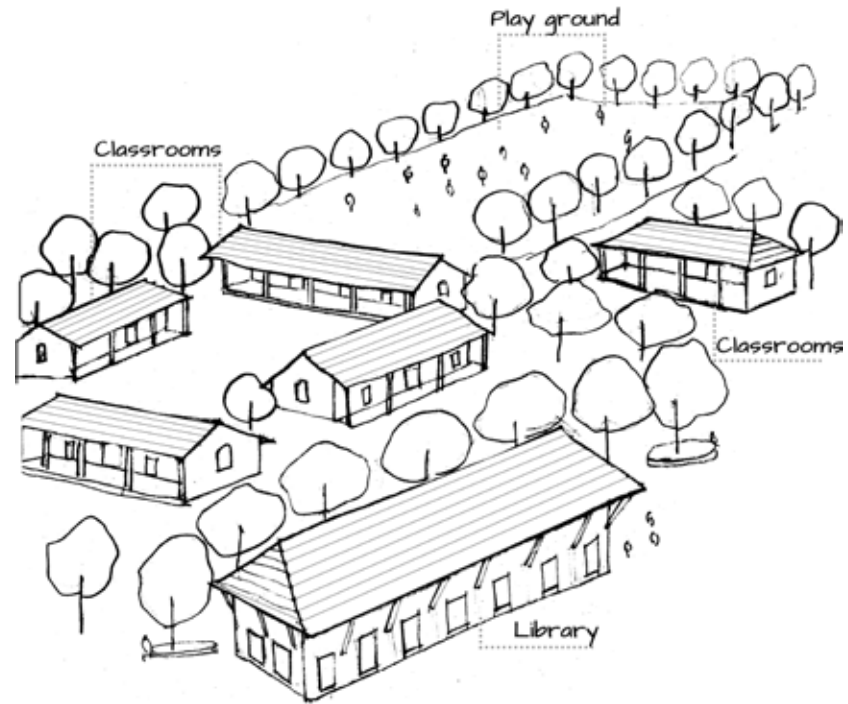
It can be placed close to the office or the staff room, making it convenient for the parents to drop the kids in a safe zone, under the watch of the teachers.



Classrooms located around the common amenities.

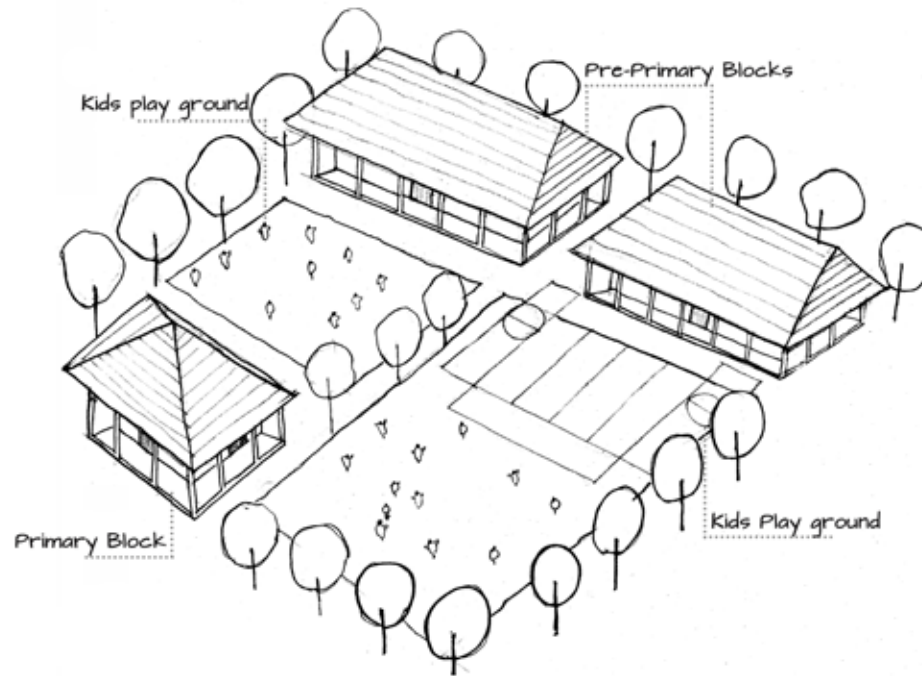
The spaces that are common, or shared by all the students can be grouped into one zone.

Some school amenities like labs, workshops, library, activity clubs, dining spaces etc., can be organised in a group at a location from where, it is accessible to students of all age groups.



Library block placed away from the playgrounds.

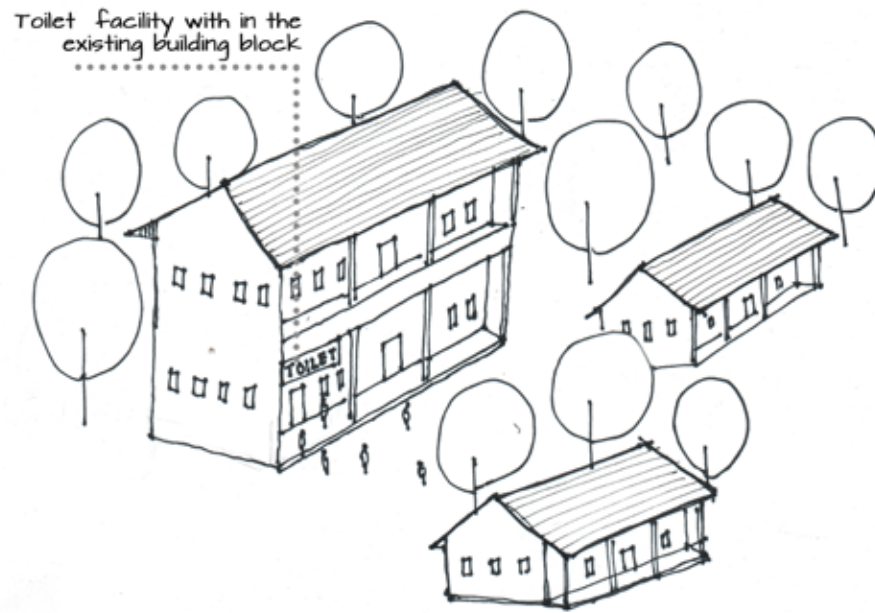
The playgrounds can be placed away from the library block and the classrooms to minimize the disturbance coming from the grounds.



The primary section with its own playground space.

The pre-primary and primary block classrooms can be close to a separate play area for the kids, so that they can access it easily.

This will also assure they are not bullied by the senior students sharing the same ground.

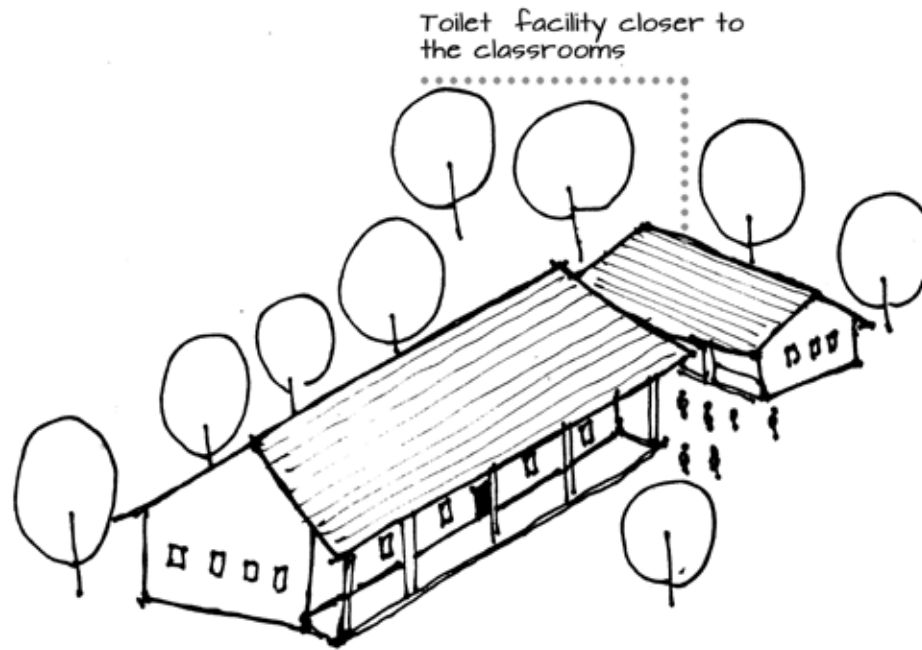


A toilet block within the classroom block.

The sanitation facilities need not be in a separate block if a new classroom block is being constructed.

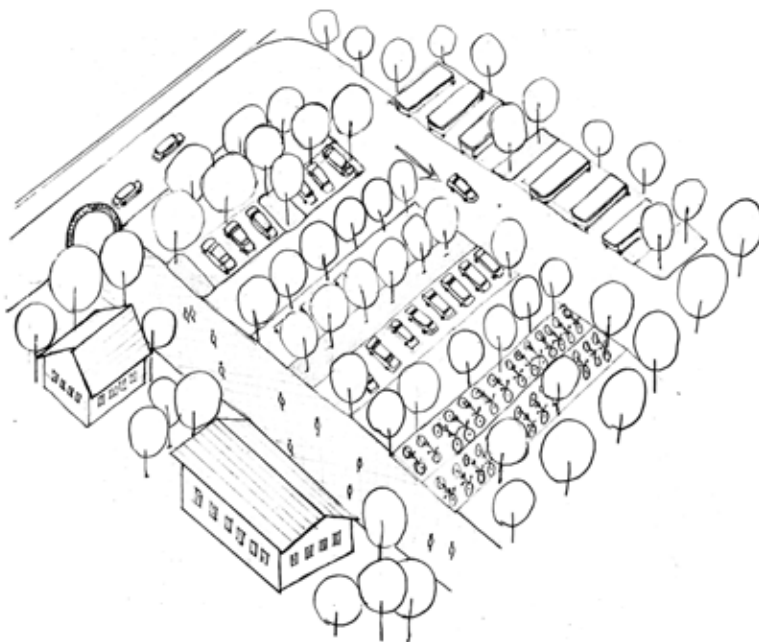
Accordingly, the school may give provision for good water facilities in the toilet blocks to ensure that they are maintained clean and healthy.

However, in existing school buildings, the toilet blocks can be added, in such a way that it is not far away from the classroom blocks.



Toilet facilities placed close to the pre-primary

It is necessary to keep in mind that the toilet blocks for the nursery students, can be relatively close to the nursery section of the school campus for them to access sanitation facilities quickly.



Parking area outside the main entrance of the school.

The parking for two wheelers and four wheelers can be segregated from the school campus.

They can be provided at a zone between the main entrance and the administration block of the school.

The parking of the school bus can also be separated from the classroom areas, considering the safety of the students.



Variation in heights of the buildings according to the available site area.

Building Heights

The school building can go up to three floors high. If there is sufficient land area, the buildings can even be single storied.

Vertical access within the school campus can be done by using stairs, ramps or lifts. Ramps and lifts can be provided for facilitating access for differently abled and elderly teachers within the campus.



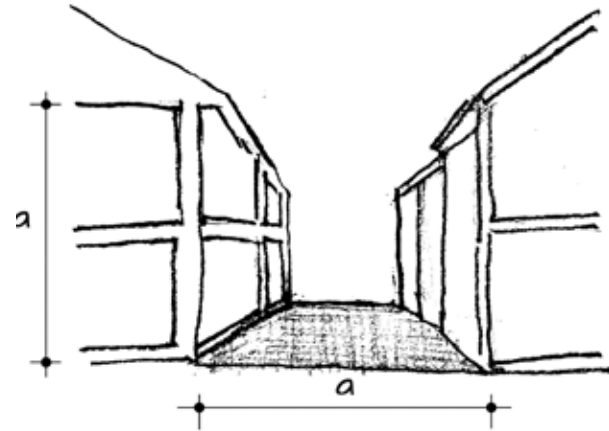
Passageways connecting the buildings at higher floors.

The buildings within the school campus can be well connected. The connections or passages between different blocks may be given at least in the first floor level, if not at all levels.

This is done to ease the circulation of the teachers and students moving between buildings, also improving the interaction among them.



Left
Minimum distance between the buildings



Right
Distance between buildings equal to its height

The minimum distance between two or more buildings with a height of 12 meters, should preferably be 6 meters.

It is preferable for the layout to provide a minimum distance between the blocks, equal to the height of the buildings.

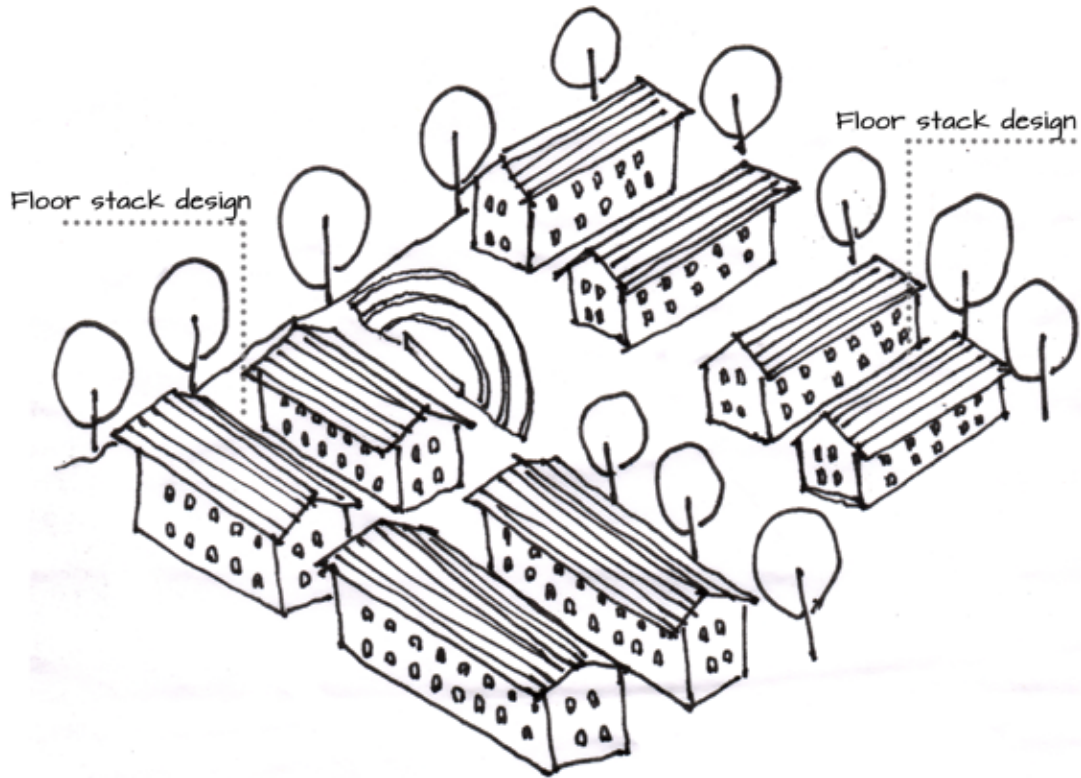


A setback is the measurement between the building and the boundary wall of the site.

The school building can have a minimum setback of 3 meters, and can preferably be up to 6 meters.

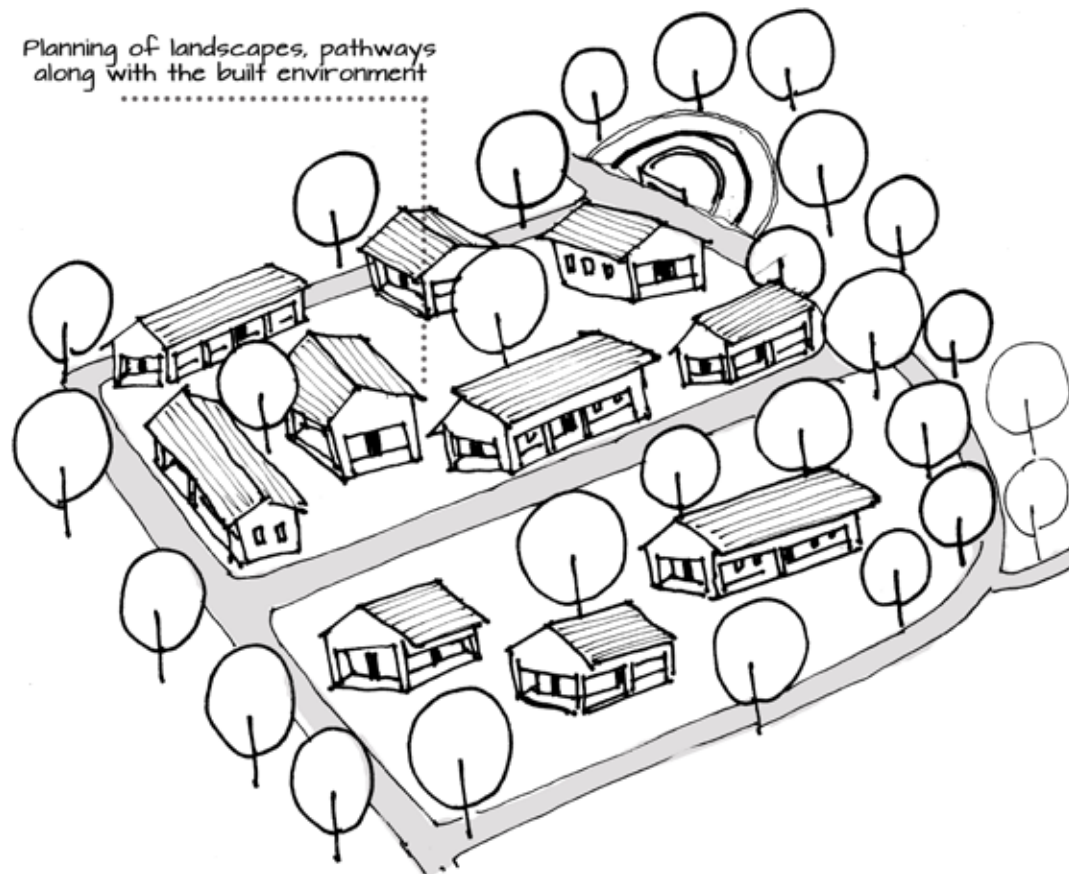
This setback area can be developed as a garden or landscaped area by planting trees and shrubs, to cut off the vehicular disturbance from the roads, also allowing sufficient light and ventilation into the building.

Buildings with lesser setback areas lead to unusable or negative spaces.

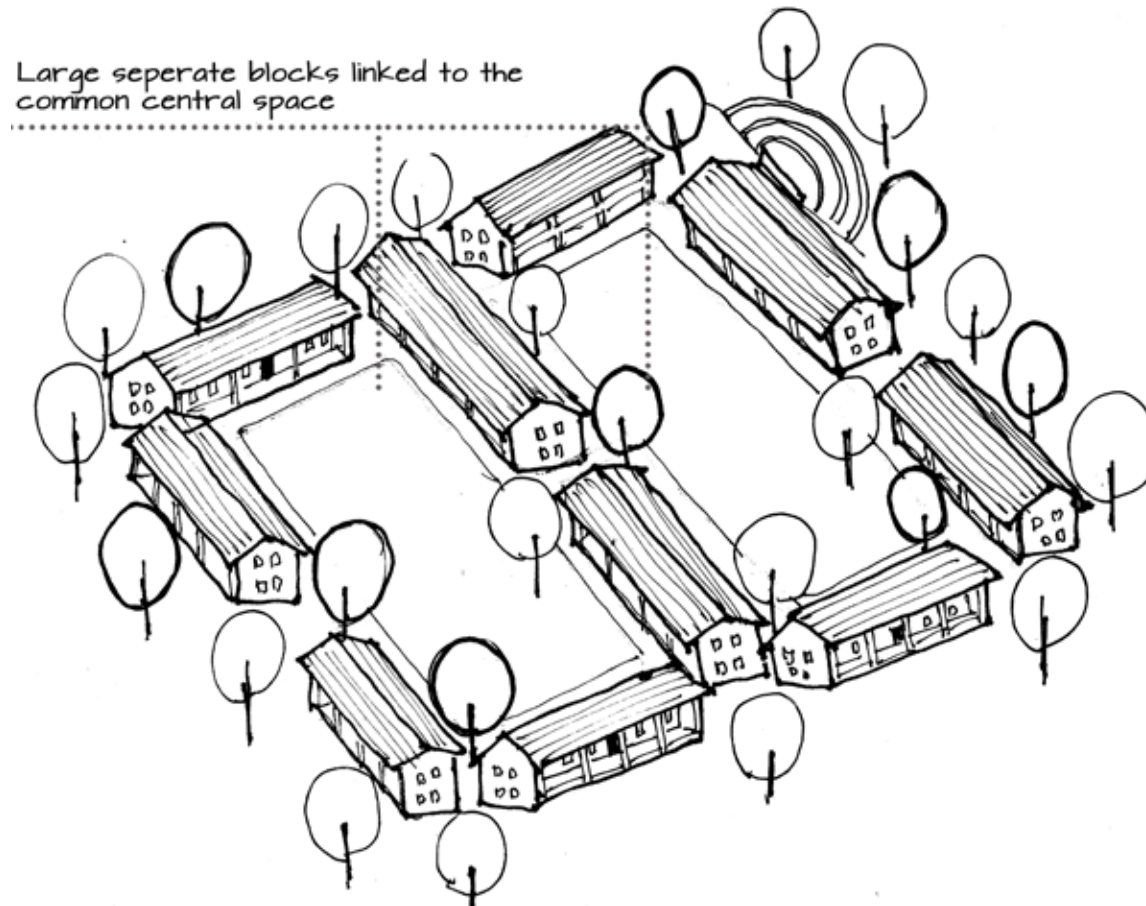


Planning Layouts for School Components

Once the site layout has been documented, the design process may begin with the planning of the components of the school on the site. There are various methods by which planning of classrooms on a site can be done, are illustrated through sketches in the following pages:



When a layout incorporates landscape and pathways along with the built environment.



A layout having large separate blocks linked to the central space, as a shared common area.

03. Classroom Design

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The classroom is the child's window to the world.

Classroom as a Microcosm of the World

For a child, the school is the first step in the process of learning, making them wonder and nurturing their creativity. It makes them question, explore, identify problems and attempt solutions.

The school teaches children to interact with their environment using the classroom as a model of the world. It employs books, teaching, play and other activities as mediums of learning.

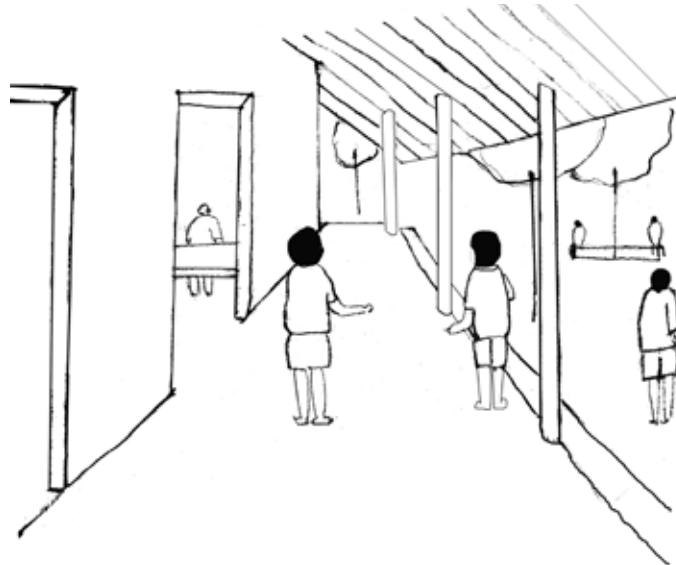
This learning helps children visualize the world and their role in it thus shaping their future.

Planning of a Classroom

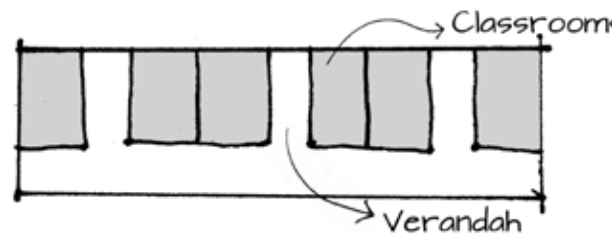
Planning is important for the smooth running of daily activities and behaviour management in the classroom. Proper classroom planning will allow the teacher and students to be organised and have the flexibility to conduct various activities within the classroom space.

Arrangement of Classrooms Within the Site

Some of the possibilities of arranging classrooms within a site are discussed in the following pages.



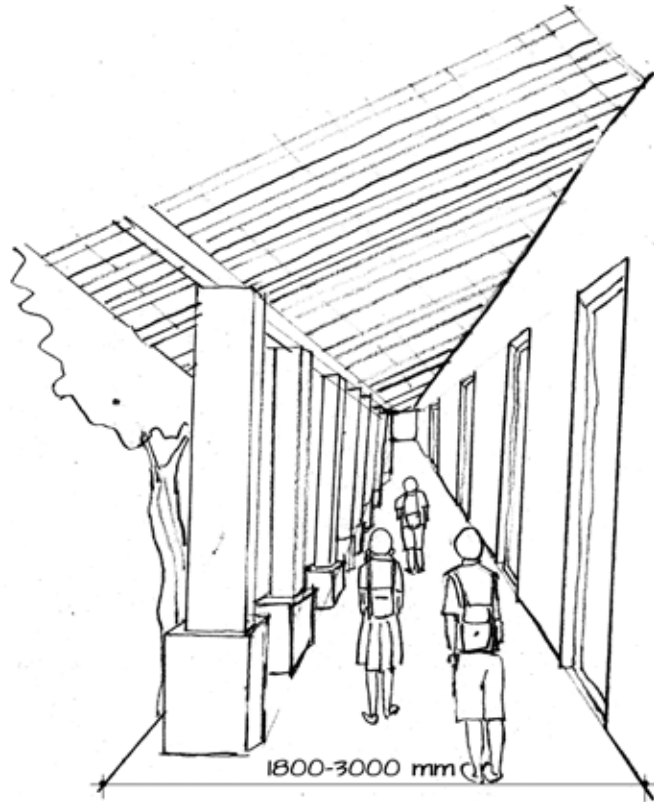
Linear arrangement of classrooms along a



Plan of a linear arrangement of

Linear Arrangement of Classrooms

In a linear arrangement, the classrooms are placed on one side of a verandah or a corridor, providing a direct relation between the classrooms and the outdoor space on the other side. This allows sufficient light and ventilation for the classrooms. This type of classroom arrangement is known as a single loaded corridor.

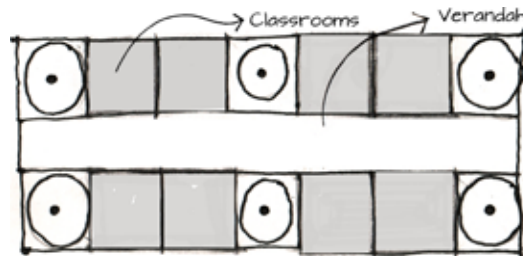


Width of a single loaded

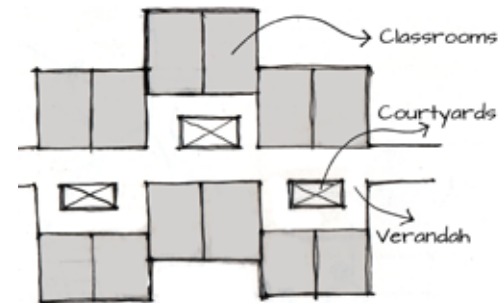
The width of this type of a corridor can be between 1800 to 3000 mm. The average height of the corridor can preferably be a minimum of 2400 mm.



Arrangement of classrooms on either side of a



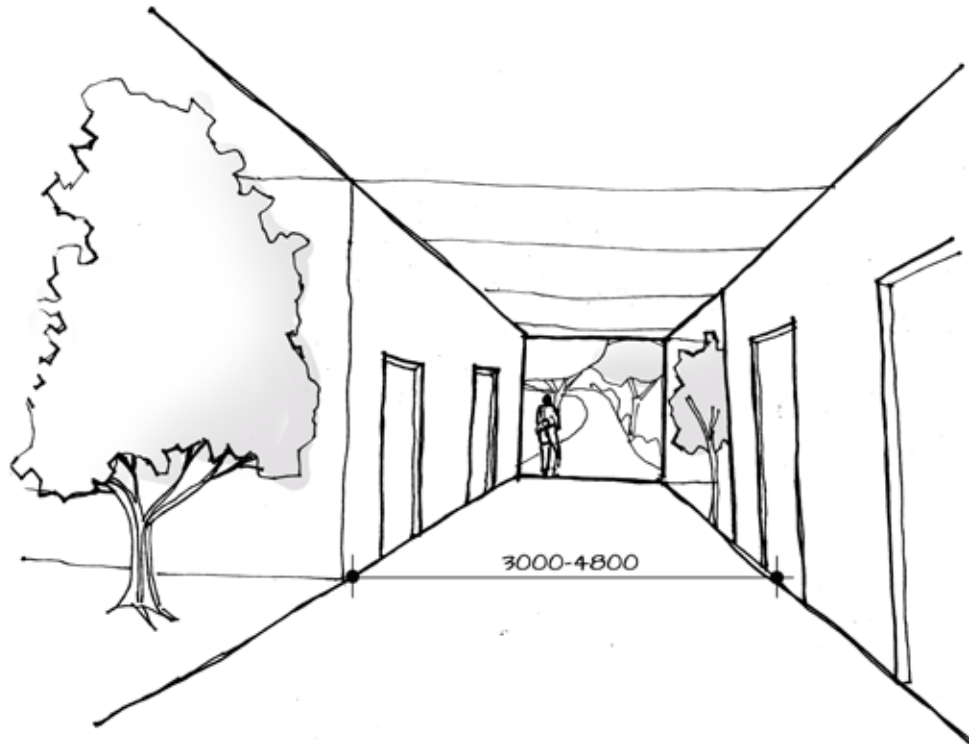
Plan of a classroom arrangement with buffer zones.



Plan of a classroom arrangement with staggered layout.

Classrooms on Either Side of a Corridor

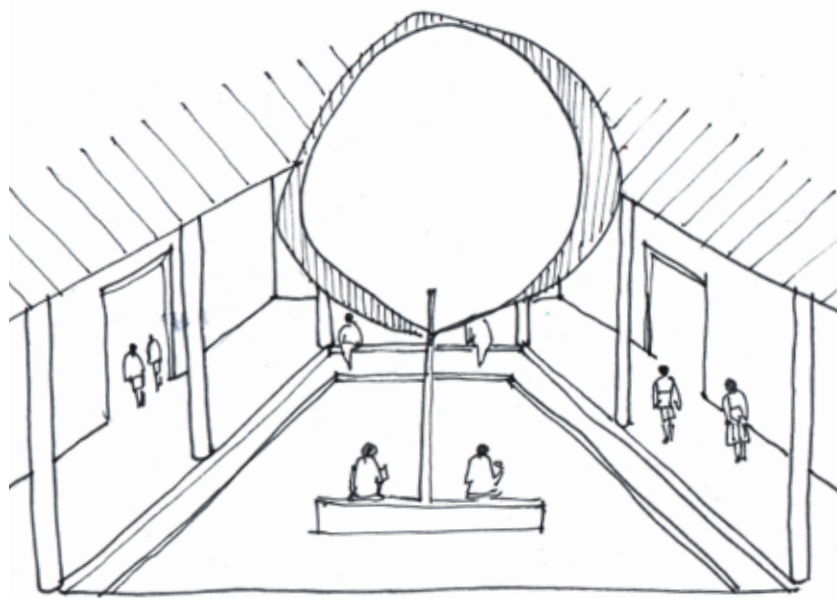
In this type of an arrangement, the classrooms can be arranged on both sides of a corridor. The classrooms can also be staggered to allow light and ventilation into the rooms.



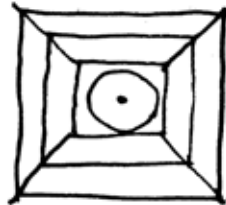
A double width corridor

The light and ventilation in the building may be affected, therefore, open spaces can be provided between two to four classrooms.

This type of an arrangement of classrooms is known as a double loaded corridor, in which the indoor spaces are arranged on either side of a double width corridor. The width of such a corridor can vary from 3000 mm to 4800 mm.



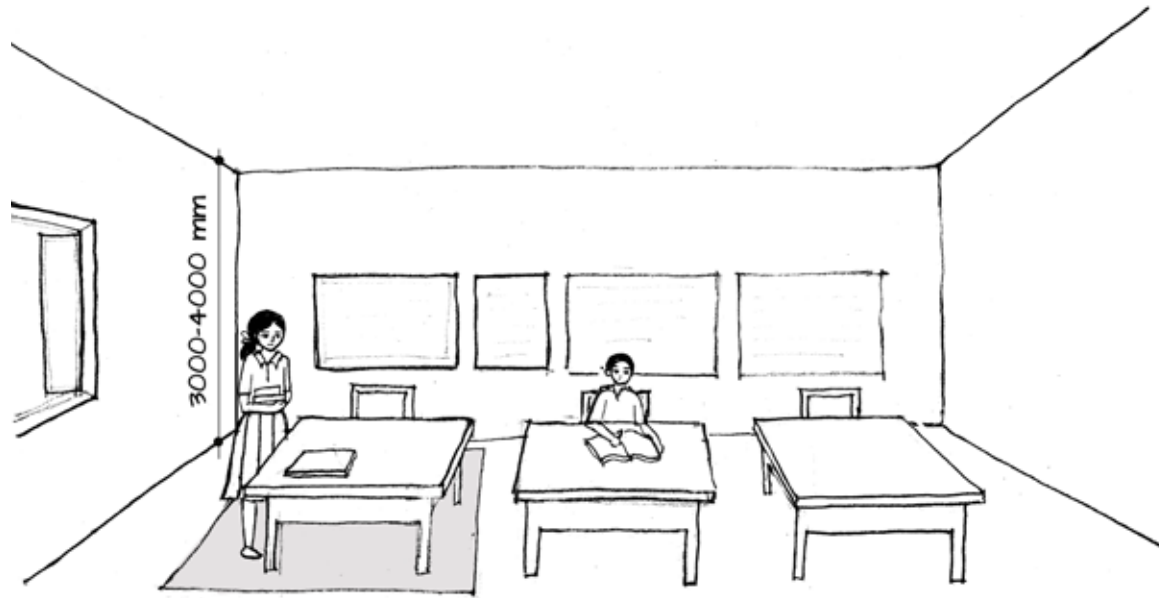
Classrooms arranged around a central courtyard with a



Plan of a classroom around a

Classrooms Around a Central Courtyard

In a courtyard arrangement, a cluster of classrooms are located around a central courtyard. The shared common space can be used for various activities.



Size of a Classroom

The classroom is the basic unit of a school.

The size of the classroom depends on the number of students, the methods of teaching, activities conducted, and other classroom facilities.

The average space required by a student in a classroom varies from a minimum of 1.1 sq.m to 2 sq.m depending on the number of students per desk. This is inclusive of basic facilities like storage, circulation space, furniture space etc.

The clear height of the classroom can be between 3000 - 4000 mm.

Classroom Types

Learning between students and teachers takes place both formally and informally within classrooms. This develops the need to know and understand classroom types.

For example, regular classrooms with basic furniture, storage and teaching facilities.

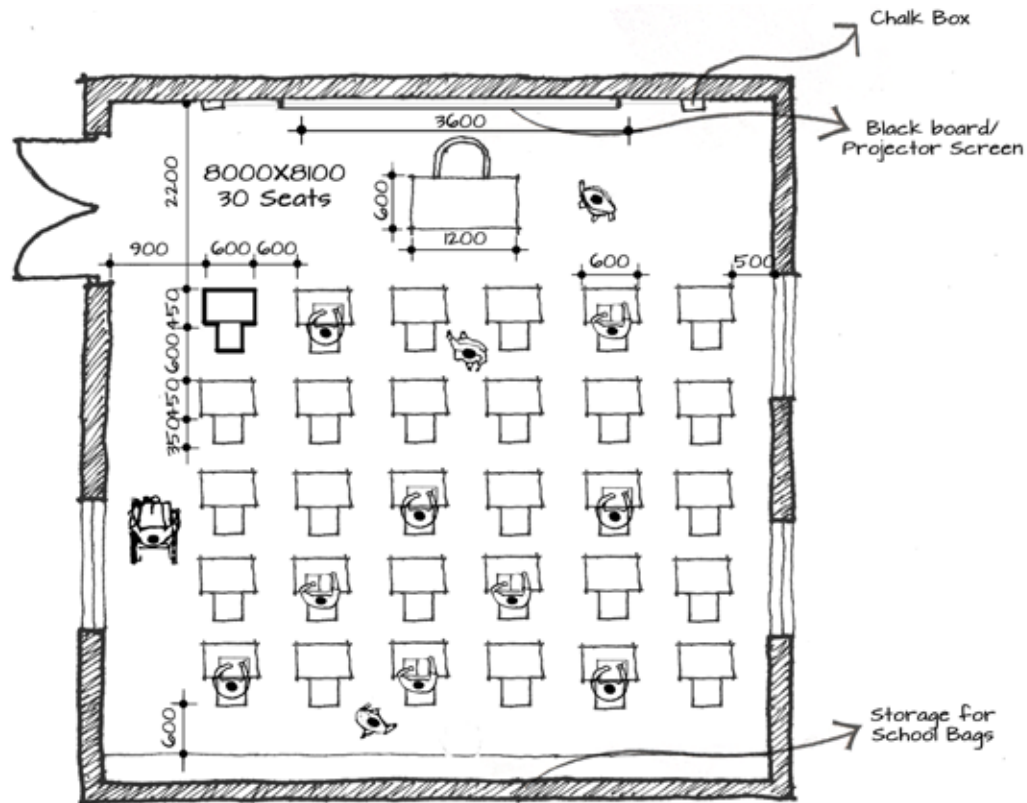
- Activity classrooms, where activities can be combined along with regular classrooms for conducting various activities in an internal environment.
- Seminar or theory rooms, to conduct seminars for various age groups, exchange programs, talks etc.
- Subject rooms, where demonstrations, experiments and activities related to various subjects can be conducted.
- Extra curricular activities, for conducting non subjective activities like music, arts, theatre etc.

Furniture Arrangement in Classrooms

Different furniture layouts depending on the:

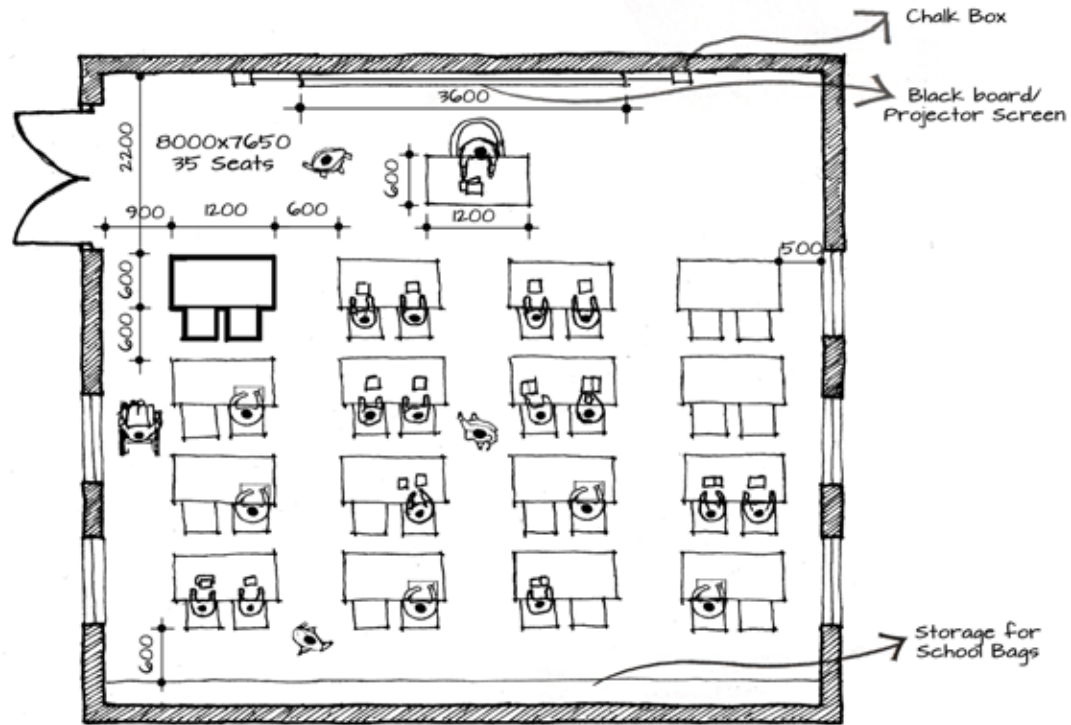
- Number of students in a classroom,
- Number of students per desk,
- Furniture requirements and sizes,
- Activity spaces,
- Storage spaces and other basic facilities to be provided are to be kept in mind while designing a classroom space.

Layouts showing standard measurements for planning a classroom have been discussed in the following pages. The sketches show the preferred size of the classrooms.



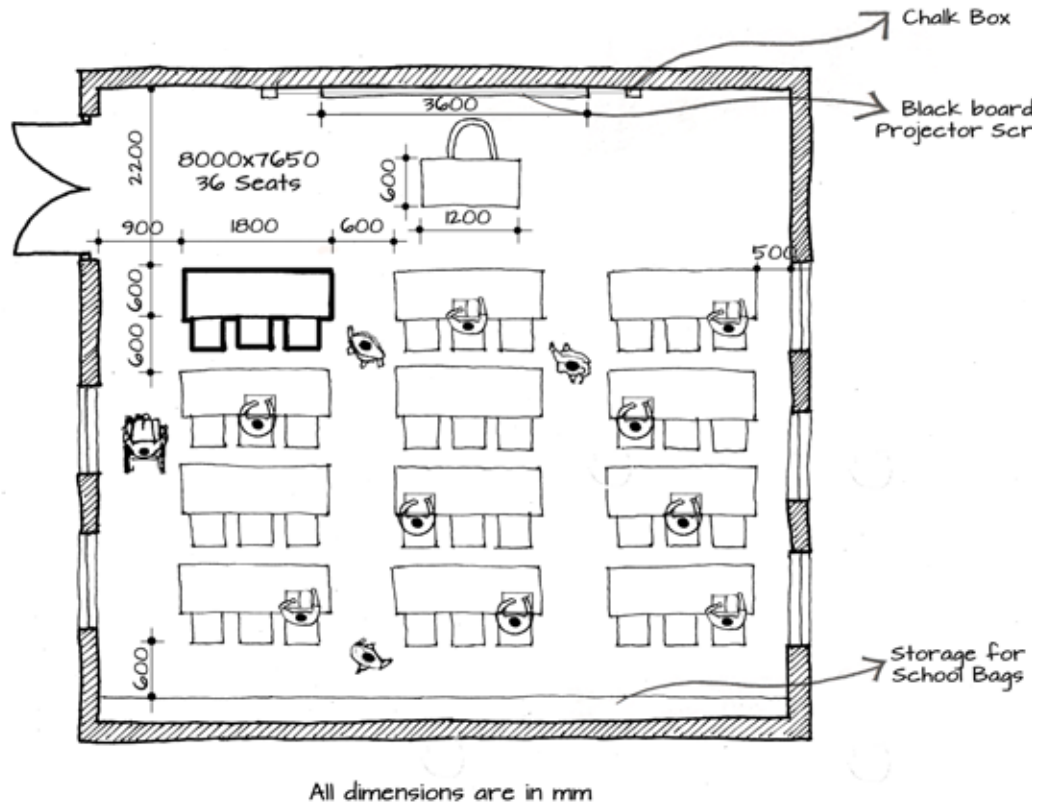
All dimensions are in mm

A classroom layout of 30 students with single desks and benches. The area is 65 sq.m.

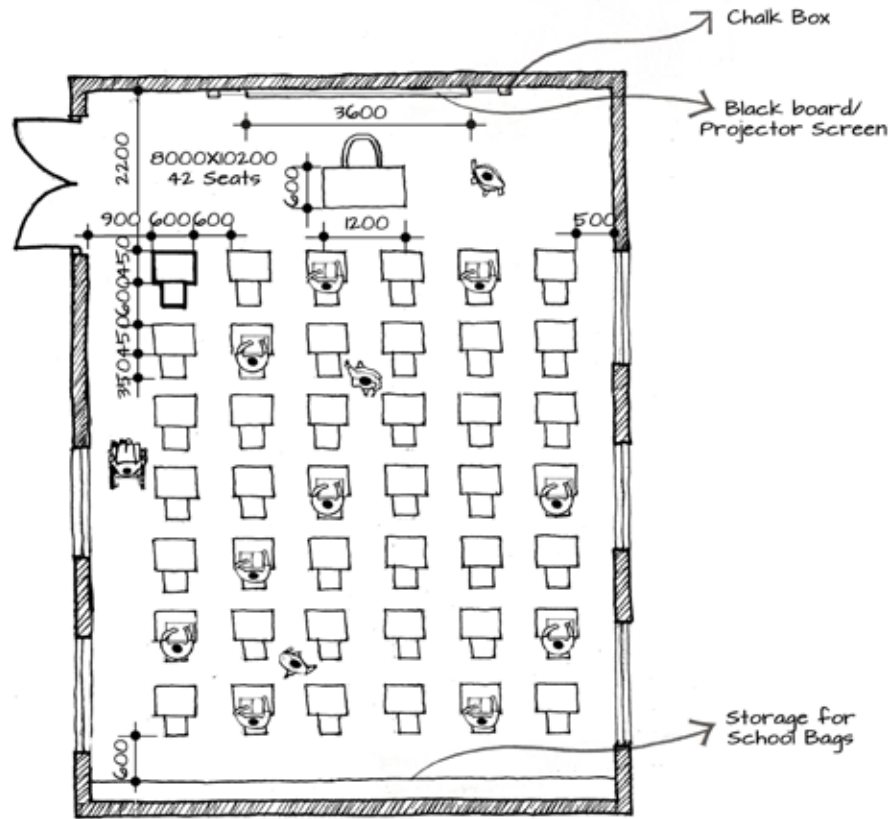


All dimensions are in mm

A classroom layout of 30 students with two-sharing desks. The area is 61 sq.m.

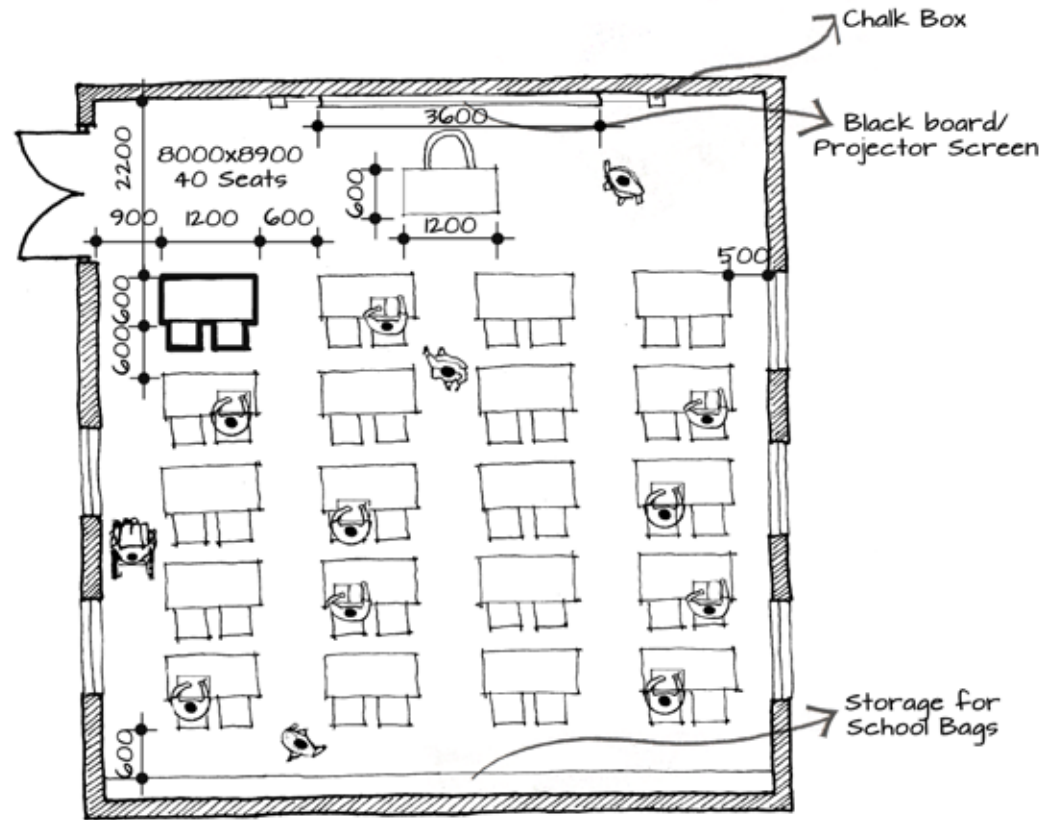


A classroom layout of 30 students with three-sharing desks. The area is 61 sq.m.



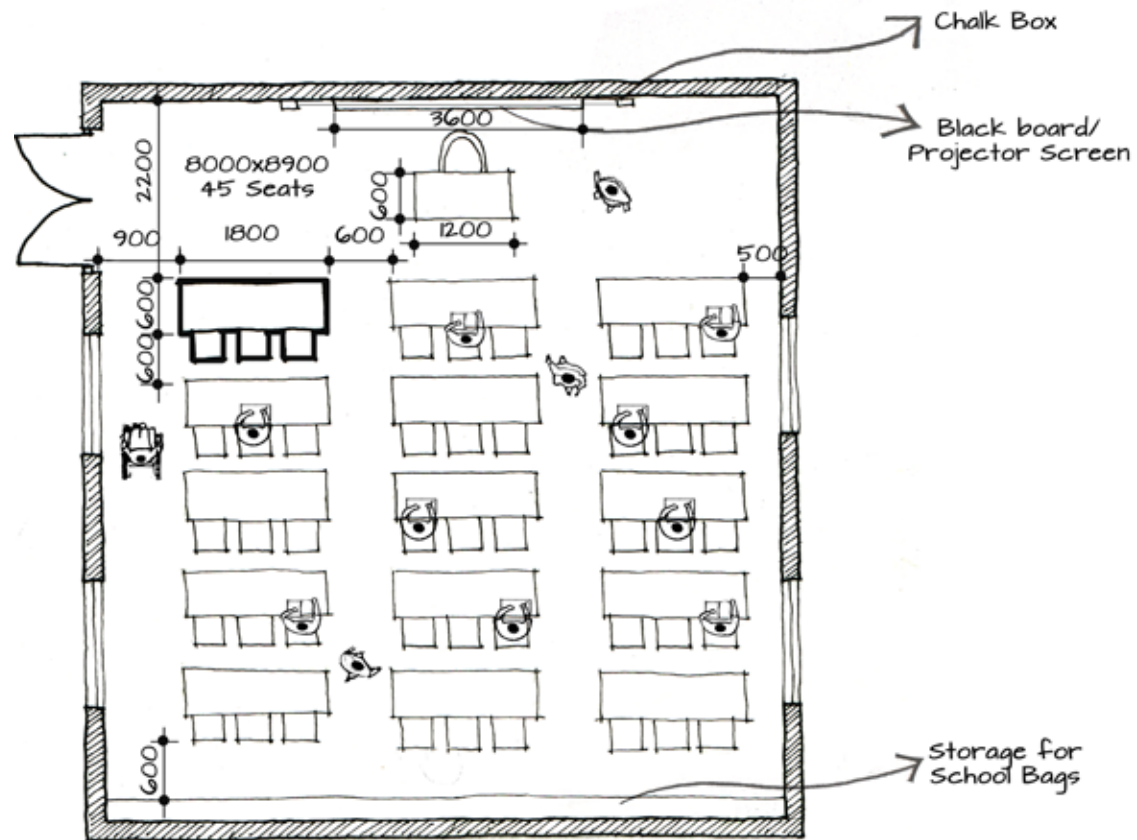
All dimensions are in mm

A classroom layout of 40 students with single desks and benches. The area is 81 sq.m.



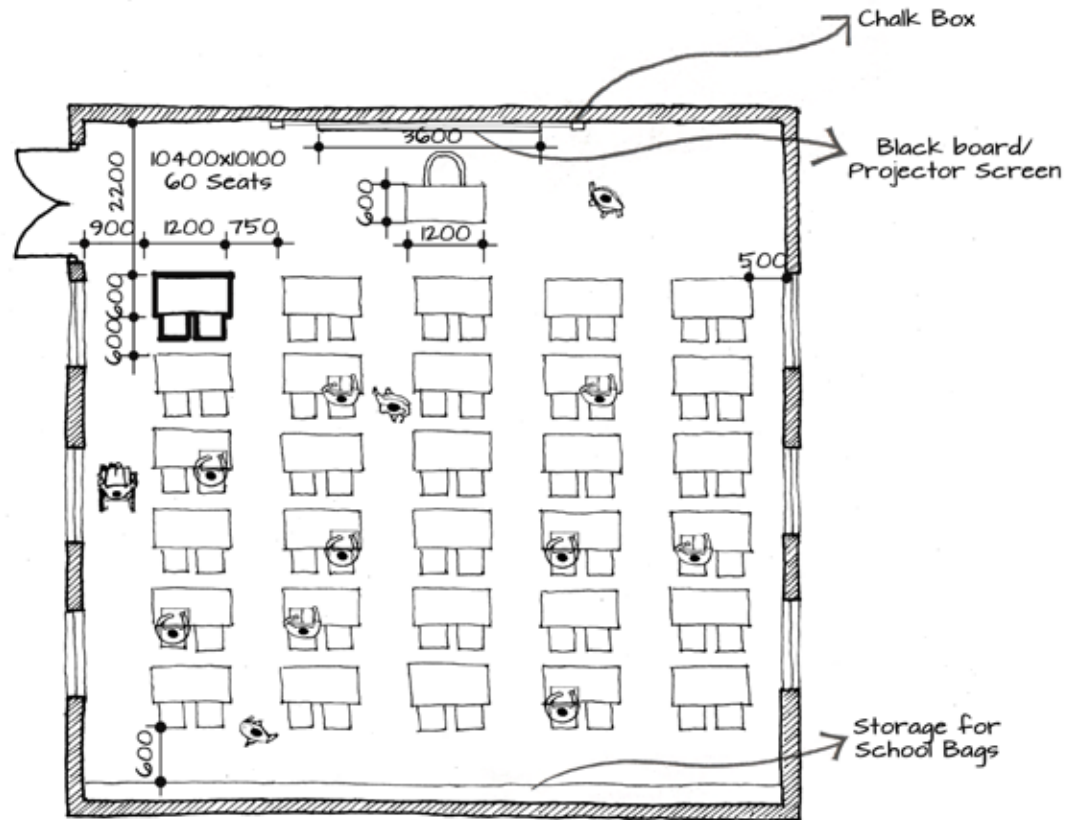
All dimensions are in mm

A classroom layout of 40 students, with a two-sharing desk. The area is 71 sq.m.



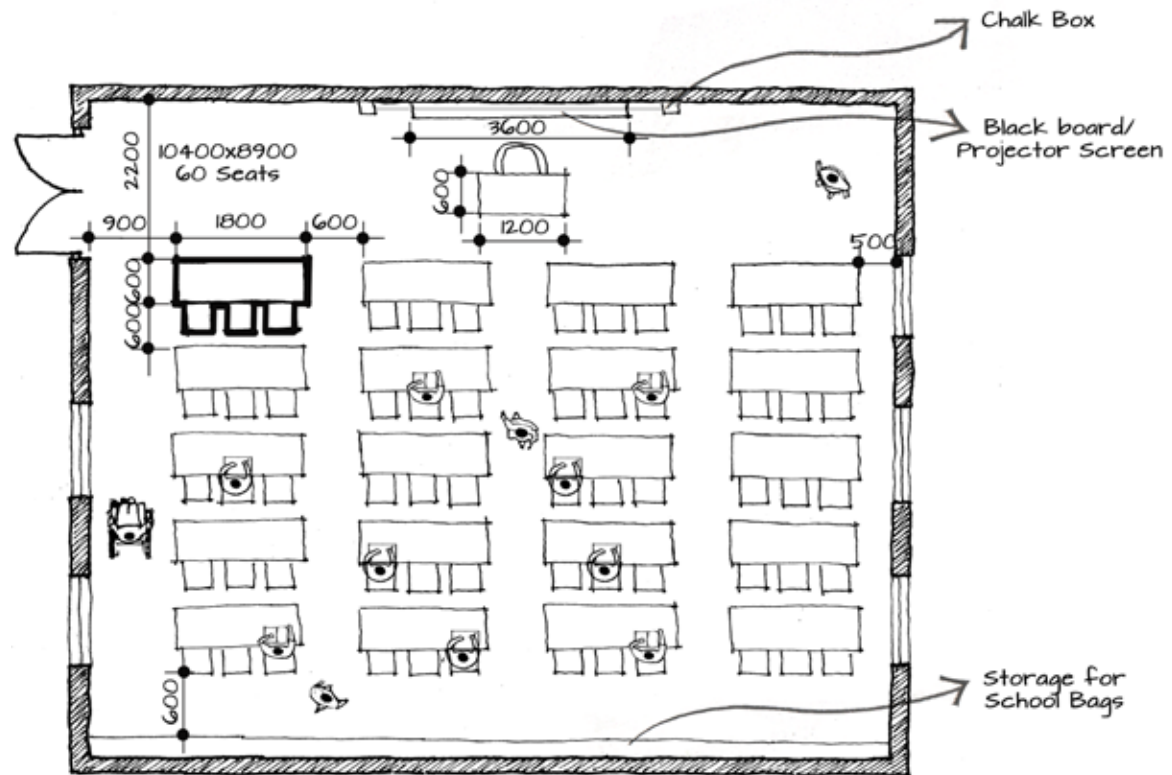
All dimensions are in mm

A classroom layout of 40 students with a three-sharing desk. The area is 71 sq.m.



All dimensions are in mm

A classroom layout of 60 students with two-sharing desks. The area is 105 sq.m.



All dimensions are in mm

A classroom layout of 60 students with three-sharing desks. The area is 92 sq.m.



Students performing in the activity space provided in the class

Activity Corners

In activity based learning, the main focus is on encouraging self-learning and allowing children to learn through the experience of the activity.

This methodology can be used to impart concepts of various subjects like science, mathematics, history etc.

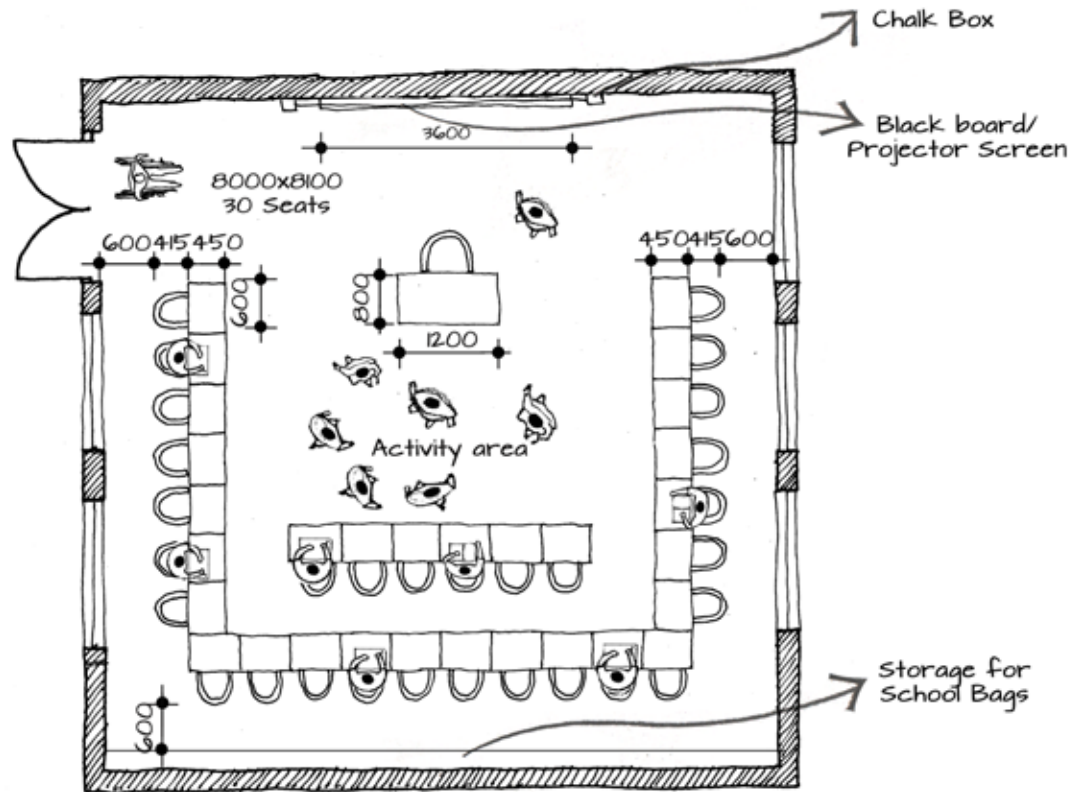
The activities can include singing, art work, recitation, role play, games etc.

A space within the classroom can encourage activity based learning, for example:

- A learning stage, where a group of children can enact, perform, play etc. This cultivates team spirit.
- Activity corners, where children can paint, sketch, learn origami etc. This will enhance individual creativity.

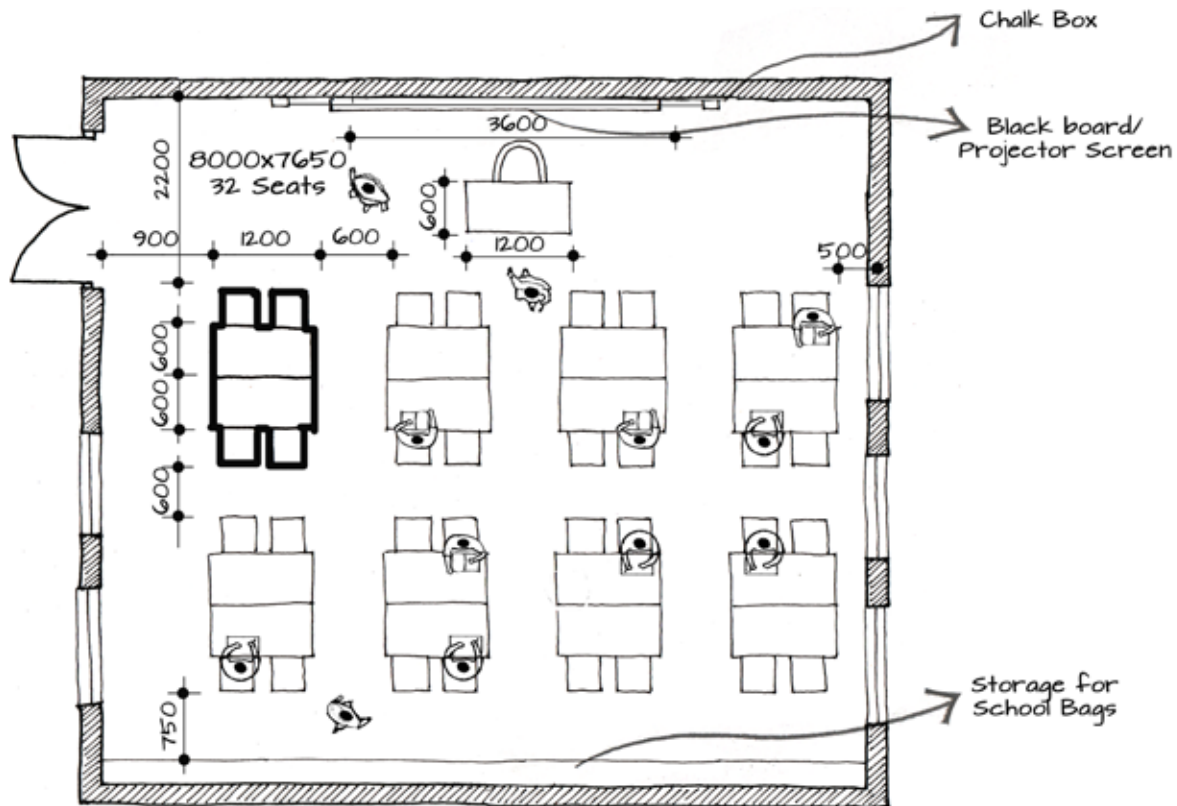


Students creating artwork in the activity space of the classroom.



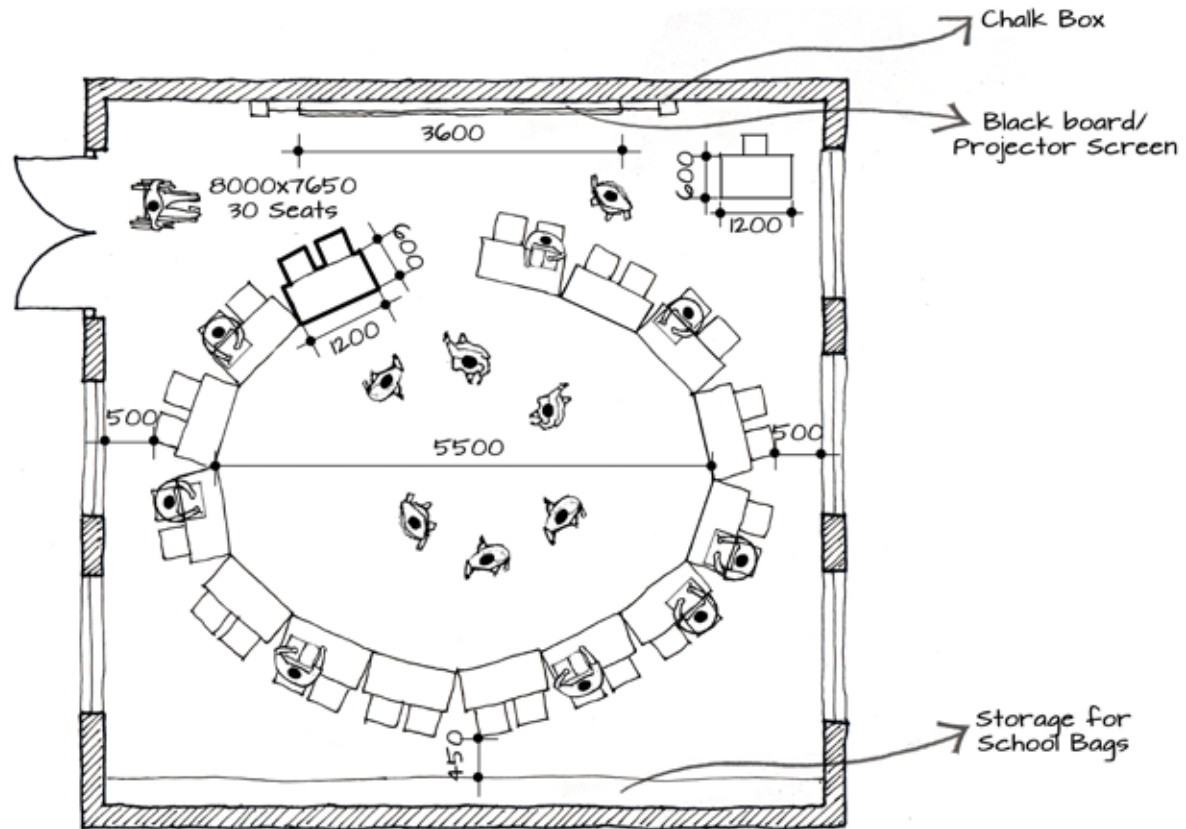
All dimensions are in mm

A classroom layout of 30 students with single desks and benches can be rearranged in a U- shaped pattern to facilitate activities. The area is 65 sq.m.



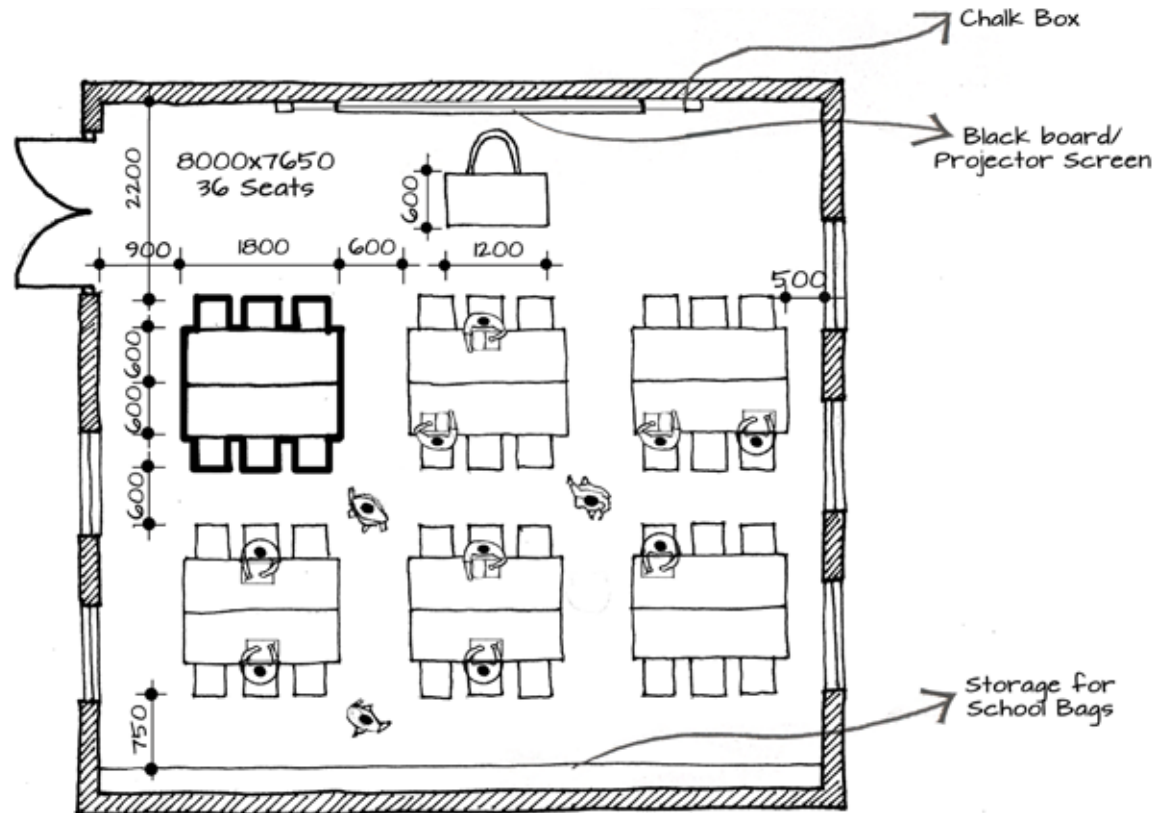
All dimensions are in mm

A classroom layout of 30 students with two-sharing desks rearranged to form a square table accommodating 4 students. The area is 61 sq.m.



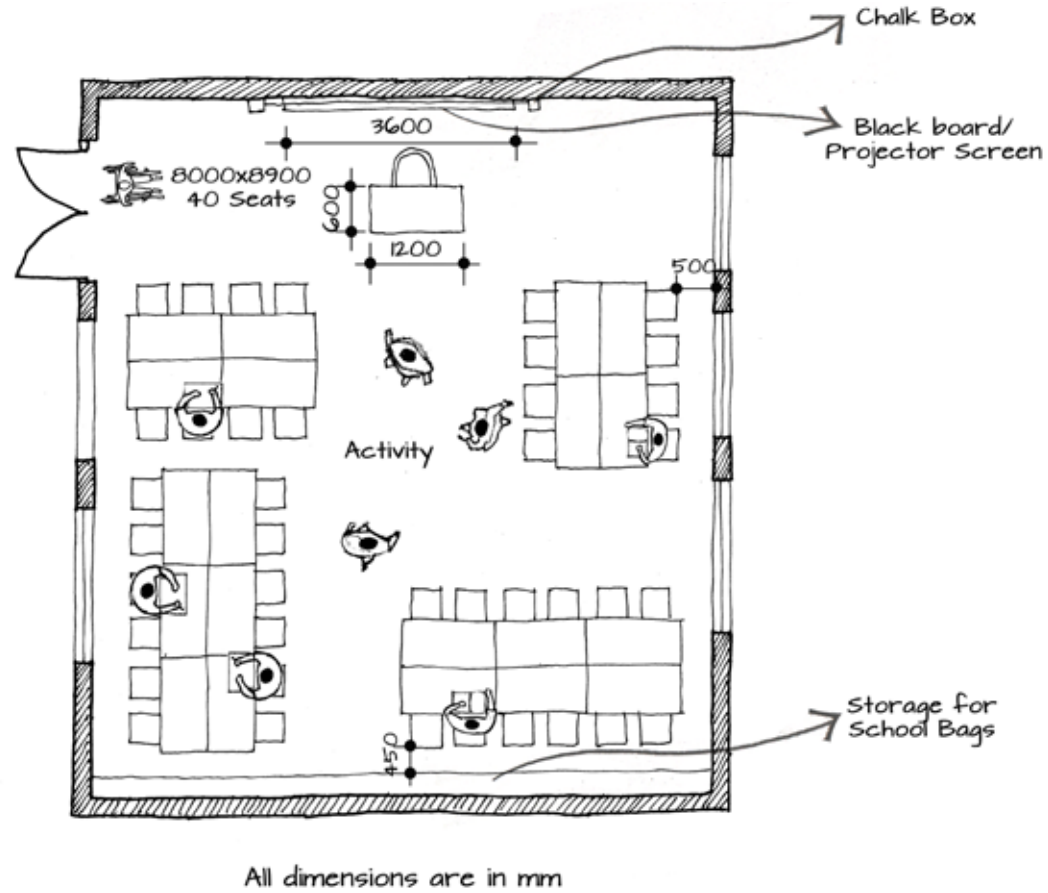
All dimensions are in mm

A classroom layout of 30 students with two-sharing desks can be rearranged in a circular pattern for centre focused activities. The area is 61 sq.m.

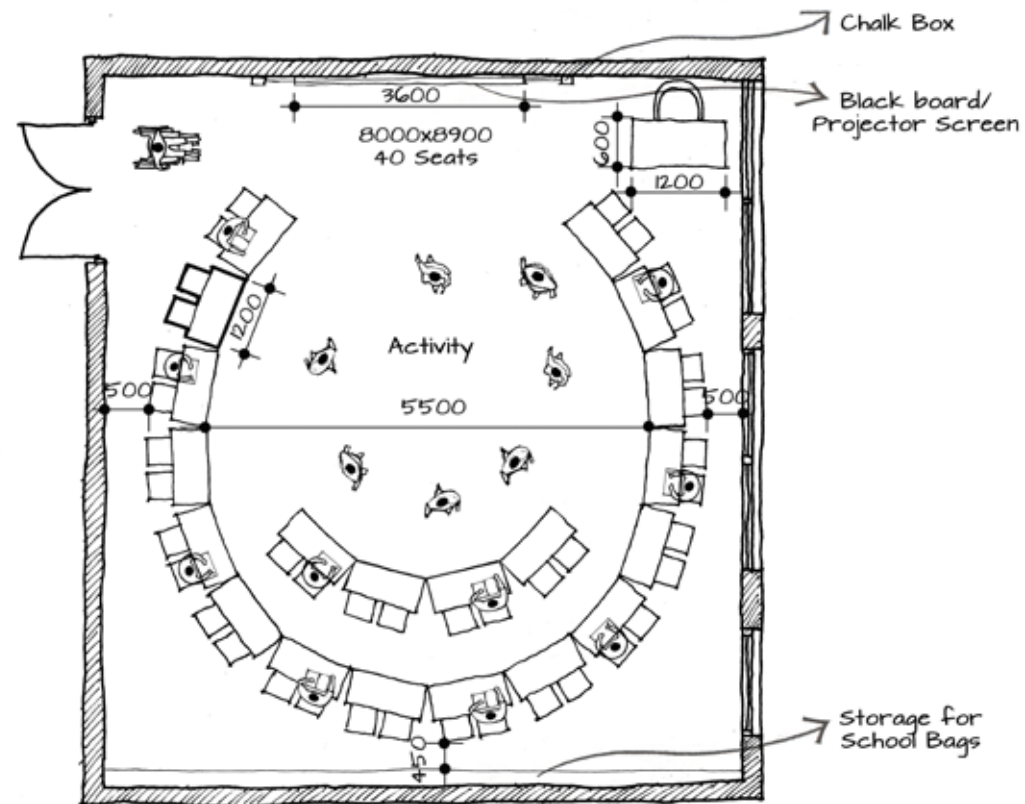


All dimensions are in mm

A classroom layout of 30 students with three-sharing desks can be rearranged to form a table accommodating 6 students. The area is 61 sq.m.

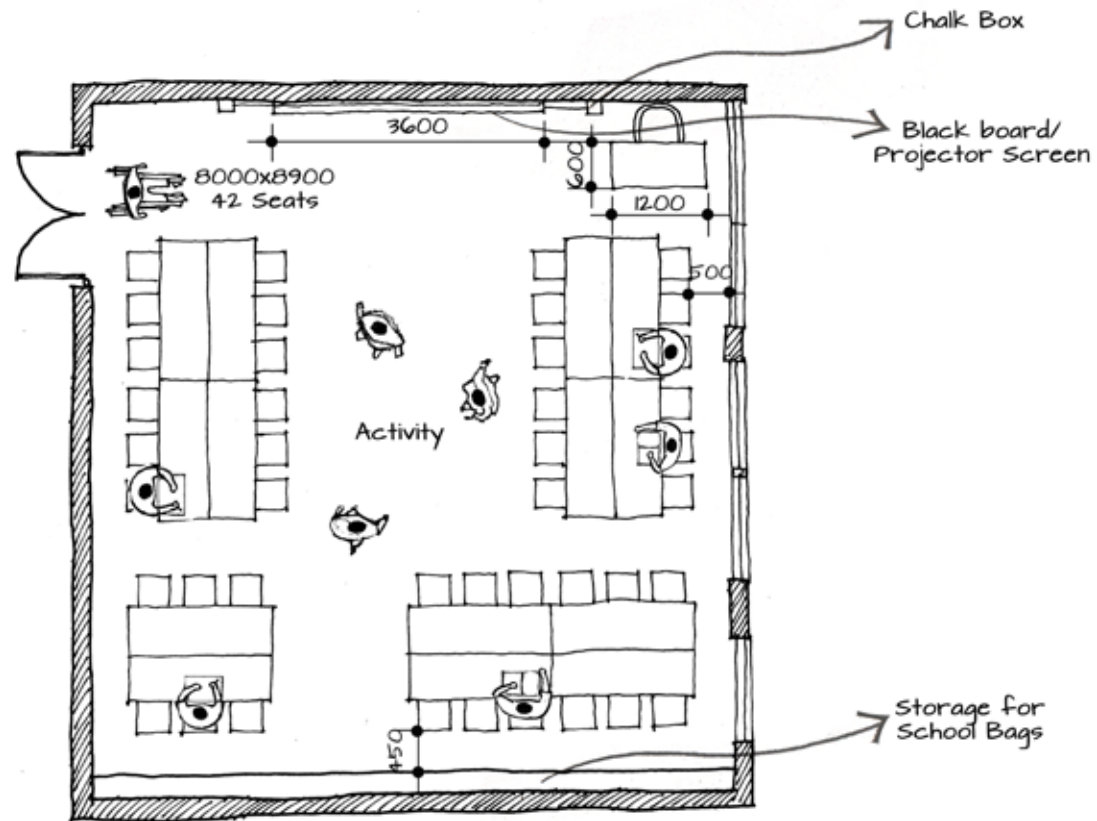


A classroom layout of 40 students, with two-sharing desks can be rearranged to form a square for a group of 4 students. The area is 71 sq.m.



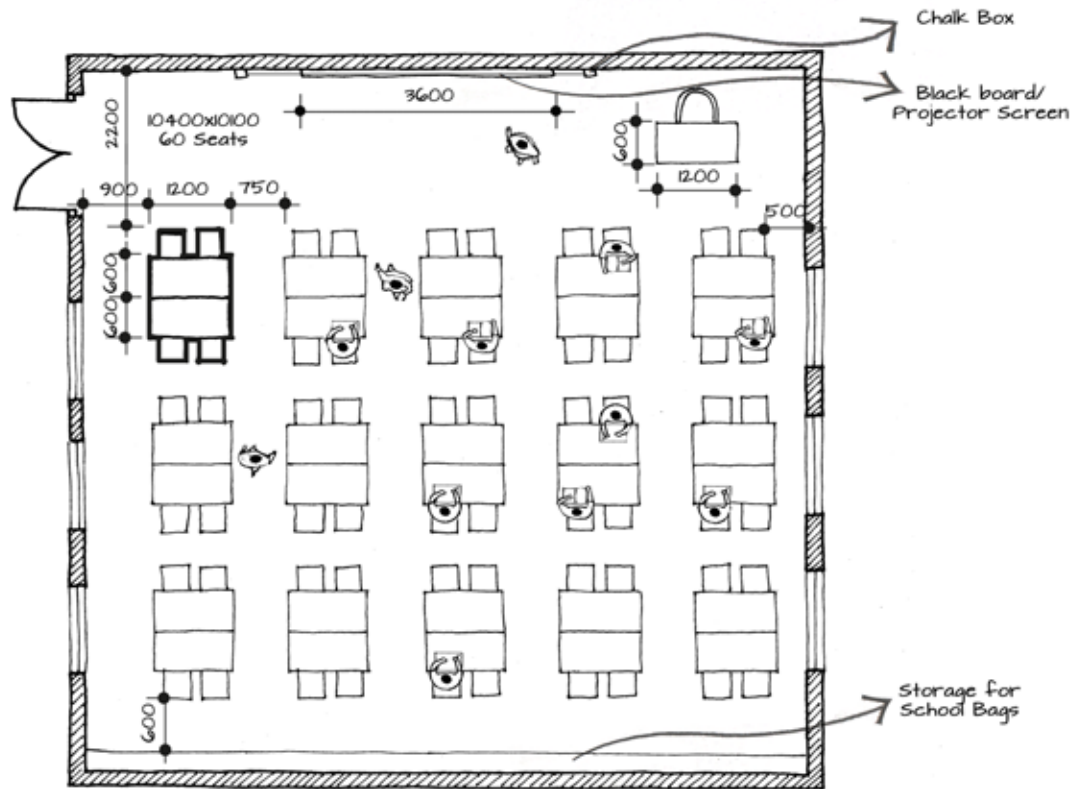
All dimensions are in mm

A classroom layout of 40 students with two-sharing desks arranged to form a circular pattern for a common central space. The area is 71 sq.m.



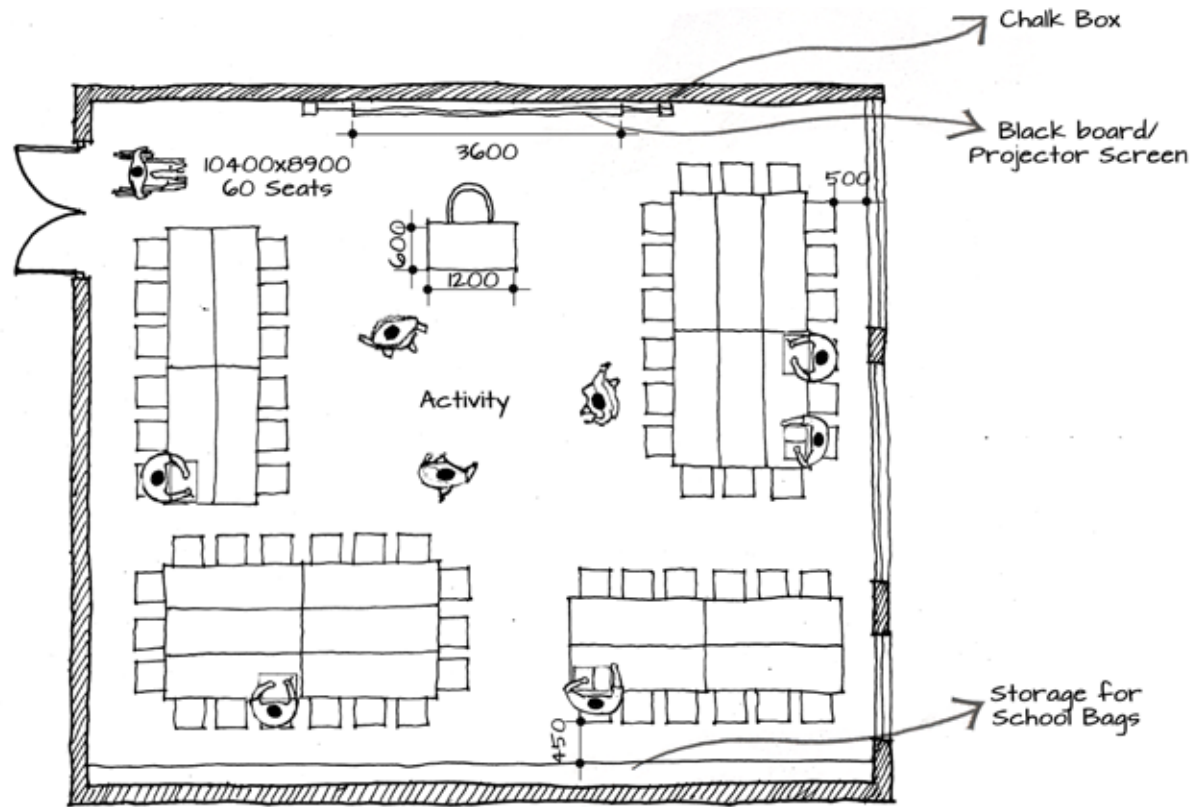
All dimensions are in mm

A classroom layout of 40 students with three-sharing desks can be rearranged to form a rectangle table for a group of 6 students. The area is area 71 sq.m.



All dimensions are in mm

A classroom layout of 60 students with two-sharing desks can be rearranged to form a square table accommodating 4 students. The area is 105 sq.m.



All dimensions are in mm

A classroom layout of 60 students with three-sharing desks can be rearranged to form a rectangle table accommodating 6 students. The area is 92 sq.m.

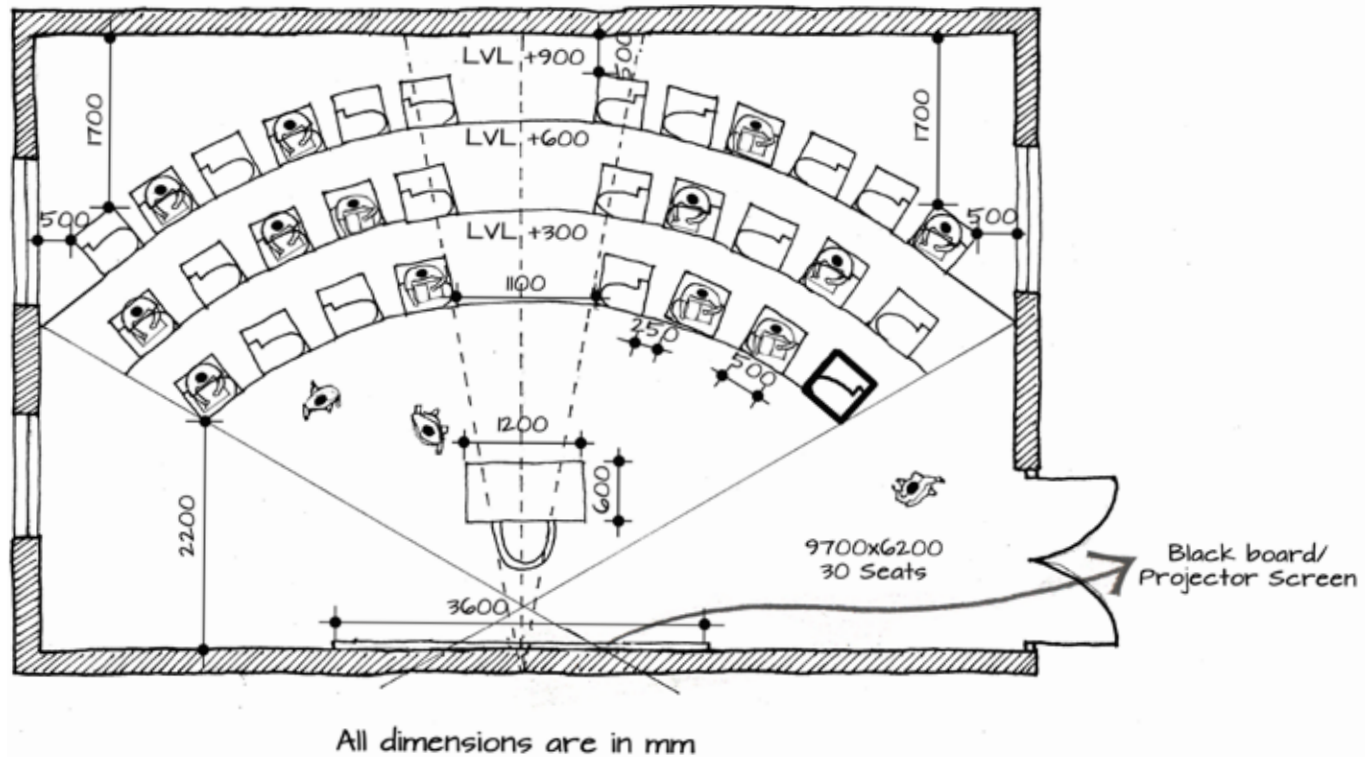


Seminar Room

Seminar rooms are planned for discussions, presentation, theory classes for integrated events.

One or more classes can sit together for various seminars being conducted in schools.

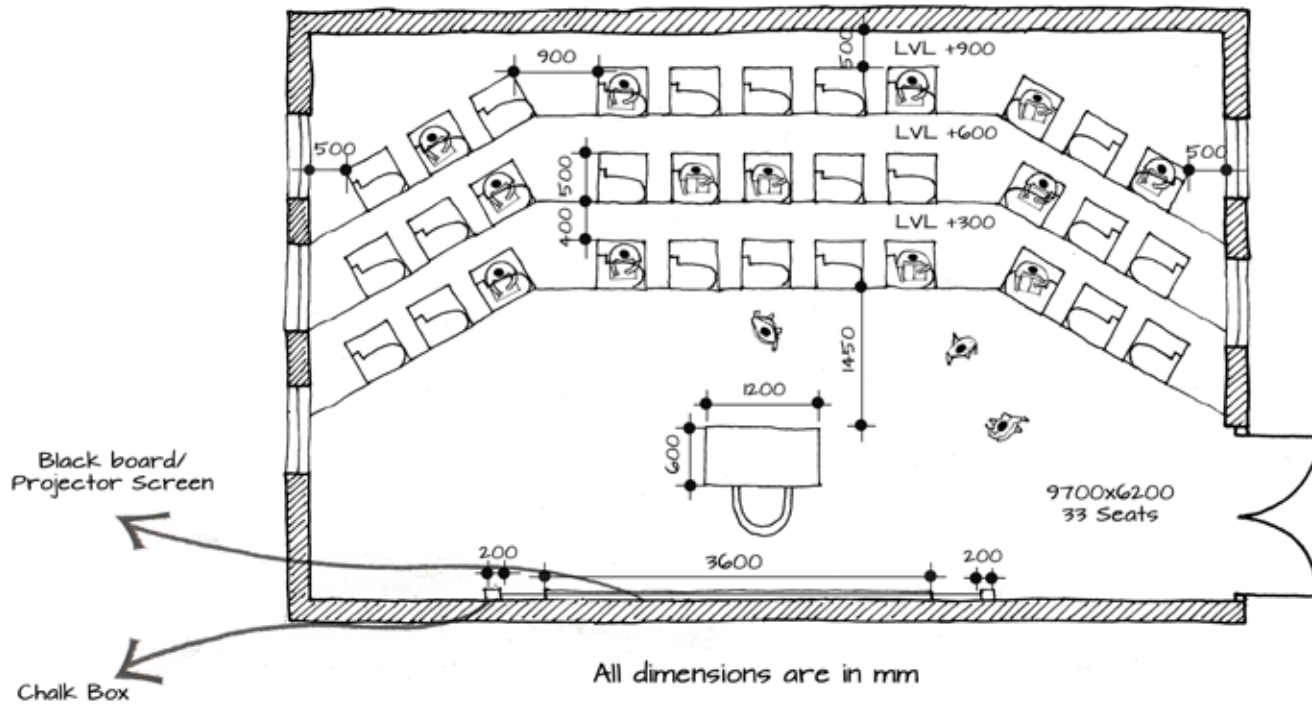
Layouts for accommodating 30, 40 or 60 students in a seminar rooms are shown. Chairs with foldable writing pads have been used in the layouts.



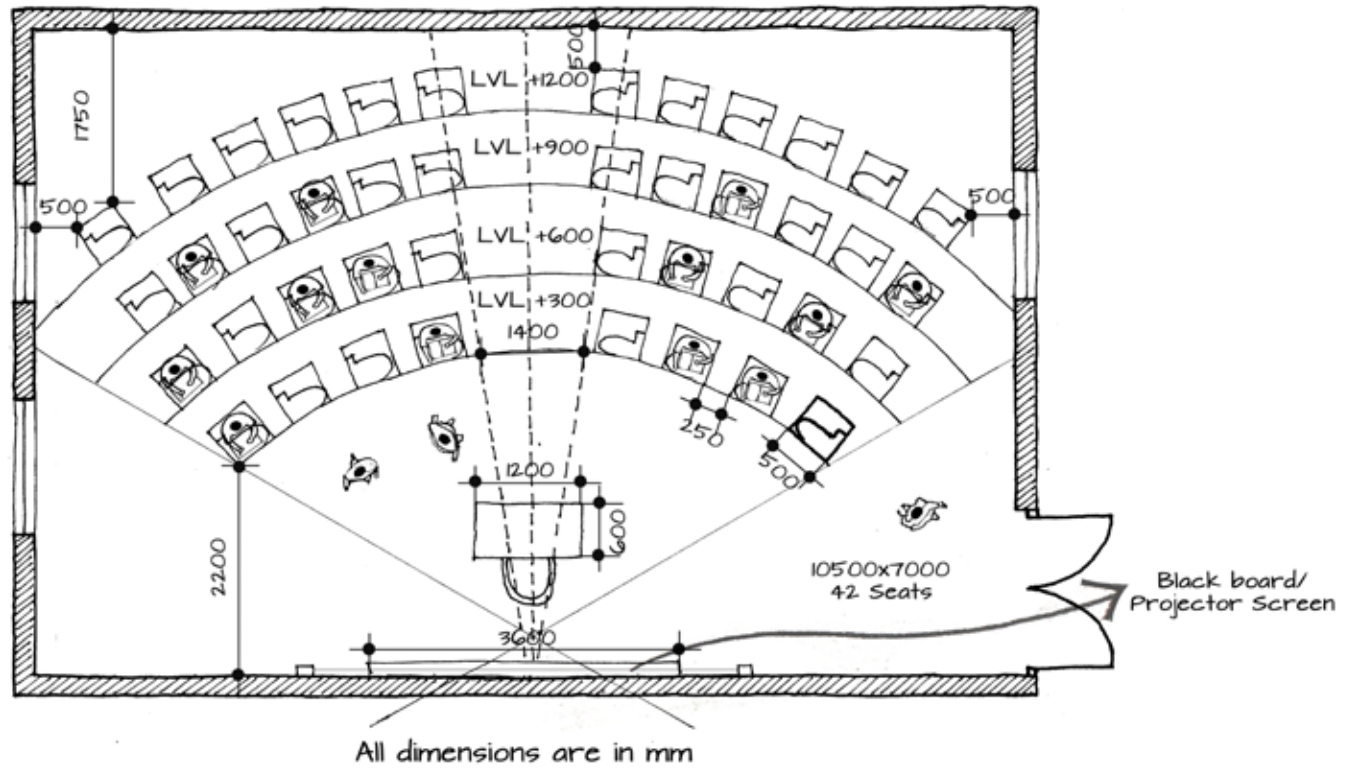
Area - 60 sq.m.

A classroom for 30 students can be arranged in a tiered layout. This arrangement enhances visibility for both teachers and students for viewing the blackboard and demonstrations.

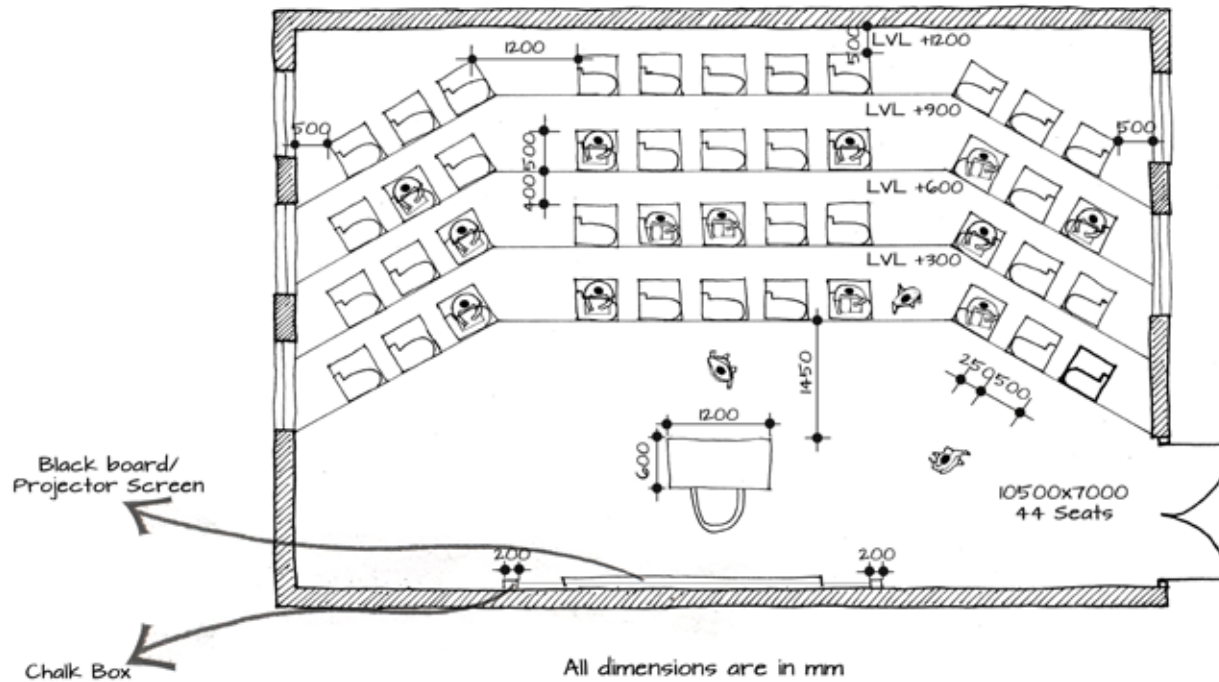
This type of layout can be used in seminar rooms.



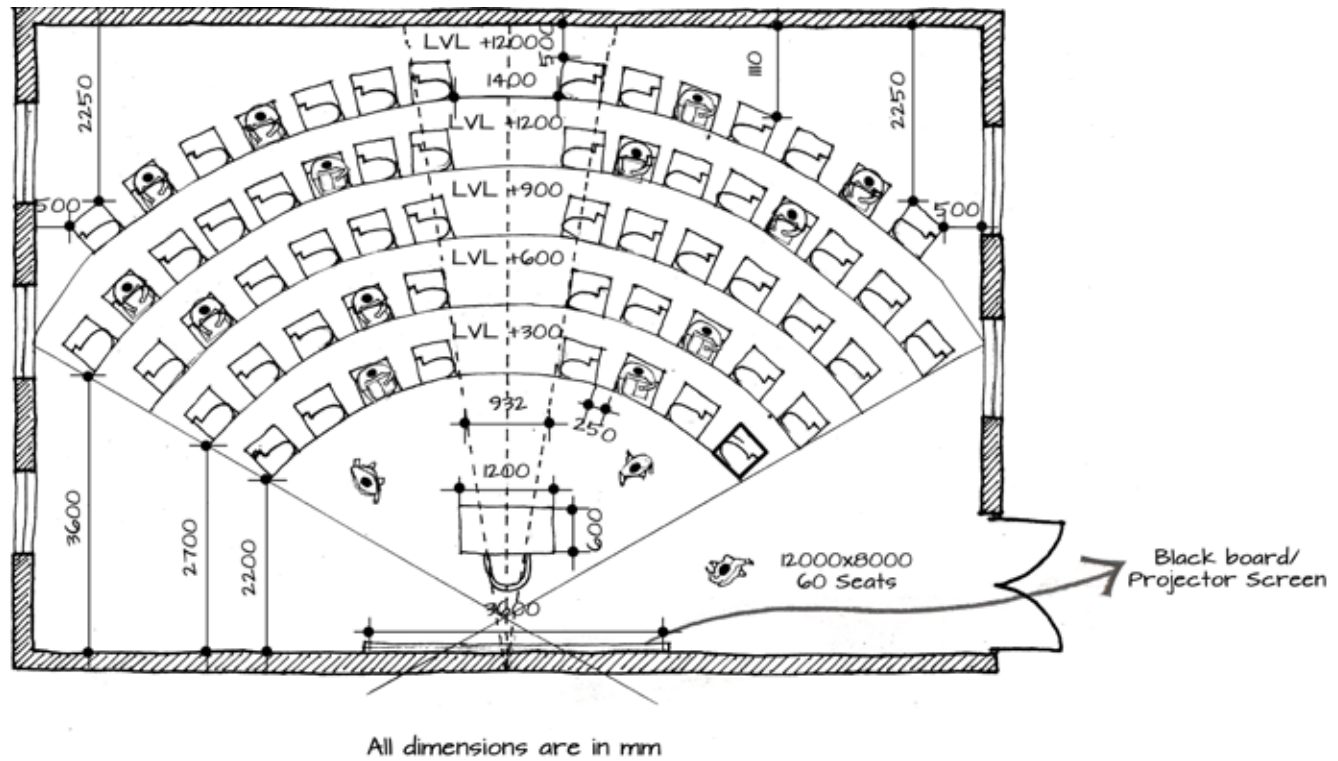
A classroom of 30 students which has a tiered layout with an alternative option. The area is 60 sq.m.



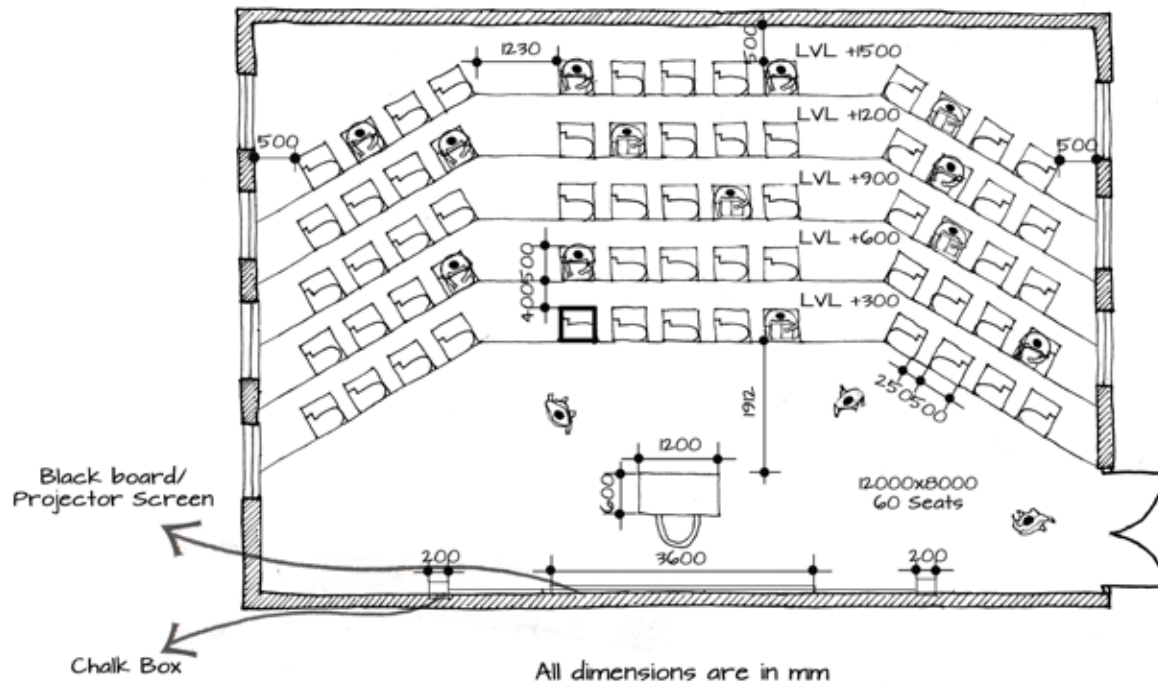
A classroom arrangement of 40 students with a tiered layout for seminar rooms. The area is 73 sq.m.



A classroom of 40 students which has a tiered layout with an alternative option. The area is 73sq.m.



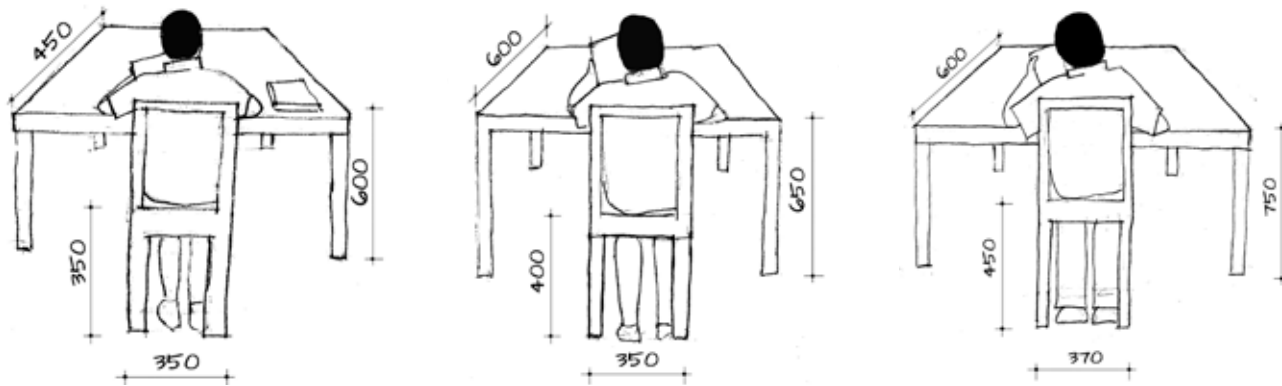
**A classroom arrangement of 60 students with single a tiered layout for seminar rooms.
The area is 96 sq.m.**



**A classroom of 60 students which has a tiered layout with single desks with an alternative option.
The area 96 sq.m.**

Type of Classroom arrangement	30 Students classroom layout- Area	40 Students classroom layout- Area	60 Students classroom layout- Area
Desk and Chair- Single student	8x8.1 = 65 sq.m	8x10.2 = 81 sq.m	10.4x11.3 = 117 sq.m
Desk and Chair- 2 Students	8x7.65 = 61 sq.m	8x8.9 = 71 sq.m	10.4x10.1 = 105 sq.m
Desk and Chair- 3 Students	8x7.65 = 61 sq.m	8x8.9 = 71 sq.m	10.4x8.9 = 92 sq.m
Group Activity arrangement- 4 Students	8x7.65 = 61 sq.m	8x8.9 = 71 sq.m	10.4x10.1 = 105 sq.m
Group Activity arrangement- 6 students	8x7.65 = 61 sq.m	8x8.9 = 71 sq.m	10.4x8.9 = 92 sq.m
Group Activity- Circular arrangement	8x7.65 = 61 sq.m	8x8.9 = 71 sq.m	Nil
Group Activity- U-shaped arrangement	8x8.1 = 65 sq.m	Nil	Nil
Seminar Room arrangement- (1)	9.7x6.2 = 60 sq.m	10.5x7 = 73 sq.m	12x8 = 96 sq.m
Seminar Room arrangement- (2)	9.7x6.2 = 60 sq.m	10.5x7 = 73sq.m	12x8 = 96 sq.m

A comparison of areas for the different layouts with for 30, 40 and 60 students is shown.

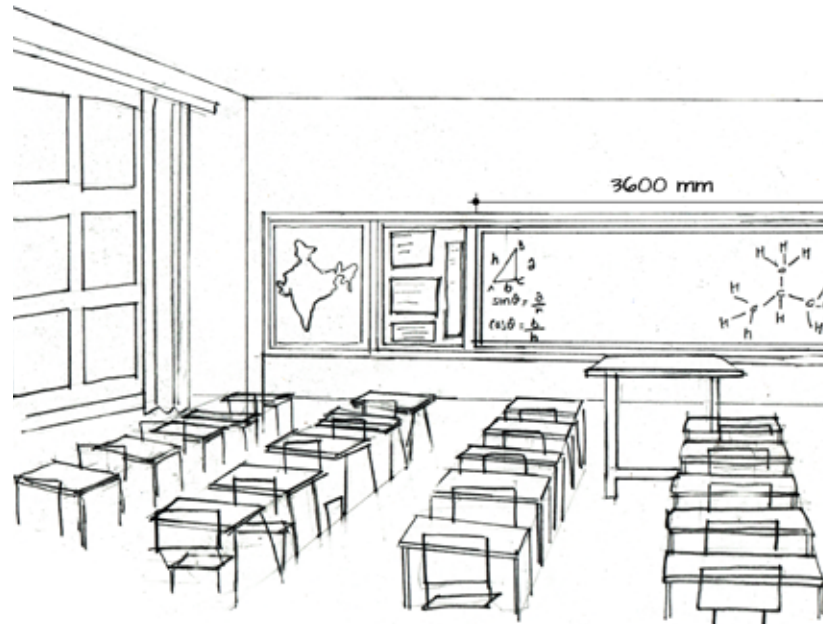


The height of the furniture varies according to different age groups.

Classroom Furniture

The minimum width and depth of a table for a single student is 600 x 450 mm. The table dimension often preferred is 600 x 600 mm.

School Furniture	Pre- Primary	Primary	Higher Secondary
Seat Height	350 mm	390 mm	445 mm
Seat Depth	350 mm	350 mm	370 mm
Desk Height	600 mm	660 mm	740 mm
Desk Depth	450 mm	600 mm	600 mm



The sides of the blackboard used to write study material.

Classroom Facilities

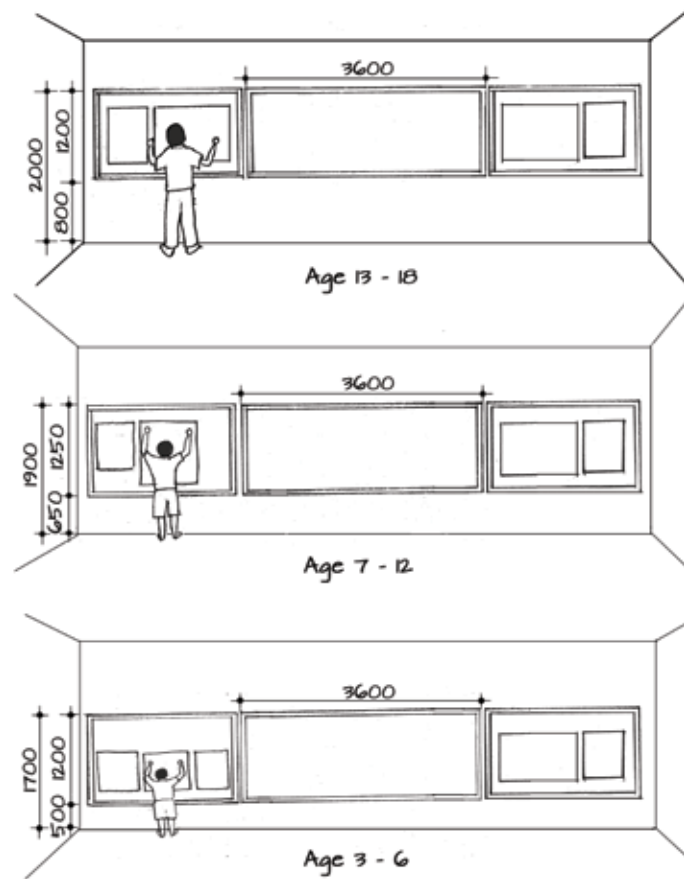
Facilities like blackboard, pinup boards, storage for school bags, cabinets for books and stationary, storage for teachers, are the basic necessities that can be provided for in the classroom.

Blackboard

A blackboard that is 3600 mm wide can be provided.

Provision of a large blackboard allows teachers to keep the study material on the sides of the board as reference for the students. The centre portion of the blackboard can be erased and utilized.

The combination of length and height maybe selected depending on the size of the



The sides of the blackboard used to write study material.

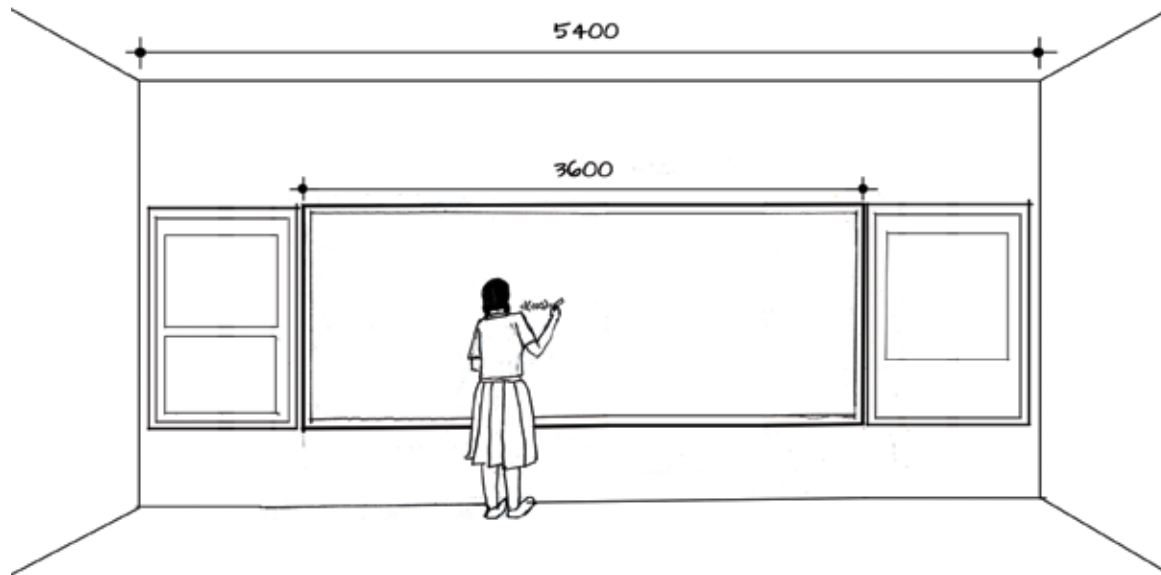
The height of blackboards from the floor level is important for children to reach the board while standing, as well as to view it when seated.

Pinup facilities are generally placed on either side of the blackboard to pin up pictures, maps, reference sheets related to the subjects taught in class.

It is generally the same size as that of the blackboard.

The minimum height of the blackboard and pinup boards on a wall for different age groups is given.

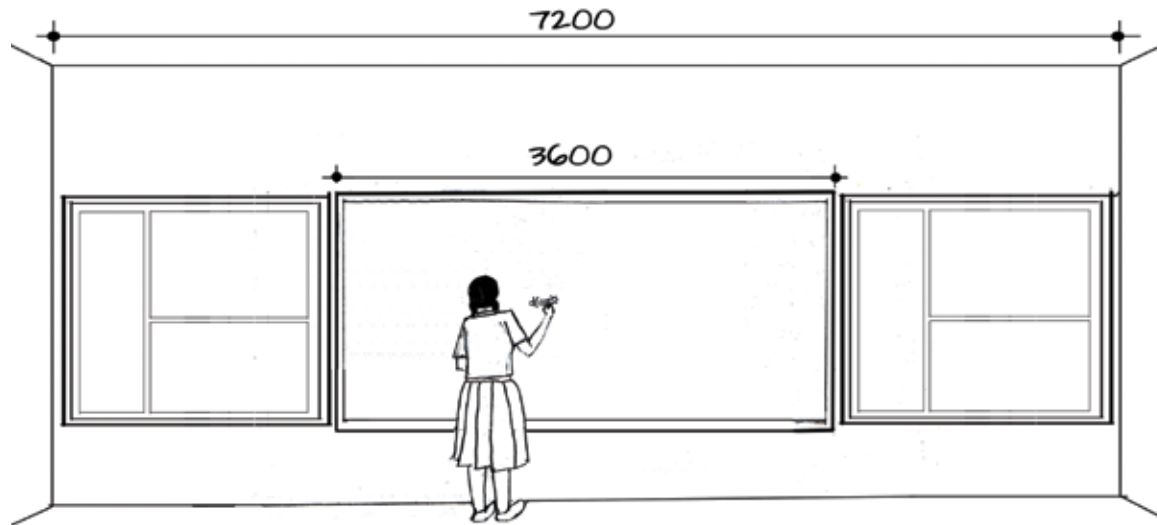
Item	Age 3-6	Age 7-12	Age 13-18
Blackboard and Pinup board- Bottom	500 mm	650 mm	800 mm
Blackboard and Pinup board- Top	1700 mm	1900 mm	2000 mm



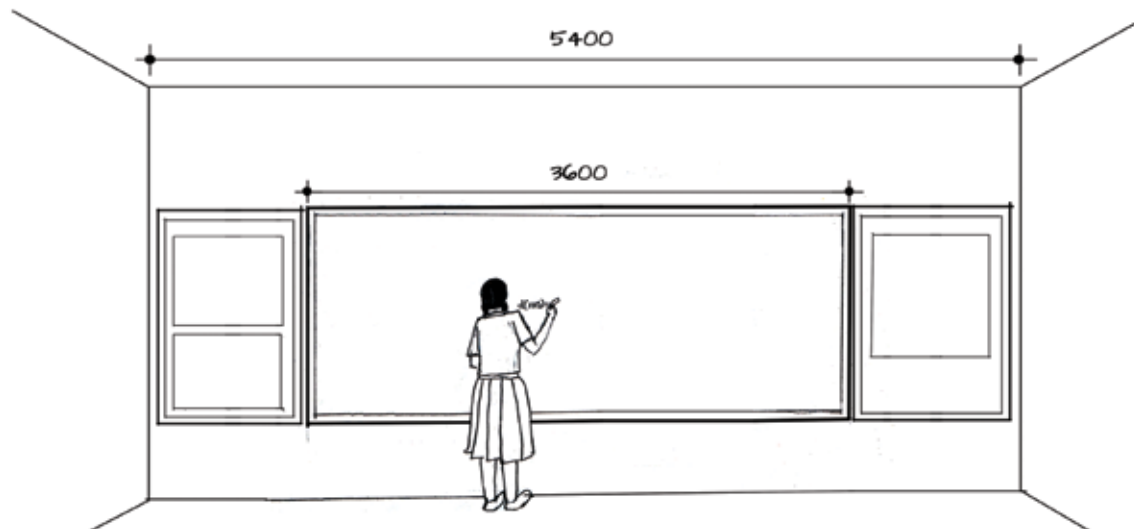
Blackboard and Pinupboard sizes for 5400 mm wide classroom.

Different room sizes can have various proportions and sizes for the blackboard and pinup boards on a classroom wall.

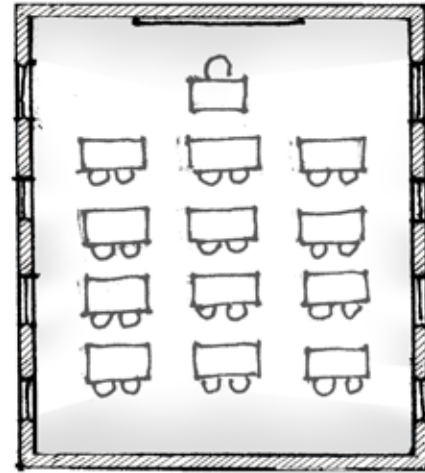
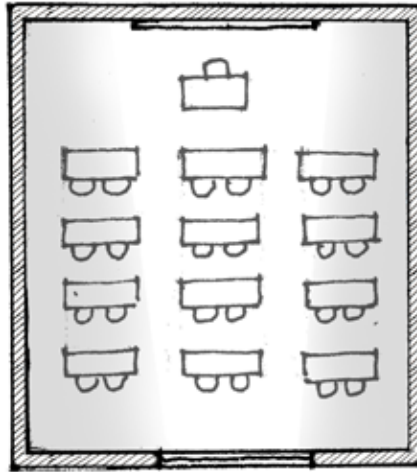
This will ensure efficient use of the wall area in the classroom.



Blackboard and Pinupboard sizes for 7200 mm wide classroom.



Blackboard and Pinupboard sizes for 9000 mm wide



Ways in which the light enters the classroom based on the location of windows

It is advisable to not have windows directly opposite to the blackboard so as to avoid glare and discomfort for the students in a class.

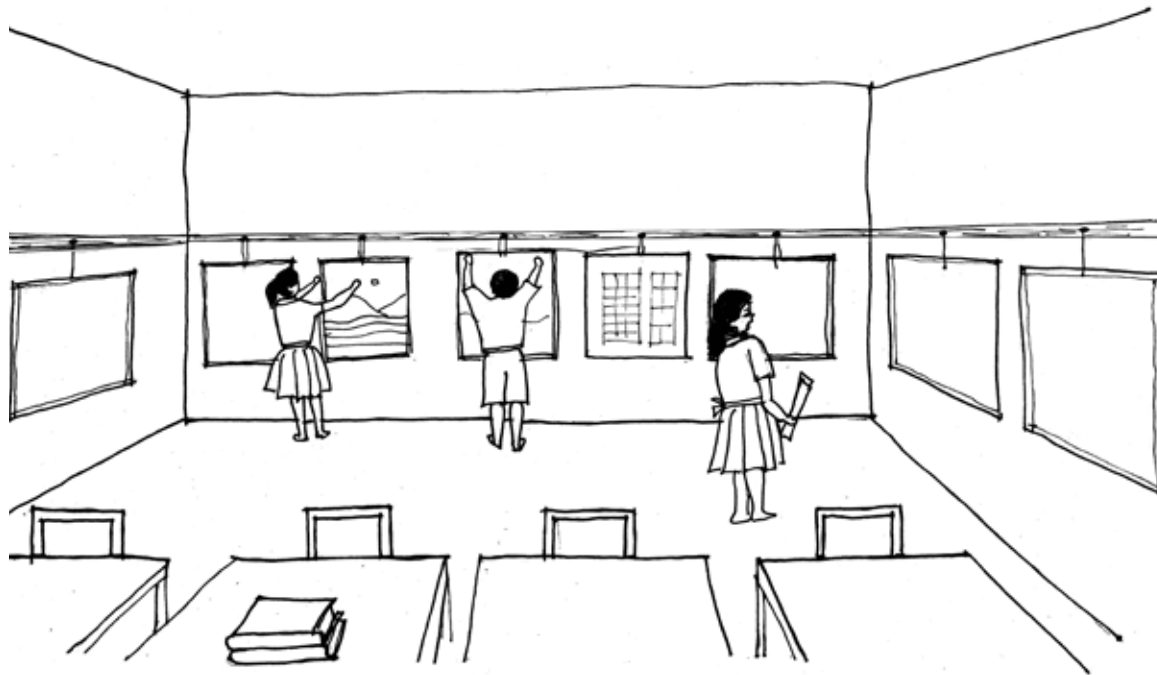
Ideally, a classroom is best lit when windows are provided on adjacent walls of the blackboard as the teachers and the students will have a view of each other.

Blackboard
Chalk is messier and it dries the skin on teachers' hands.
Cleaning the boards is more work, it does not erase completely.
Dust is suffocating, and can affect people with asthma.
Cannot be used as a screen for projection.
Low cost of installation.
Lasts longer.

Whiteboard
Using markers does not make it messy.
While cleaning, it erases completely.
No chalk dust.
Can be used as a projecting screen.
High cost of installation.
Gets stained through the years, and needs to be replaced.

The table shows a comparison between black and white board

Nowadays, whiteboards are preferred in classrooms as they can be used for projecting as well. A comparison between blackboards and white boards is given in the tables.



Students using the timber rails on the walls to display their work.

Pin-up Facilities

Pin-up facilities like pin up boards and display walls can be provided in the classroom.

Abrasions on plastered walls can be avoided by using the timber rails instead of directly nailing on the walls.

On a timber rail with a section size of 50 x 50 mm, nails or hooks can be provided at regular intervals, allowing students to put up their works, calendars, maps, timelines etc. This also allows all the students to view and compare their works.

The timber rails and the hooks can be provided according to the heights of the age group using the classroom.



Pin-up boards in corridor area displaying notices and students work.

Common pin-up boards within the school campus for display of students' work, artwork, and student exhibits can also be provided.

Pin-up boards on an entire wall for providing the latest news and current affairs can be provided.

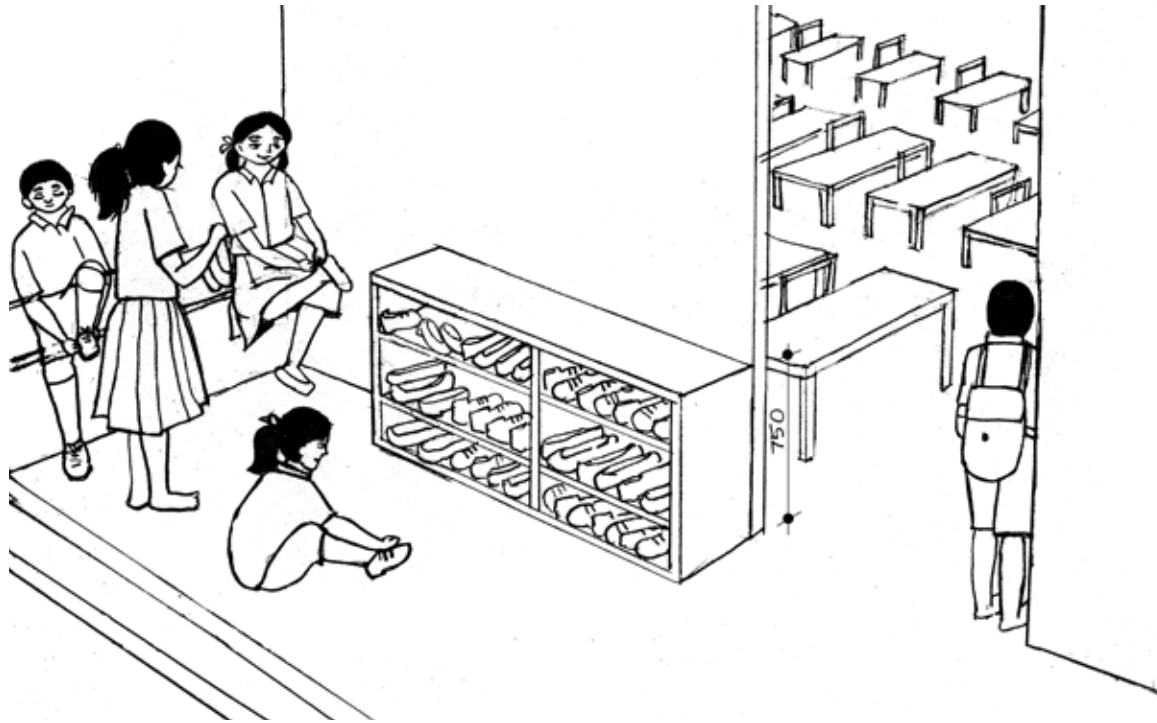


Students storing their bags in the ledge provided at the rear of the classroom.

School Bag Storage Facilities

A one-foot wide ledge can be provided along the rear wall of the classroom as storage for school bags. The size of each compartment can be about 450 x 300 x 200 mm.

Depending on the number of students, the number of ledges to be given can be decided. Natural stones or timber can be used to construct these ledges.



Shoe rack provided outside classroom.

Shoe Rack Stand

It may be required to leave footwear outside before entering a learning area. In such cases shoe racks can be provided.

Shoe racks can be made out of timber or natural stones that are available locally.

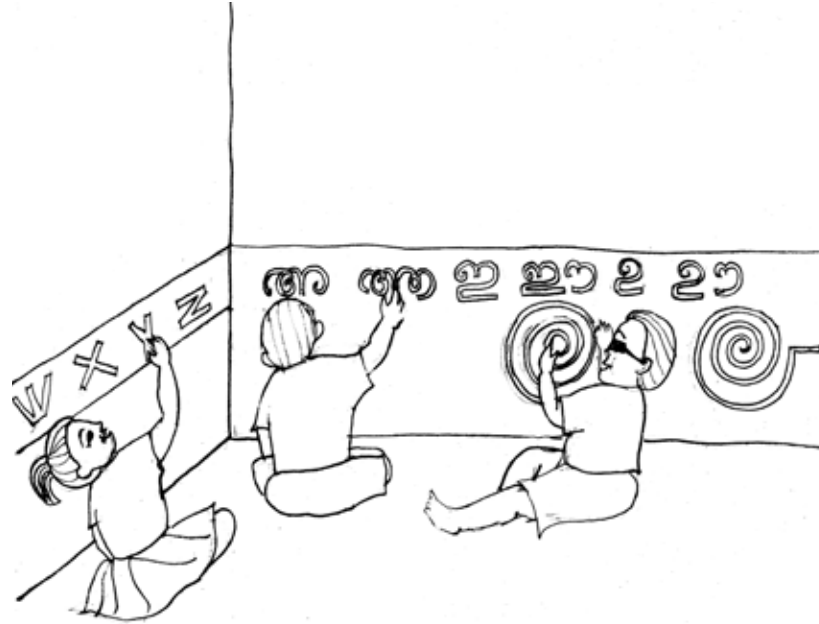


Activities in the central space in the nursery classroom

Nursery Classroom Design

Nursery classrooms are generally bigger in size to involve more activities for the kids.

The furniture arrangement can be such that it is flexible to move around within the space, allowing centre free space for group works, or free corner spaces as activity corners.

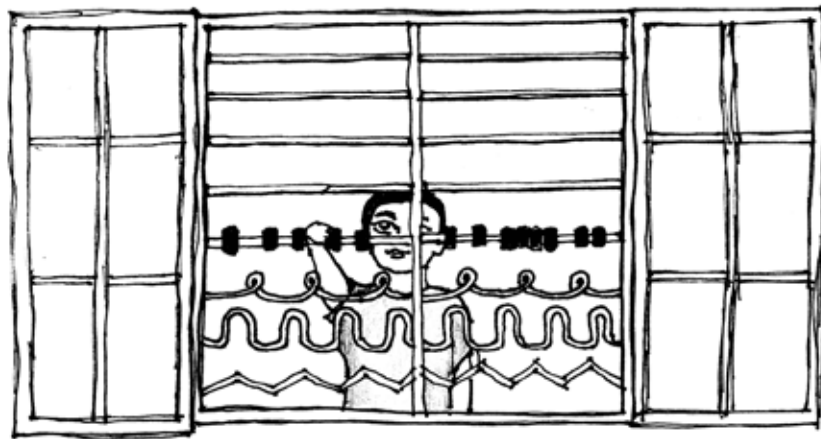


Nursery children interacting with the alphabets engraved on the walls.

The walls of the nursery classrooms can be a large surface for the young children to scribble, paint, display shapes and tangram tiles etc..

These walls can also have engraved numbers or alphabets in English or in Malayalam, allowing the children to learn from them by touching and following the patterns.

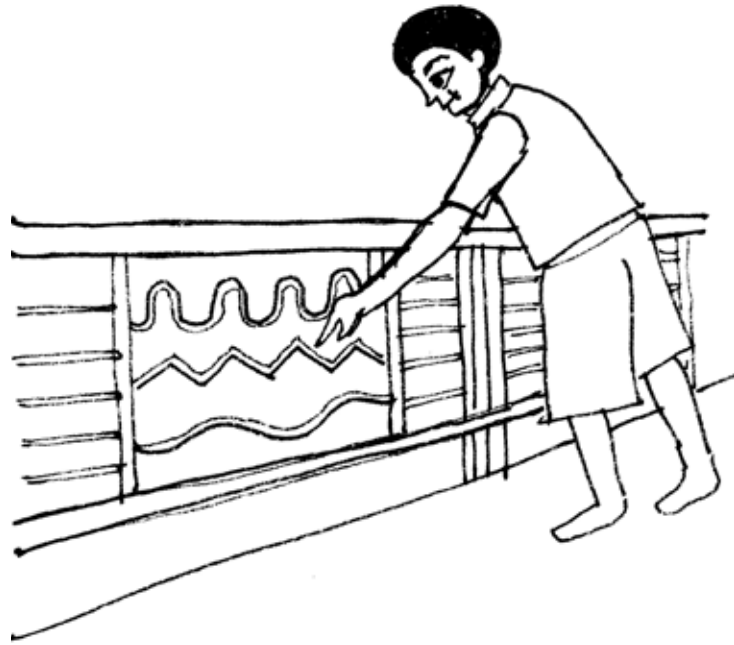
This will enable them to learn local languages through indirect methods of learning.



The interactive grill becomes an indirect learning aid for the children.

The window grills can be used like an abacus to learn calculation through an alternative method.

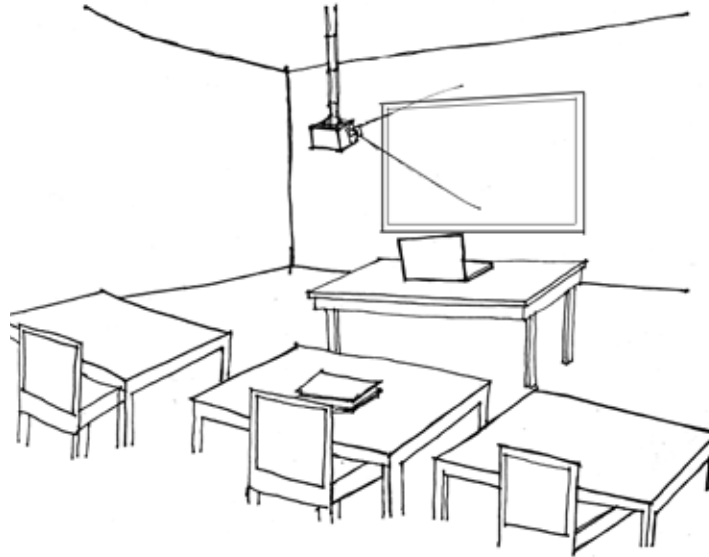
Waste nuts from garages can be used for this purpose because they do not have sharp edges and are safe for children to use.



To develop finely controlled motor skills, children need to learn to freely move their fingers and muscles in a predetermined manner.

Pre-Writing aid is an activity that requires coordination of the muscles.

The design of the railing can be a learning aid by allowing children to follow the shapes on the railing which can be alphabets, numbers, shapes, etc.



Facilities in a smart classroom.

Smart Classrooms

A smart classroom is a teaching space that uses technology to teach concepts. The teacher can take the help of an audio-visual aid, computer etc. to explain a particular topic.

Students and teachers will have to be trained to use the equipment efficiently.

Smart Classroom
A smart classroom will need basic necessities like laptop, projector, a white screen with uninterrupted power supply.
It gives access to online resources.
It may require software skills and special teaching applications.
Using multimedia, students learn through audio-visual methods and visual teaching.
It has a high cost of implementation.
It is prone to technical faults and needs maintenance.

Traditional Classroom
A traditional classroom has a blackboard. If projection is required, an extra screen may need to be provided.
There is no direct access to internet.
The teaching method depends on the teacher herself involving conversation, questioning sessions, role play etc.
Teacher incorporates various methods of teaching like drama, games and other practical learning techniques.
It has a low cost of implementation.
It does not require high maintenance and gives no room for technical faults.

A comparison between traditional and smart classrooms is given above

Smart classrooms require a lockable storage provision for keeping the equipment safe. The projector in these classrooms can be hung from the top, making efficient use of classroom space.



Illustration showing door width with the angles along a door swing

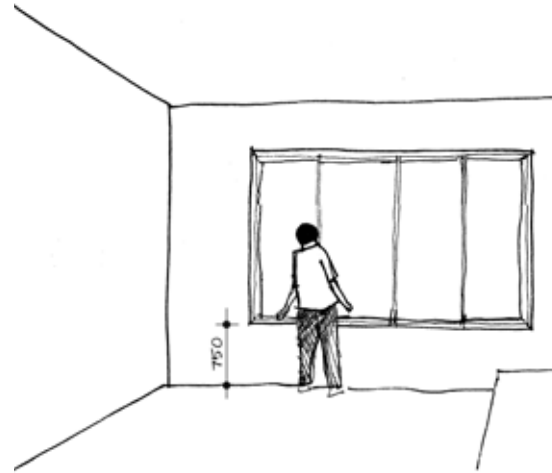
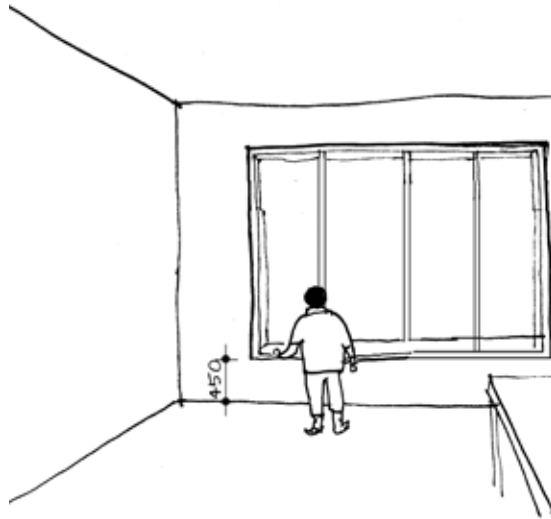
Elements Beyond Classrooms

The classrooms lead to other building elements like doors, windows, corridors and staircases, which connect the other indoor and outdoor spaces within the school layout.

Door Widths

The minimum width of the main door of a classroom is 1000 mm. Provision of a double leaf door with a minimum width of 1200 mm is preferable.

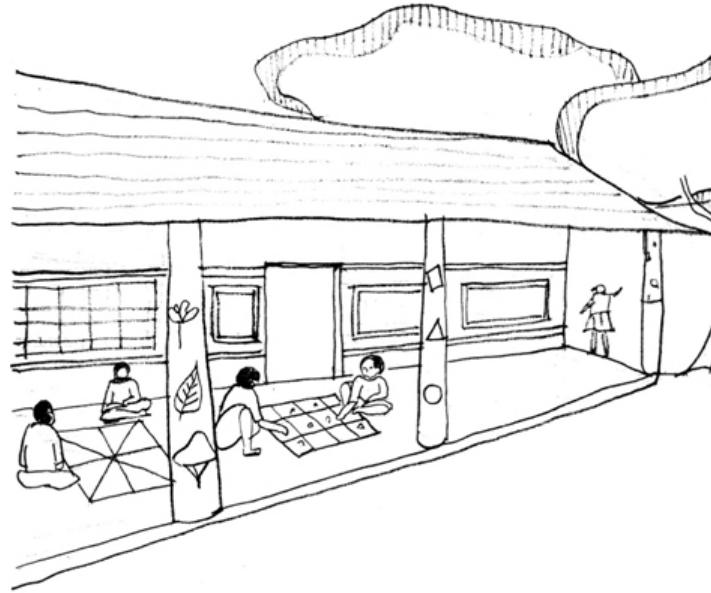
Doors can also be learning aids by showing the angles of the protractor on the floor of the door opening.



Window Sills

The window sill heights are specified for comfortable vision to the outdoors for different age groups.

A sill height of 450 mm from the finished floor level can be provided for the pre-primary and primary, whereas a sill height of about 750 mm for the higher classes can be given.

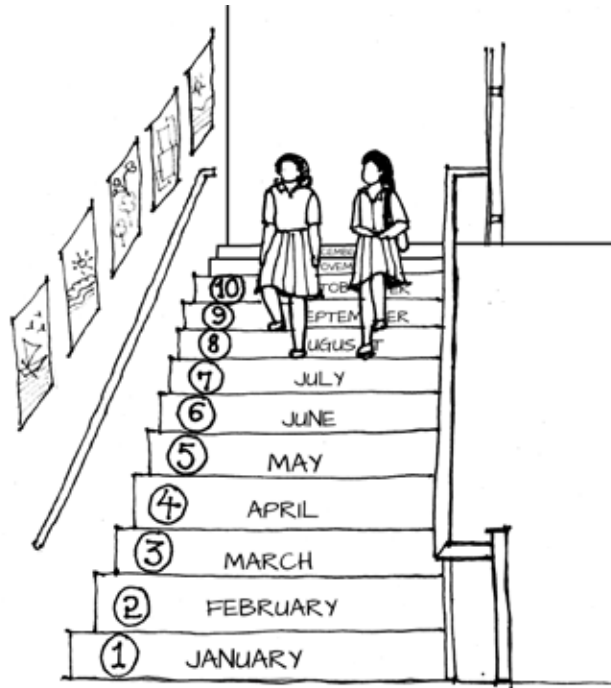


Corridors

For existing buildings, while re-plastering wall and column surfaces, some fun elements can be implemented for children. For example, wall boards, fraction tiles on walls, floors etc.

Board games can be implemented on the floors, of the corridors, creating activity spaces.

Similar steps can make the environment livelier.



Numbers and month names can be marked on the steps for children to learn while using the stairs.

Staircase Design

A staircase shall have a minimum width of 1500 mm.

The riser of the staircase can have a maximum height of 150 mm and the tread of a step can have a minimum dimension of 300 mm as per building norms.

A landing maybe provided after a flight of 12 steps, to provide a break from climbing continuously.

04. Other Teaching Spaces

Subject Rooms	172
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Subject Rooms

Subject labs are specialised spaces that can be used to accommodate specific needs that arise for each subject, such as demonstrations, experiments and other activities.

Some labs like science labs, language labs, mathematics labs, geography labs, etc. can be provided to reiterate the concepts learnt theoretically.



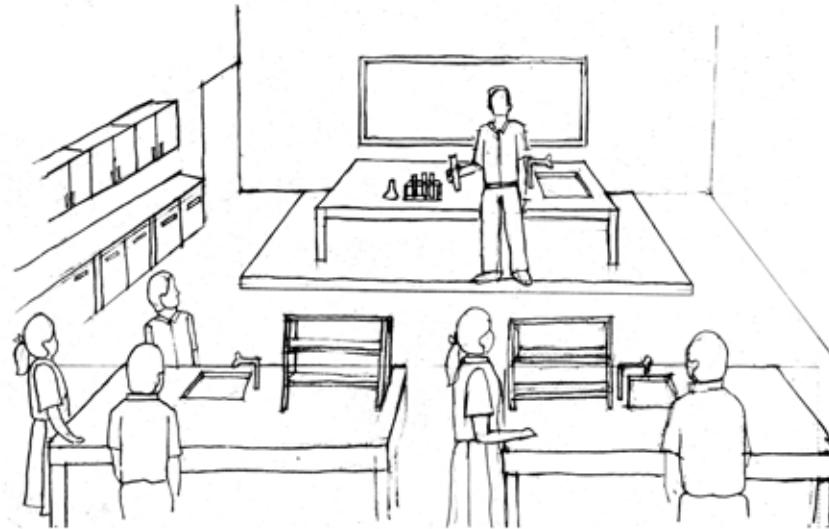
A teacher demonstrating an experiment for lower class students.

Science Labs

Chemistry, Physics and Biology may require laboratories to demonstrate experiments practically.

The lab spaces are generally provided for standard VIII and above. Standard VIII - X, may be provided with a space where only the teacher demonstrates the experiments for the students to view and learn.

Standard XI - XII can be provided with labs where both the students and the teachers can perform experiments.

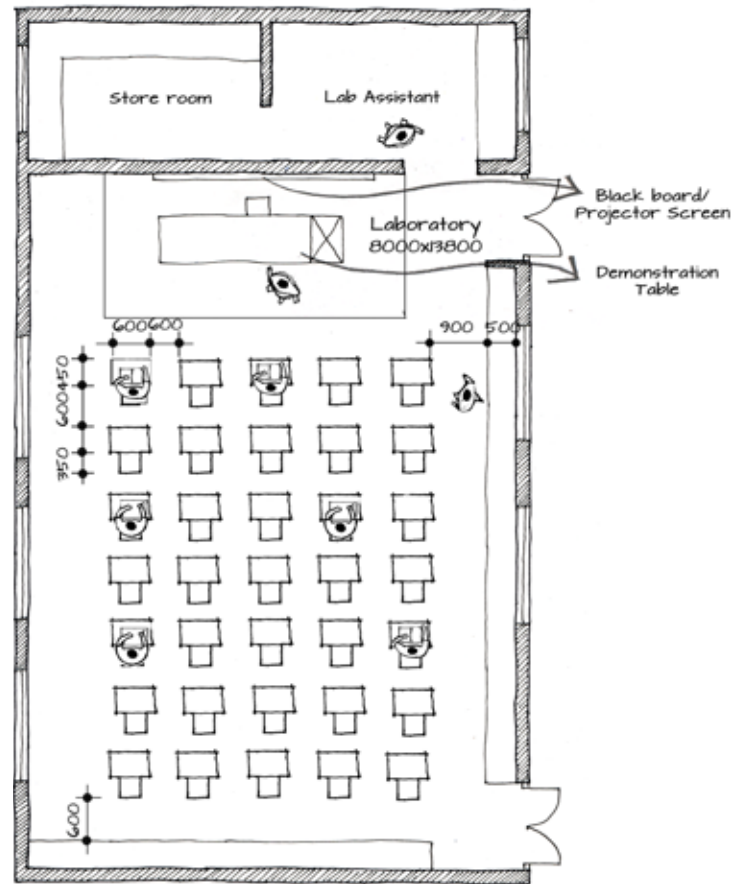


A well-planned science lab generally provides for the following:

- At least one sink with hot and cold running water shared by a set of students.
- Adequate counter space for laboratory preparation work.
- Appropriate material and equipment.
- Storage space for classes XI and XII.

The lower classes may not need separate storage spaces, as they are usually required to only view the demonstrations.

A demonstration table can be provided in each lab over a raised platform of height 125 mm so that the students can view the demonstrations.



All dimensions are in mm

Demonstration Classroom

The average room size and layout of a science lab in schools, for classes VII to X, is similar to a classroom layout. This is because sufficient provision for only viewing the demonstration is provided.

The teacher's table can be provided with a sink, electric points, gas lines etc.



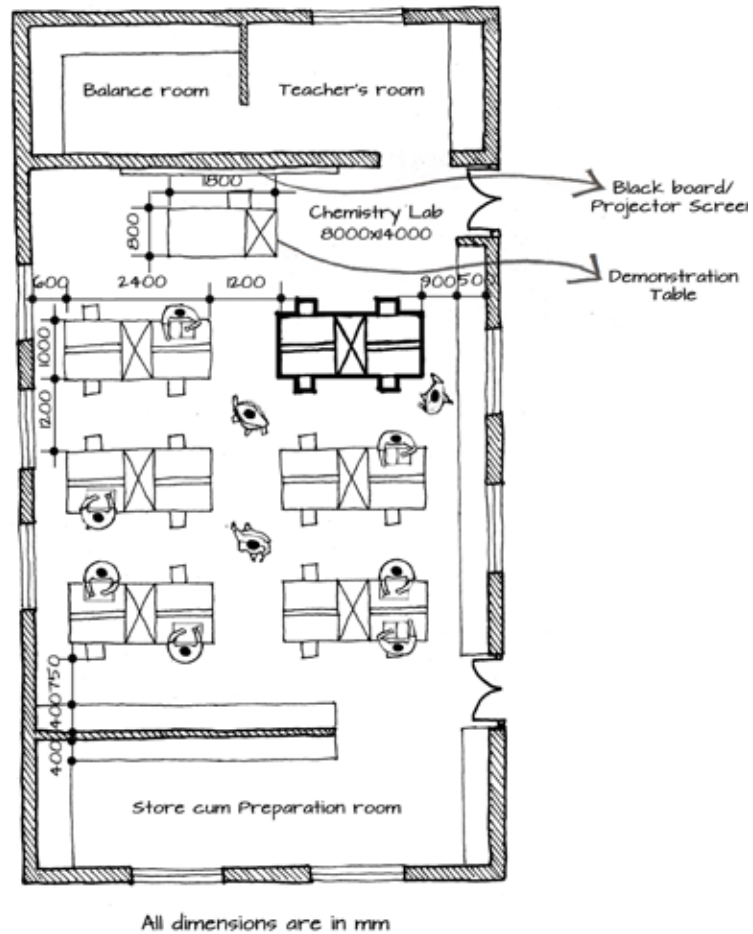
Chemistry Lab

A chemistry lab provides a safe zone for conducting chemical experiments and studying reactions.

A chemistry lab may contain:

- Chemical resistant and heat resistant work surfaces.
- Gas nozzles such as natural gas and compressed air.
- Chemical storage cabinets are required for the safe keeping of chemicals used in the labs.
- Storage space for classes XI and XII.

This lab should preferably be placed on the ground floor for the convenience of providing the plumbing lines.



The layout shows a chemistry lab, with an area of 112 sq.m, accommodating 24 students

Space requirements of a chemistry lab:

- Laboratory
- Preparation room
- Storage room where apparatus and chemicals can be kept safe.
- Balance room to avoid any disturbance during weighing and balancing.
- A space for the lab assistant can also be provided.

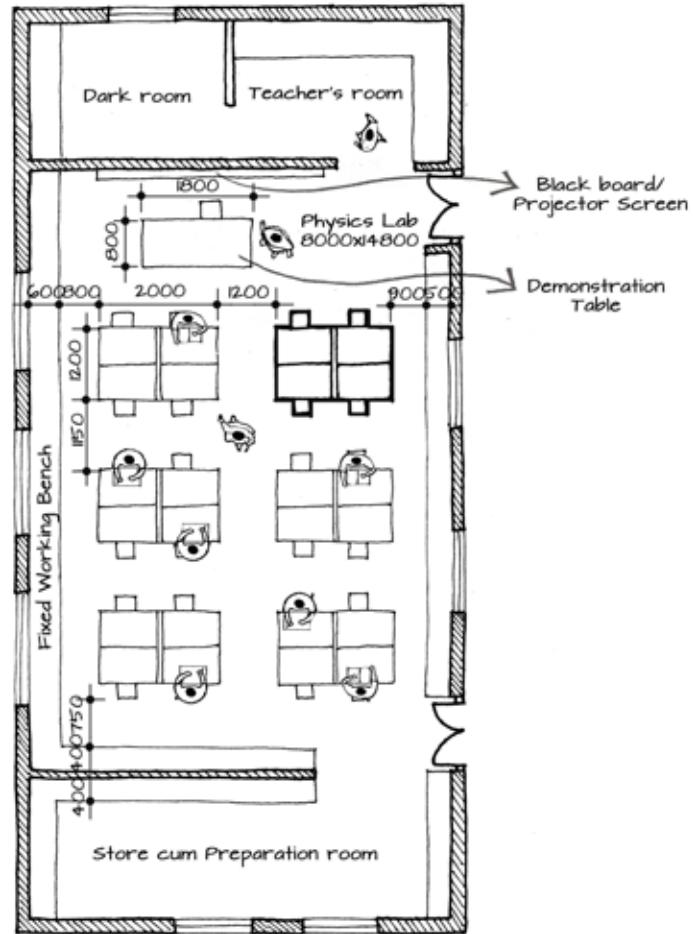


Physics Lab

A physics lab provides space for conducting and understanding the laws of physics using equipments.

A physics lab may contain:

- A good source of constant electrical supply for each workstation with earthing and AC-DC voltage provision.
- Provision of spaces with ample natural lighting and spaces for conducting experiments without artificial light as well.
- Physics labs generally require more storage spaces, as the equipments used are bulkier.



All dimensions are in mm

Space requirements of a physics lab:

- Laboratory Space
- Preparation space
- Storage Space
- Lab Assistant room
- Dark room where experiments requiring no light, can be executed.

The physics lab can be placed on higher floors in case it cannot be accommodated on the ground floor.



Zoology and Botany Lab

A biology lab provides space for observing biological process and evolutions, and studying living organisms.

A biology lab can be divided into two sections of study - zoology and botany.

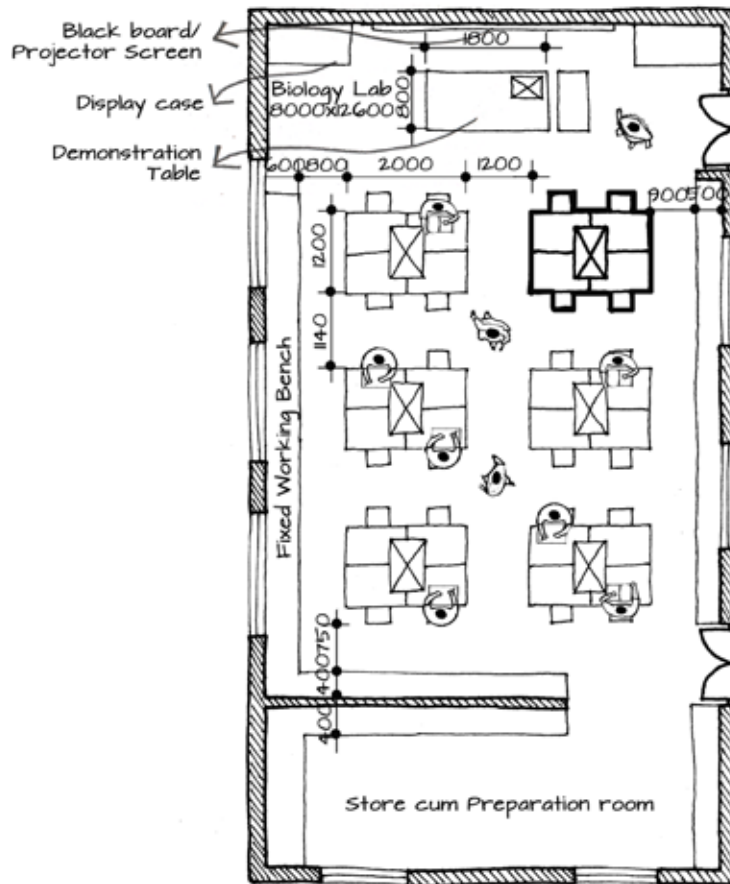
Zoology is a branch of biology, which deals with the study of animals, also known as 'Animal Sciences'.

The study material for this laboratory involves charts, diagrams, animal specimen, slides, beakers etc. Equipment required for a zoology lab may include microscopes, dissection equipment, etc.



Botany labs deal with the study of plant species, and may consist of a 'Herbarium', which is a section that contains a number of plant specimens stored for study of the subject.

All these labs can be preferably placed on the ground floor for easy provision of plumbing lines.



All dimensions are in mm

The layout of the biology lab occupying an area of 100 sq.m. accommodating 24 students

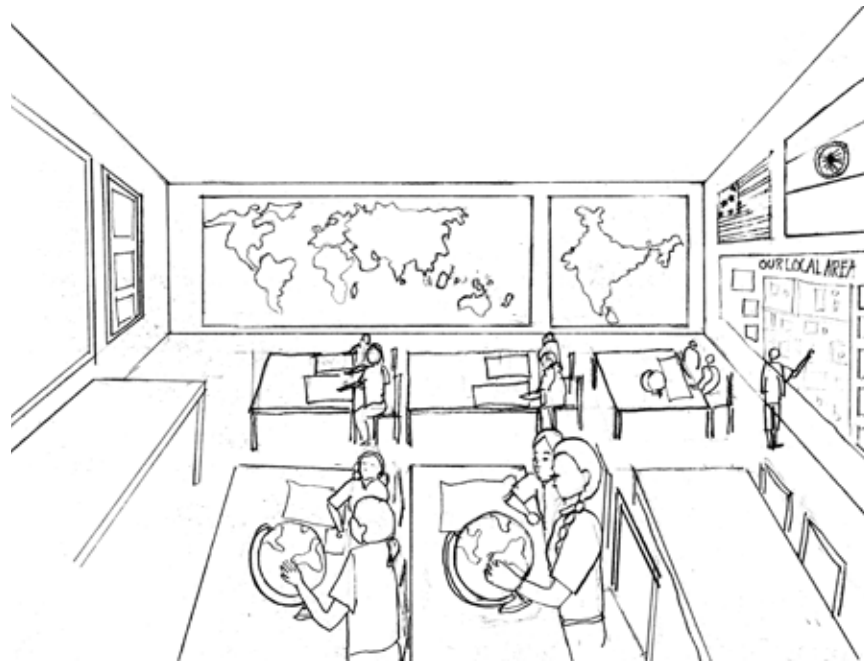
Zoology and Botany labs may contain:

- Demonstration table with a sink to view dissection procedures.
- Plant and animal specimen, storage beakers, and display cabinets through which the specimens are visible.
- Provision of microscopes with ample natural light in the room for viewing.

Space requirements of the lab:

- Demonstration table with a sink to view dissection procedures.
- Plant and animal specimen, storage beakers, and display cabinets through which the specimens are visible.
- Provision of microscopes with ample natural light in the room for viewing.

The rooms allotted to the zoology and botany labs can be separate or one single lab.



Geography Labs

Geography labs are provided for a better understanding of geographical concepts like location, region, density, scale etc. through maps, globes, books and special equipments for measurement. An area of about 60 sq.m along with a store room of 12 sq.m, for 40 students, can be allocated for this lab.

A small subject library space can also be planned for the students to refer to subject related books and references.

This lab may have:

- Display of maps on the walls - world map, country map, local state and district maps for children to learn about their location and country.
- Globes of various sizes and scales.



- Survey equipment like glass tables for tracing, with a size of about 915 x 60x 1000 mm, display boards, topographic sheets, magnetic compass etc.
- Equipment like hygrometer, anemometer, thermometer, barometer and rain gauges for measuring moisture content, wind speed etc.
- Display of physiographic models and different types of rocks like metamorphic, sedimentary and igneous rocks.
- Store room with cupboards, map stands, documents, stock registers etc.



Mathematics Labs

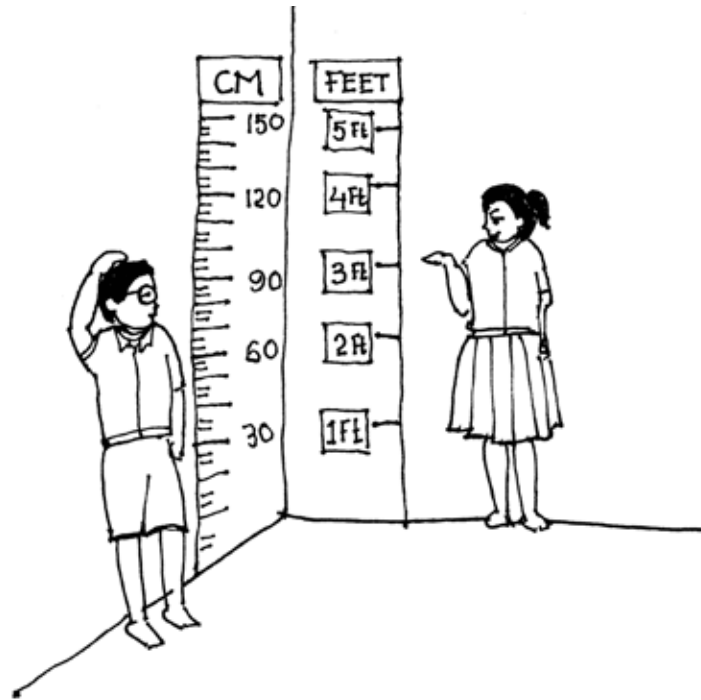
In a mathematics laboratory, students can learn and explore mathematical concepts and verify facts and theorems through a variety of activities using models, paper cutting and folding techniques.

It enables the teacher to demonstrate abstract mathematical ideas by using physical



A Math lab can provide:

- Model making spaces.
- Storage of craft and stationary items.
- Large table for cutting, drafting and conducting group activities.
- Measuring tapes, instrument boxes, tangram puzzles, stencils, graphs etc.
- Geo boards, fraction boards, volumetric cups, probability kit, time indicators etc.



Following ideas can be used while planning a math lab:

- A practical explanation of important formulae can be demonstrated. For example, the Pythagoras theorem can be represented through the diagonals of the room to calculate angles, distances etc.
- Angles, scales and proportions can be marked on the horizontal and vertical walls.
- Different units of measurement can be displayed around the lab, like meter and feet.

Computer Labs

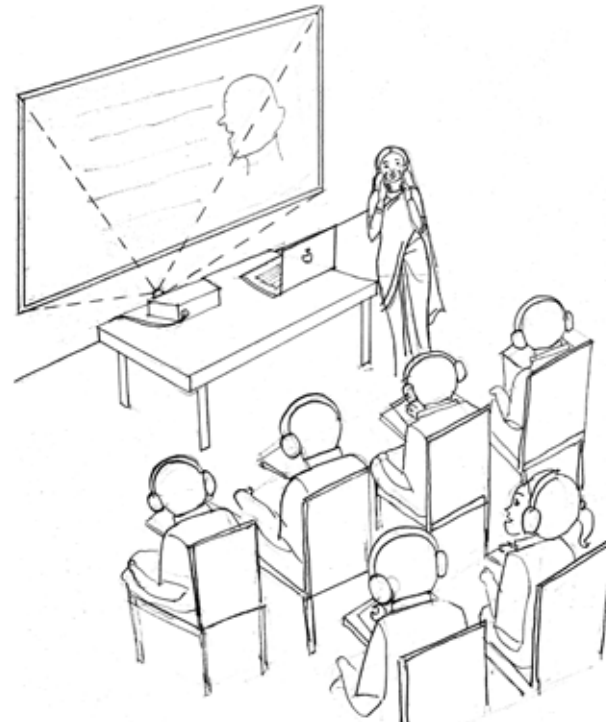
A computer lab will help children keep up with the increasingly digitized world.

The lab can provide computers, internet connection and a projector to view demonstrations.

The workstation furniture provided in these labs can have a width of 750-1000 mm and a depth of 450-600 mm for each student.

The layout of a computer lab can be planned such that the workstations are placed along the walls, so that the teacher can get a better view of the students' work.

Providing air conditioners in a computer lab may reduce the heat impact created by the systems, and also reduce the dust levels in the room.



Language Labs

The language laboratory is a place where students can record, listen to records, interact, read, perform and carry out other exercises to strengthen their language skills.

Children to listen to phonetic sounds, words, punctuations and pronunciations.

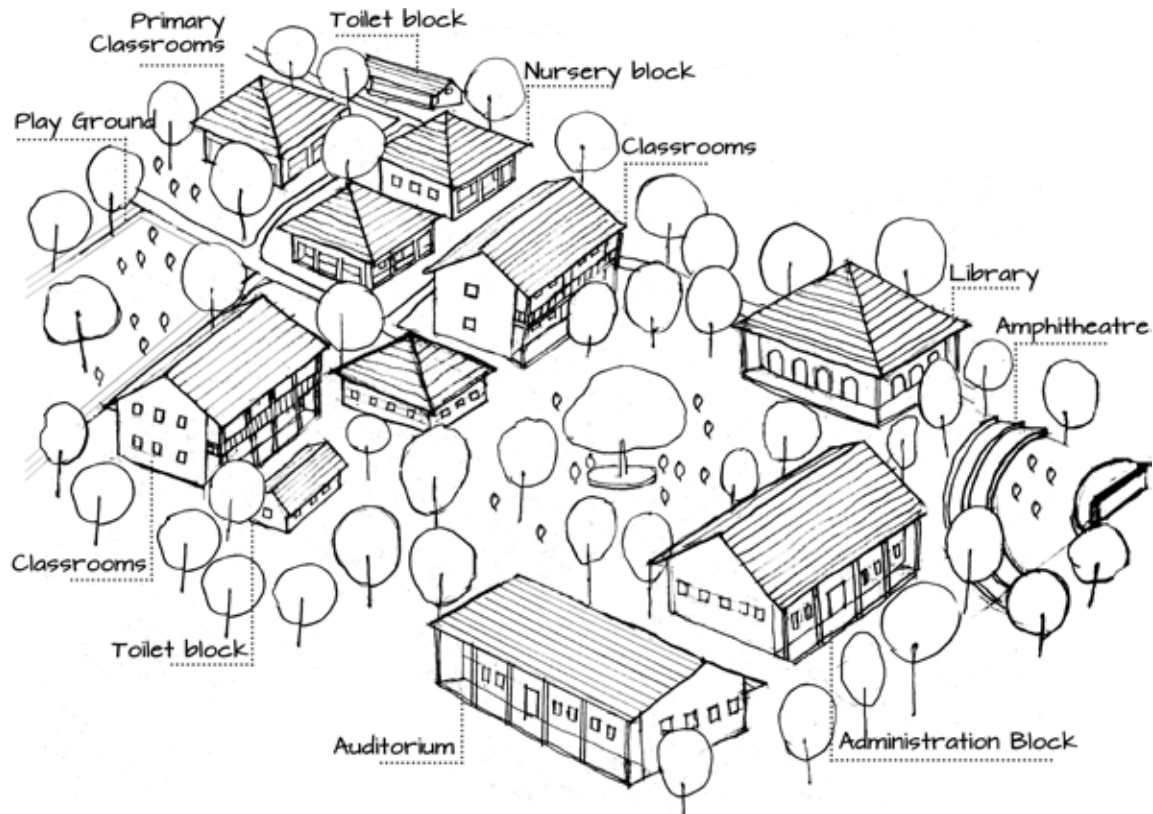
Language labs can have a projector for visuals with good audio systems and head-phone sets if possible for each child to hear with clarity.



The standard size of the lab for 20-30 students may be about 40-60 sq.m. The room can be treated with sound absorbing materials.

05. Elements of a School

Library	214
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Sports Facilities	270
Kitchen and Dining	283



The school comprises of some elements and requirements that play an important role in shaping the learning process of a child. These elements that constitute a school act as supportive spaces for what is not taught in classrooms.

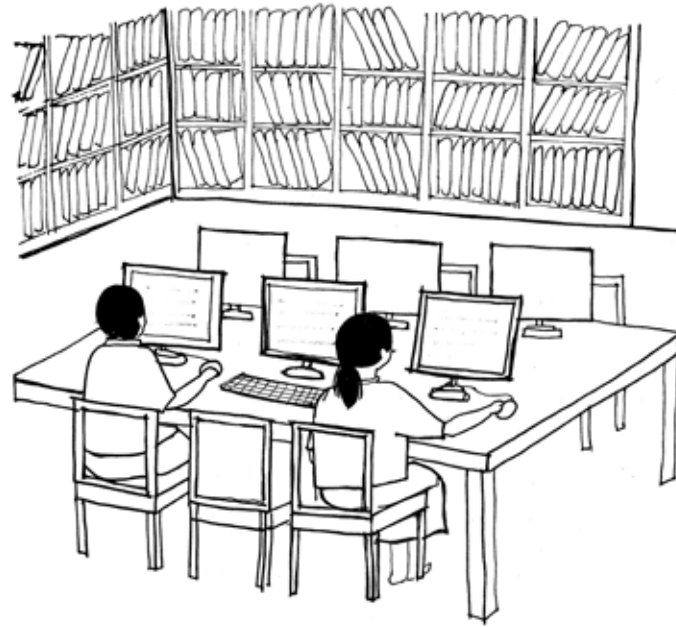
The library, auditorium, administrative office, sports grounds etc. are some components of the school that contribute to the learning process of the students.



Library

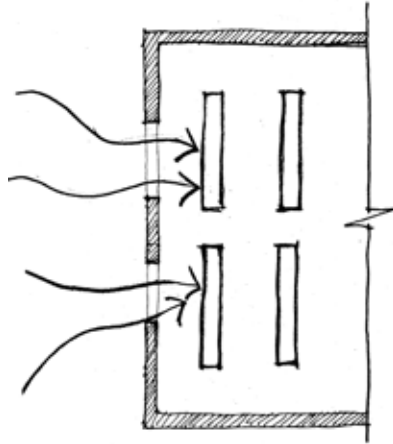
A library is a space where students and staff have access to a variety of resources in the form of books, research works, reports, internet, archives etc.

The role of a library is changing drastically, with the advancements in technology. E- Books, digital archives and audio-visual rooms are becoming increasingly important in library spaces.

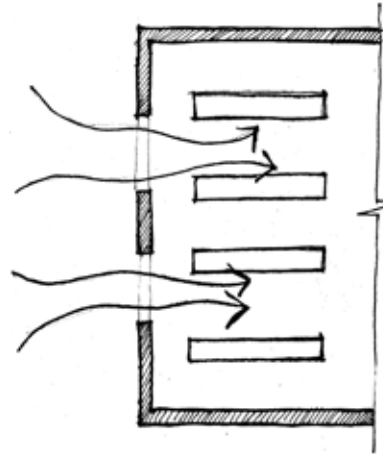


For the efficient functioning of a library, the following components can be included :

- Stack room
- General reading room
- Reference room
- Journal, newspaper, periodicals space
- Librarian's space
- Exhibition space
- Digital archive section
- Audio Visual room



Wrong



Right

In the stack room, the shelves may be placed at a distance of 1800 mm from each other, giving enough space for circulation between them.

The placement of these shelves in the stack room can be perpendicular to the position of the windows, allowing light to fall on the books arranged on the racks.



The primary and the pre-primary students can have a separate section within the library for books of their age.



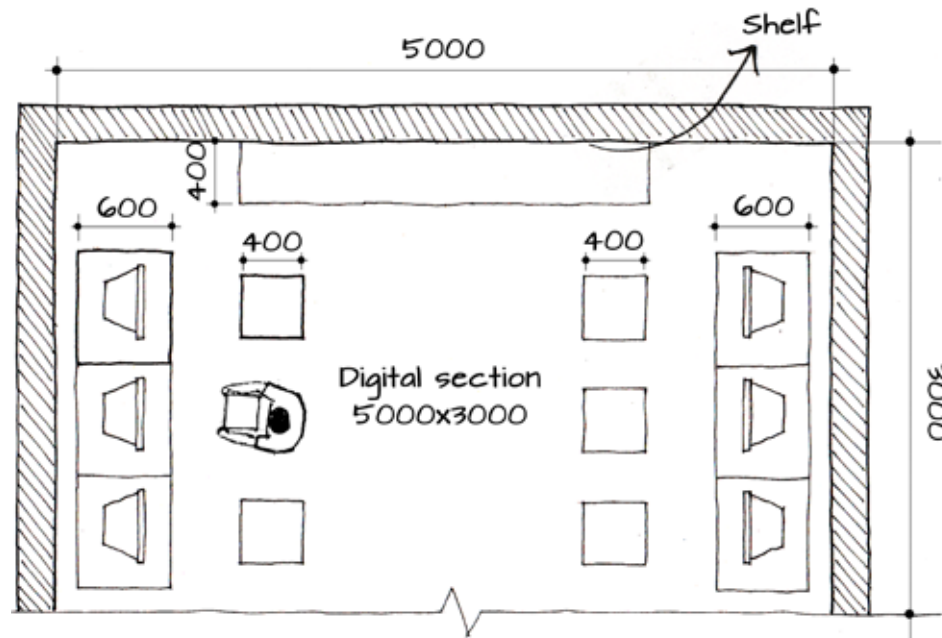
The area required in the reading area for 30-40 students can be about 70-90 sq.m.



Sufficient storage facilities can be provided to store the books and maintain them neatly.

Provision for catalogue cabinets, racks for student's bags, book display racks, bulletin boards and stationery items can be planned.

Current books, magazines, journals, newspaper and other literature, in a magazine rack can be made available in the library.

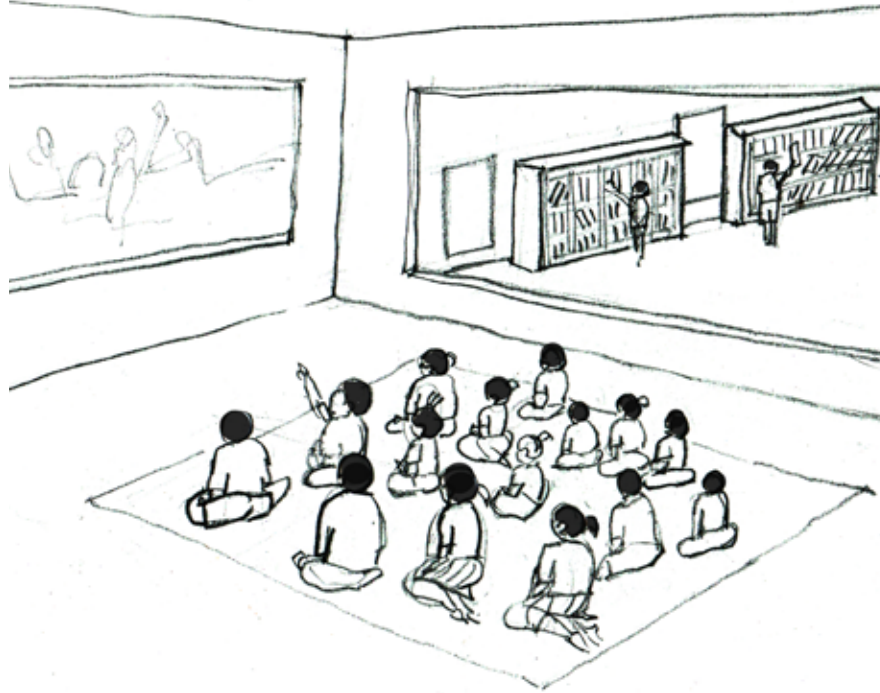


All dimensions are in mm

A space for accessing digitalized documents can be available in the library.

E-Books and E-Journals can also be made available in this section for reference purposes.

This room can have computers, network access, with provision of tables, chairs and shelves.

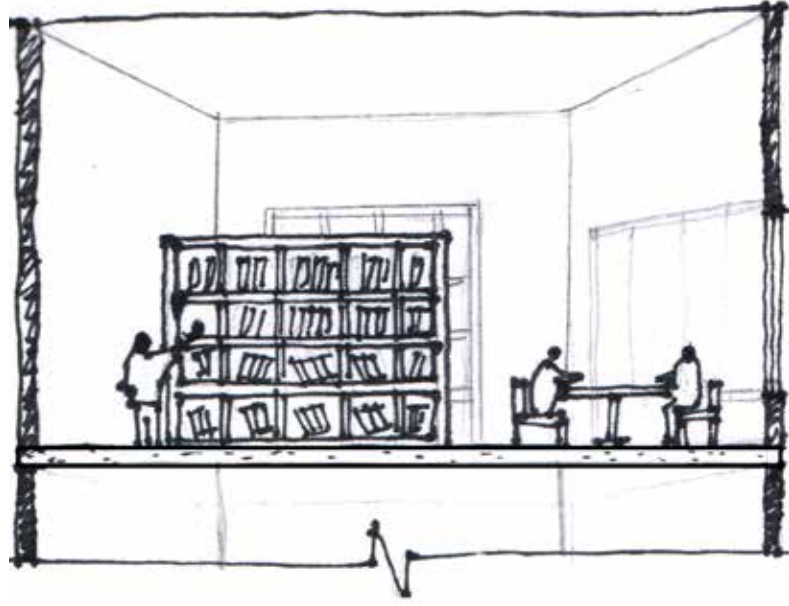


Pre-primary and the primary section students watching video documentaries along with their teacher as an alternate method of learning

Spaces that allow children to watch presentations, documentaries along with their teachers can be encouraged.

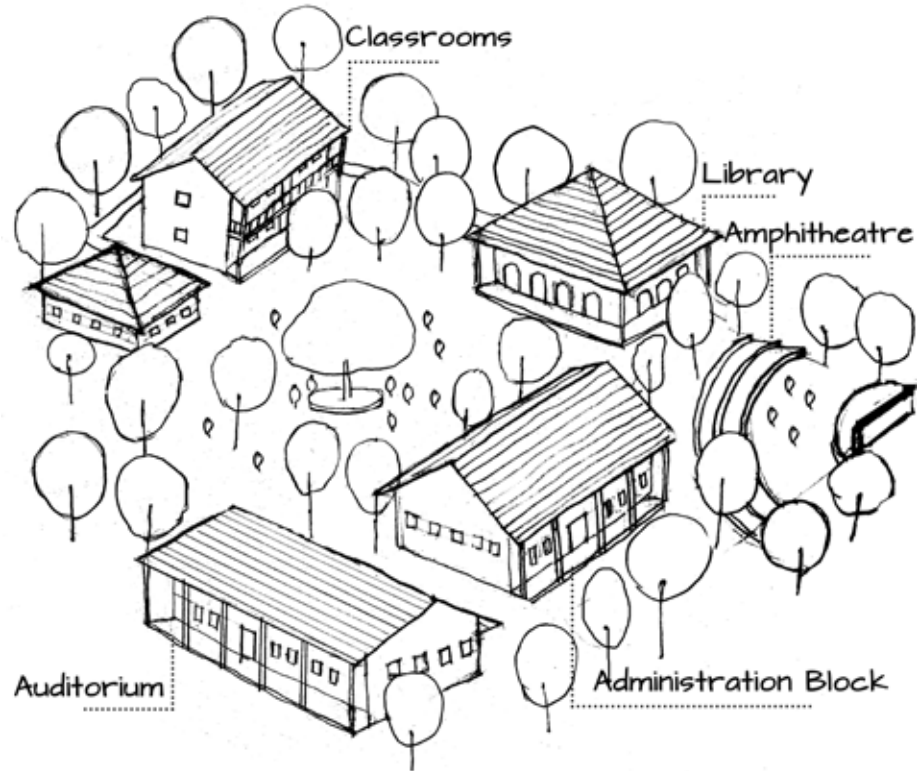
All classrooms may not be equipped with smart boards, thus making it easier to access a digital library section.

The spaces can have activities like reading, storytelling, video viewing etc.



Since books are heavy, the library is generally placed on the ground floor.

In case the library is to be provided in an upper floor, the floor slabs are to be appropriately strengthened by structural designers.



A layout of an auditorium within a school

Auditorium

The school auditorium is frequently used as a center for school programs. It can be so designed and equipped that it may be used effectively by the students, staff and the community.

Thus the auditorium can be positioned in the public zone of the school, such that it is accessible to the public as well. It can be open to them during holidays, helping them generate some income for the running of the school.

Space	Approximate Area (300 seater)
Seating	240 sq.m
Stage	64 sq.m
Control Room	30 sq.m
Equipment Storage	30 sq.m
Backstage and Stage wings	58 sq.m
Ladies Room	44 sq.m
Gents Room	44 sq.m

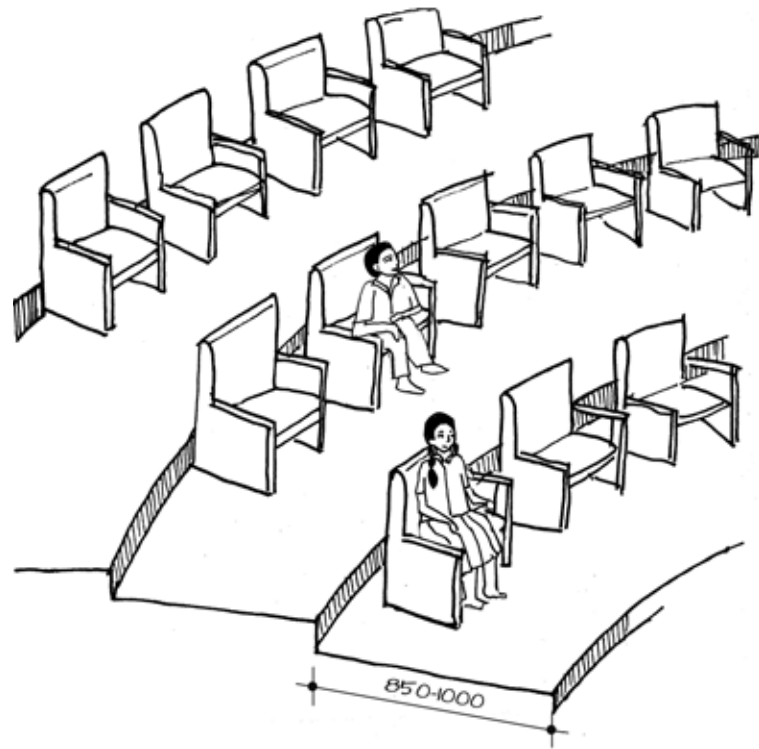
An auditorium may consist of the following spaces:

Main Auditorium

- Stage/ performance area
- Seating area (number of seats can be specified)

Support spaces:

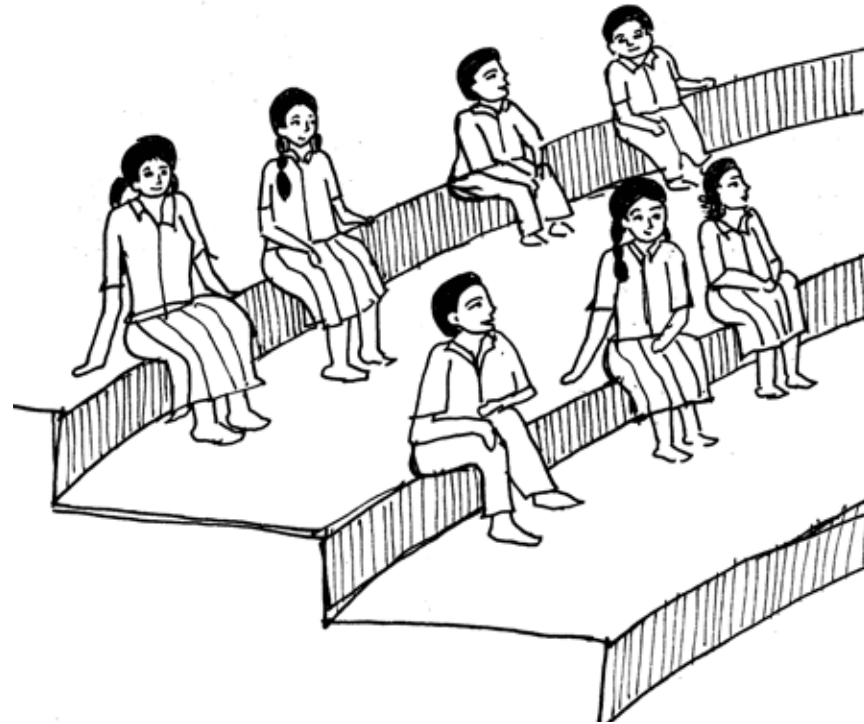
- Projection/ control room
- Equipment storage
- Green rooms and backstage
- Public toilet- male and female



An area of about 0.5-0.7 sq.m per spectator can be used for seating purposes. This includes seat width and row spacing.

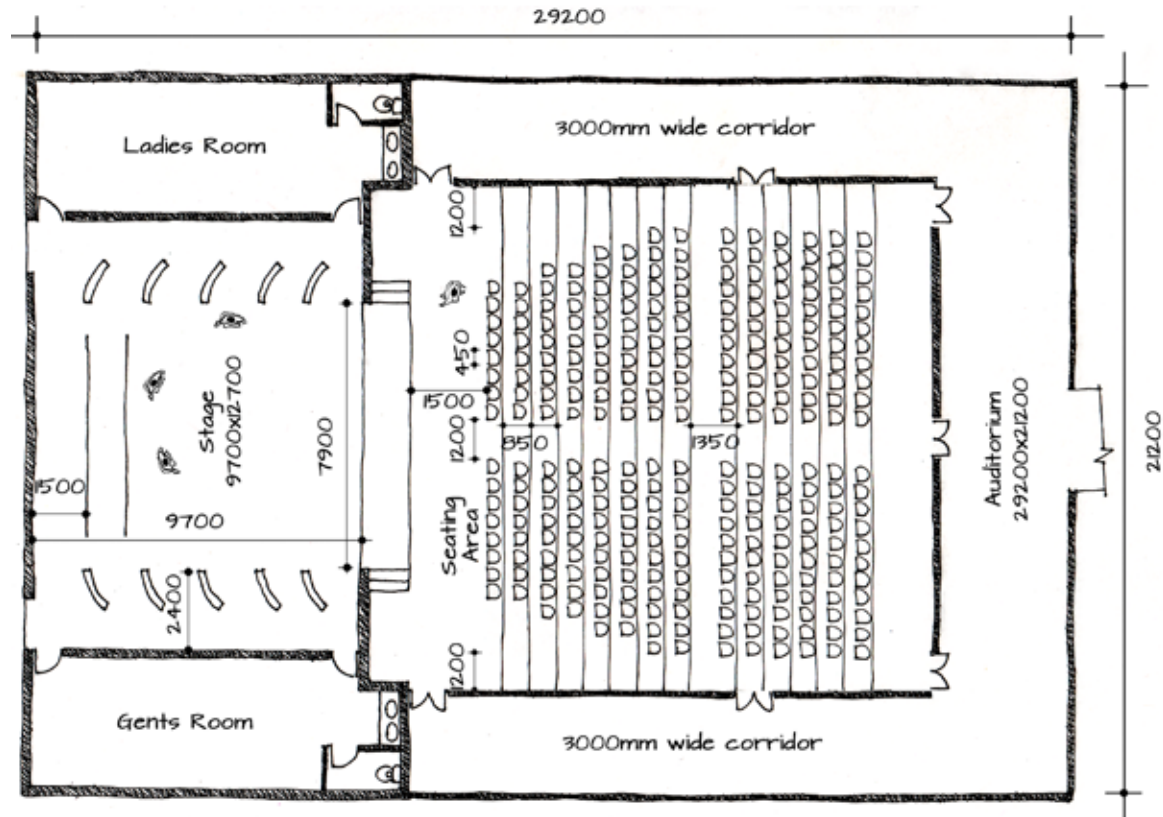
The row width can be about 850-1000 millimeters, giving sufficient space for seating and walking.

If the auditorium provides fixed seating, a maximum of 16 seats can be provided. If more than 16 seats have to be placed in a row, an aisle in between is required.



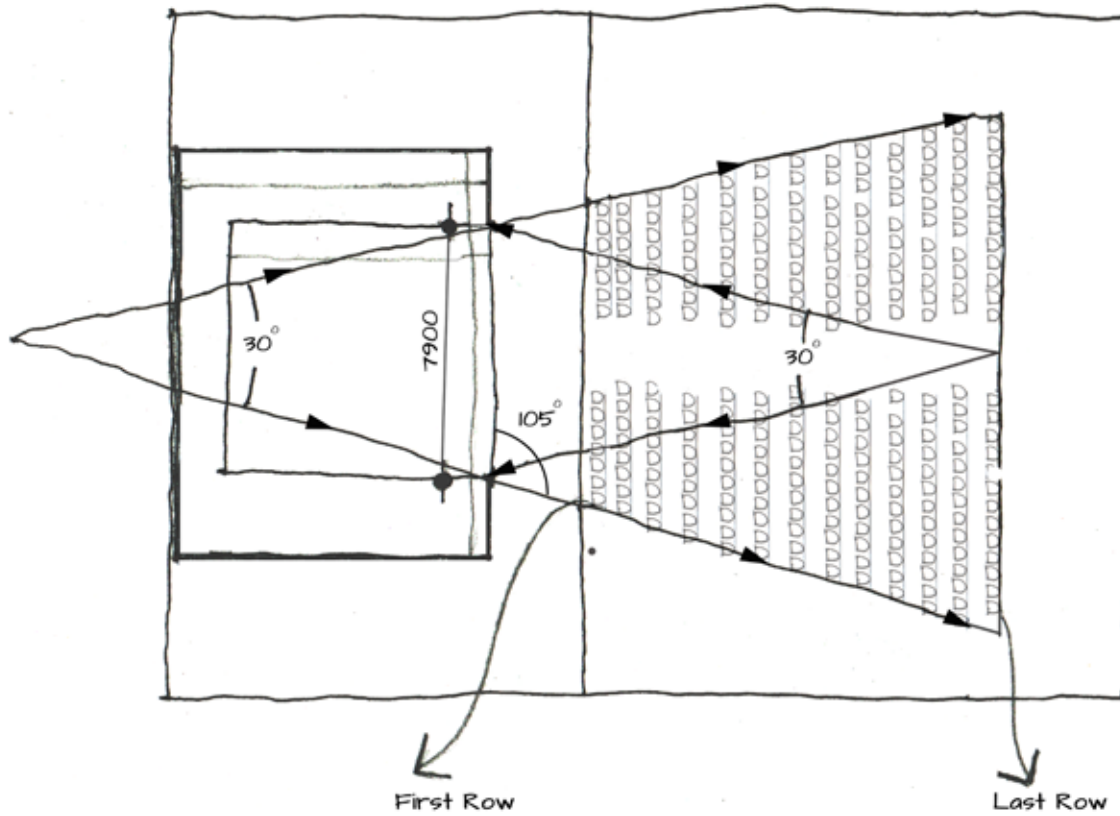
If the auditorium does not provide fixed seats, it increases seating capacity.

This is because, in case of non-fixed seats, the standard measurements to be maintained can be much lower.

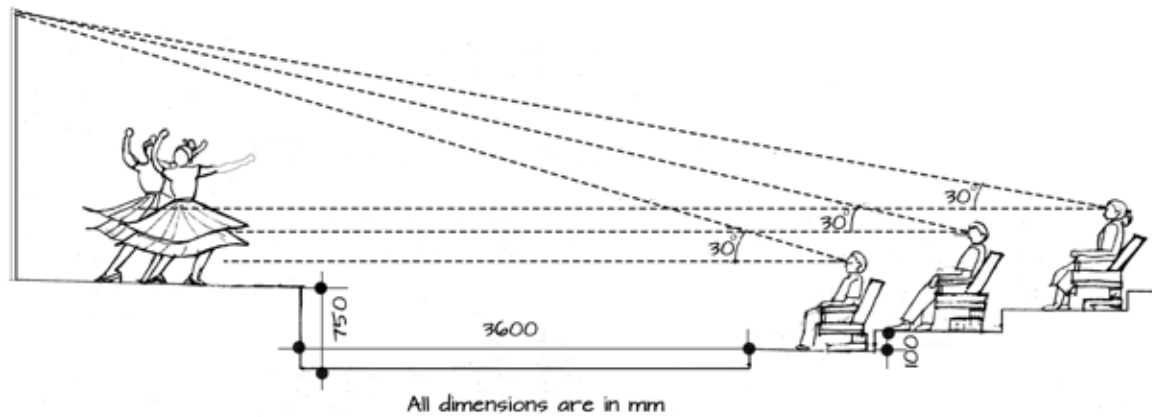


All dimensions are in mm

An auditorium layout with 300 seats. Area occupied by the auditorium is 625 sq.m.



The auditorium layout shows the viewing angles for the position of seats on the first and the

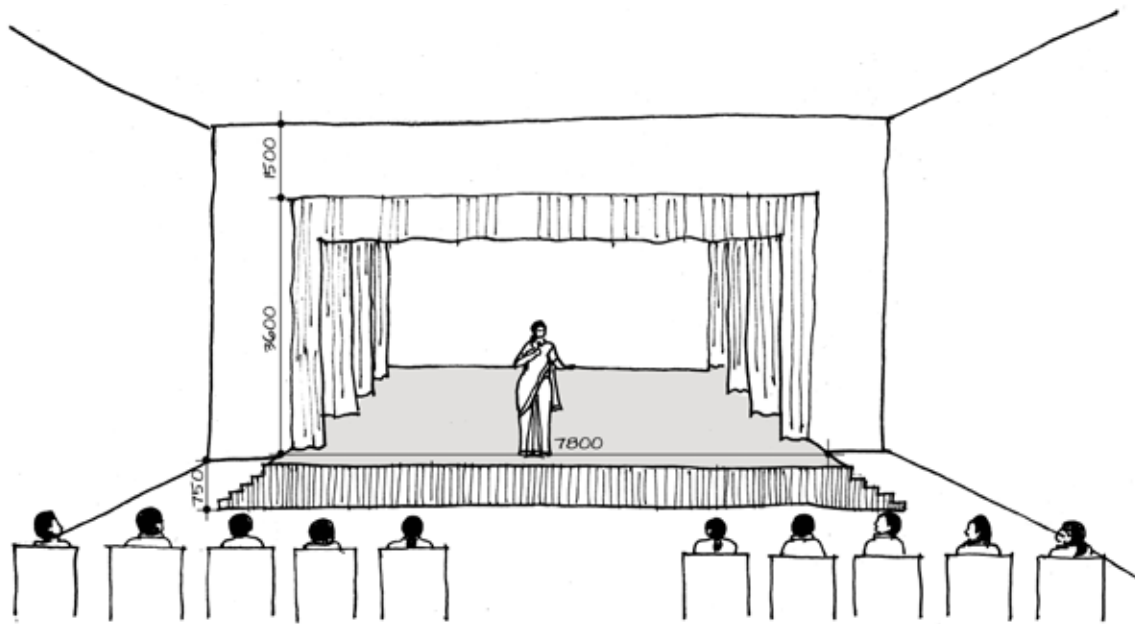


The viewing angle of a spectator, height of each level, and the position of the front row in an auditorium

The first row of seating is placed at a distance of 3600 mm from the stage so that the vision of the spectator is not disturbed. The viewing angle of the spectator at his comfort level is generally at 30 degrees.

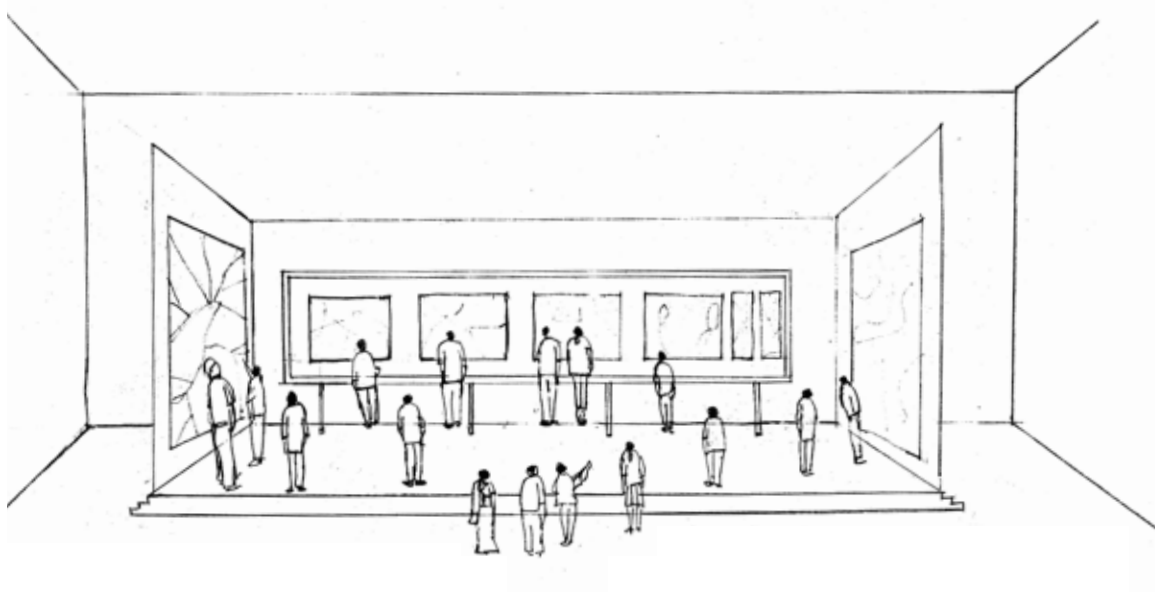
The stage height from the floor level can be 750 millimeters.

The floor of the auditorium is tiered for providing better vision of the stage. The rise in levels can be a minimum of 100-150 millimeters.



The height of about 5 - 6 metres is provided above the stage for better visual and acoustic qualities.

A minimum clear opening of 7.8 meters is required for the stage. Specialists in lighting and acoustics can be consulted for auditoriums designed for more than 300 seating capacity.



A non-tiered auditorium layout being used as an exhibition space

A non-tiered movable seating arrangement with a flat surface minimises the space occupied by the auditorium. In a tiered level auditorium, the hall space does not allow its use as an exhibition space.

Painting competition, art exhibitions, etc can be conducted in such spaces. These spaces can also be used after school working hours.



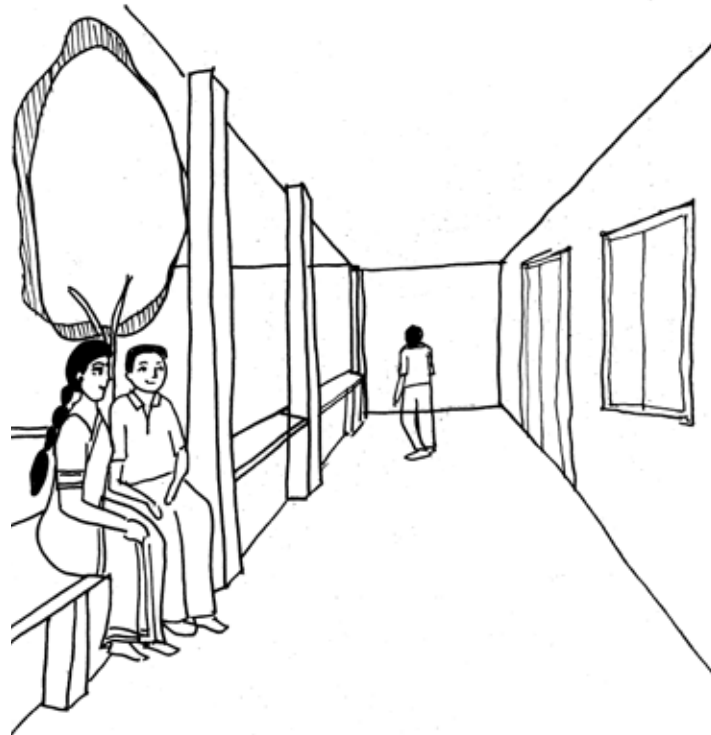
Administrative Spaces

These spaces include:

- Principal's room
- Vice-principal's room
- General office with staff and clerks,
- Visitor's waiting room
- Store room etc.

A Principal's room provides space for the principal of the school, space for parents or teacher's meetings within the room, waiting space and an attached toilet.

Depending on the size of the school, the size and the number of rooms may vary.



Apart from the working space for general office staff, the office block provides space for fee collection, student's contact, parent's contact etc.

A store room can be provided for the storage of old files and records.

A common space for visitor's waiting can be provided with display of school achievements, workshops, admissions, and other notices for parents and other visitors to see.

This waiting area can also be provided on a verandah of the admin block with built-in seats.

A conference room can be provided close to the office to hold meetings with teachers, parents etc.



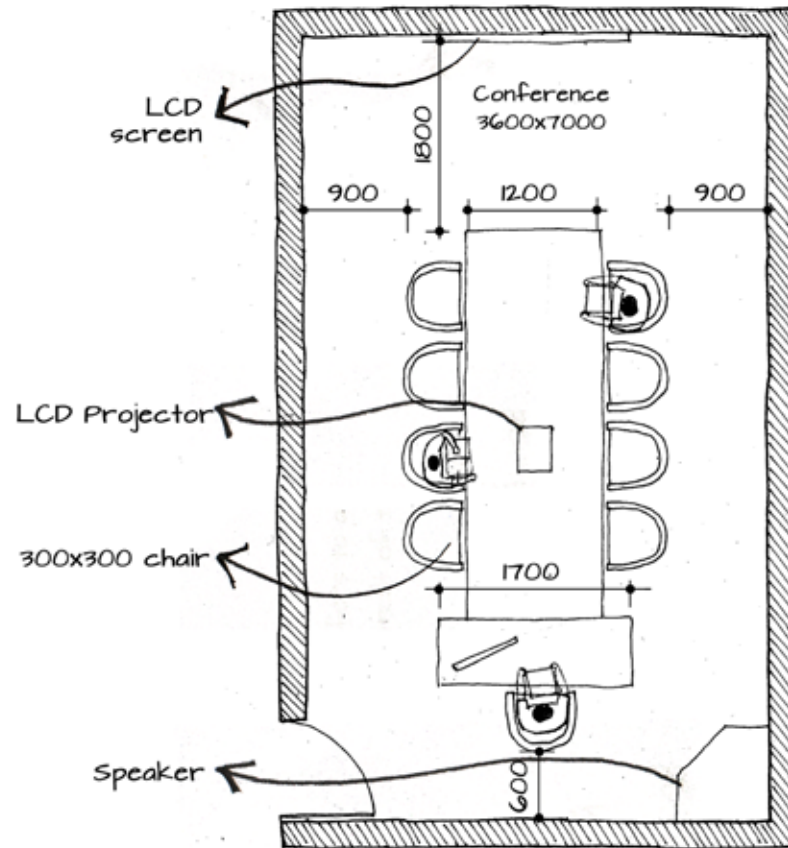
Conference Room

Conference rooms are spaces where generally meetings take place with a group of people like staff, parents or the management.

It can be used for:

- Principal to hold meetings with the teachers or other staff.
- For different groups of teachers to meet for presentations or discussions.
- Where the school can organize workshops for teachers from other schools.

Seminar rooms can also be provided close to the conference room or as a part of it.

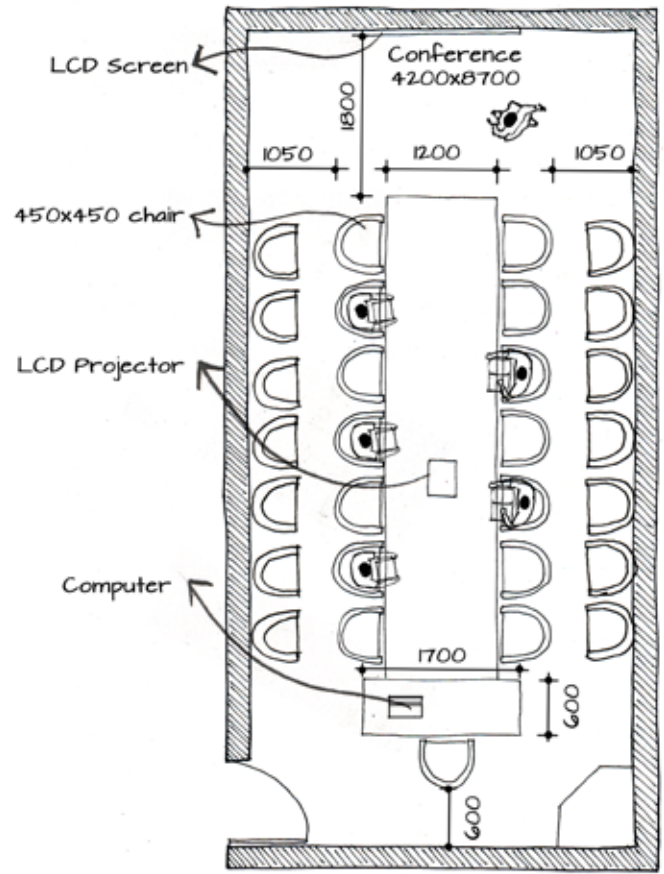


All dimensions are in mm

Requirements of a conference room:

The conference room can be provided with a centre table and seating for about 10-20 people. Provision of extra seats will allow for more members to be accommodated in the room. The conference room can be placed close to the principal's office.

Number of People	Area of Conference Room
8+1	25 sq.m
14+1	37 sq.m



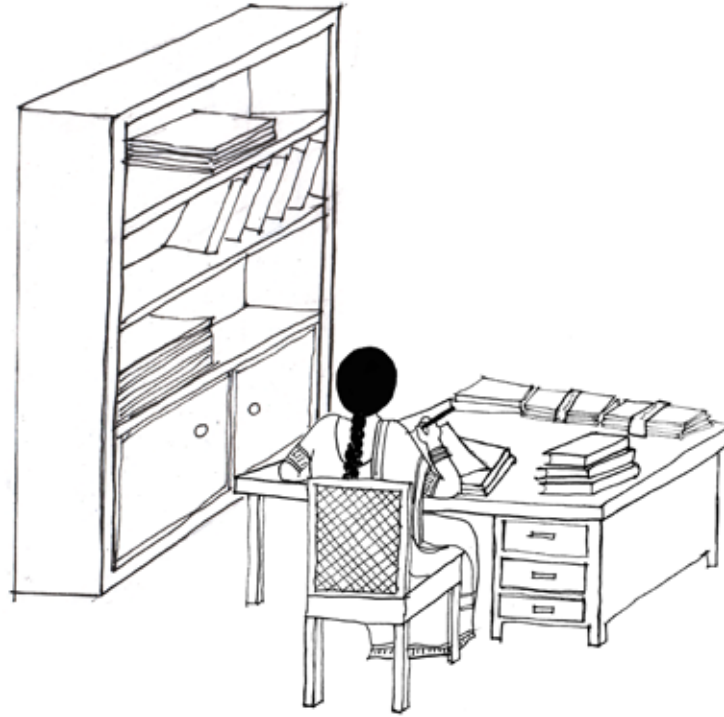
All dimensions are in mm

Facilities like a projector and a screen can be provided for workshops and presentations. The projector is generally placed at a distance of 4.5 meters from the screen.

Video conferencing facilities can also be provided in a conference room.

The components of a video conferencing facilities include:

- Video input and output
- Audio input and output
- Computer
- Network or Data



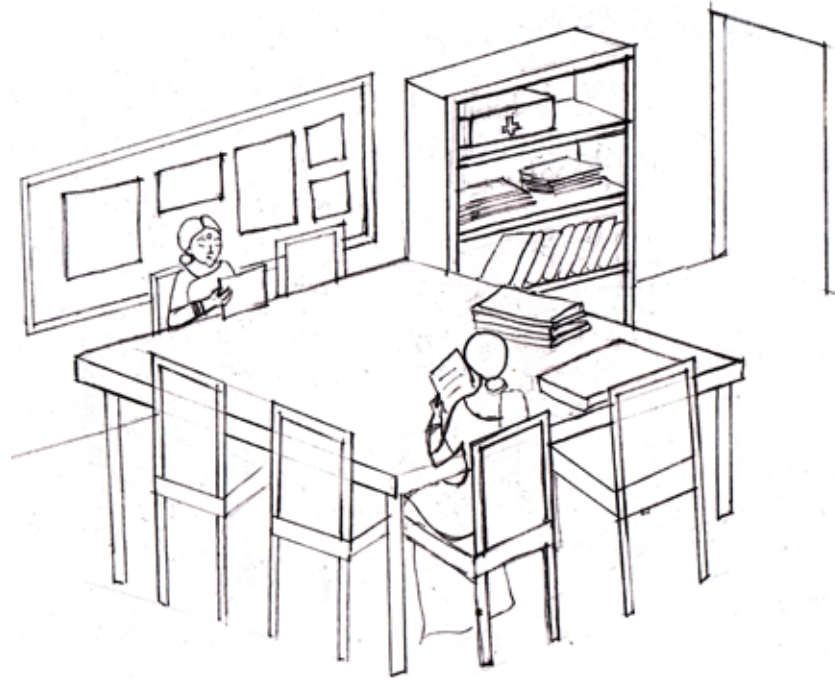
The illustration shows the space used by a teacher in a staffroom

Staff Room

A staffroom is a common room for the teachers.

Rather than providing a centralised staff room block, it can be provided on each floor of a building for better communication between teachers and students.

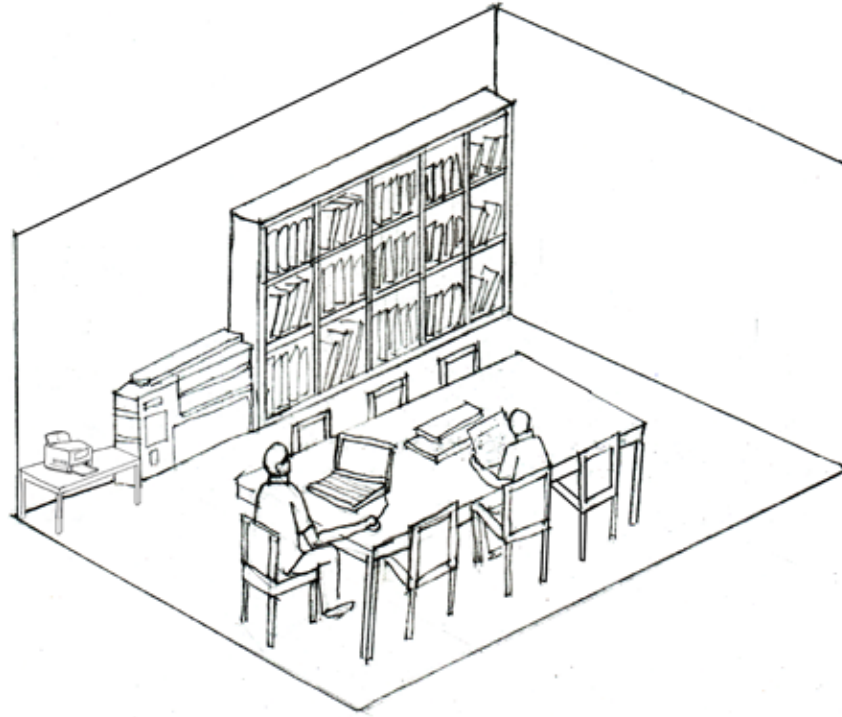
Each teacher or staff can be provided with a table, chair and locker facilities to keep books, stationary and other personal belongings, with a workspace.



A common discussion table and storage in a staffroom

The arrangement can be such that it can be shared by one or more teachers, using the space efficiently.

- A common table for discussions and lunch activities within the staff room can be provided.
- A common cupboard, for stationery, registers, books etc. can be considered.
- A computer and printer may be provided. In future, the teachers may bring their own laptops.
- Toilets can be provided within the staffroom, if possible. If this is not the case, common toilets can be provided for teachers and students, thus making sure the toilets are maintained well.



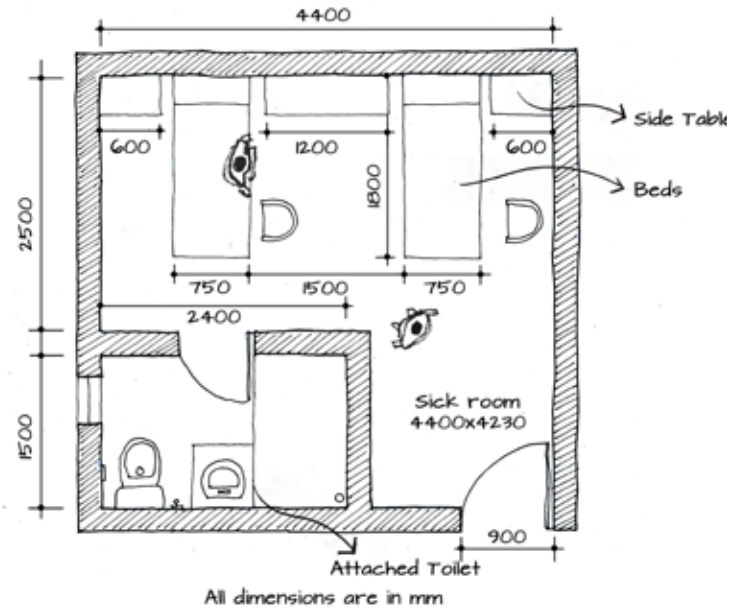
Provision of books and references for teachers in a resource room

Resource Room for Teachers

A resource room for a teacher provides the following facilities to help the teacher create learning experiences for a child.

It can be provided with:

- Reference books for teachers
- Access to online resources by providing internet
- Computer systems and provisions for laptops to be used
- Laser printers and photocopying machines



The area occupied by the sick room is about 18 sq.m in the layout shown

Sick Room

A sick room is a space provided by schools for students who are unwell. A sick room can have one or two beds, linen, table and chair.

Provision of an attached toilet in the sick room will make it easy for students with diarrhea, vomiting or any other illness of that nature.

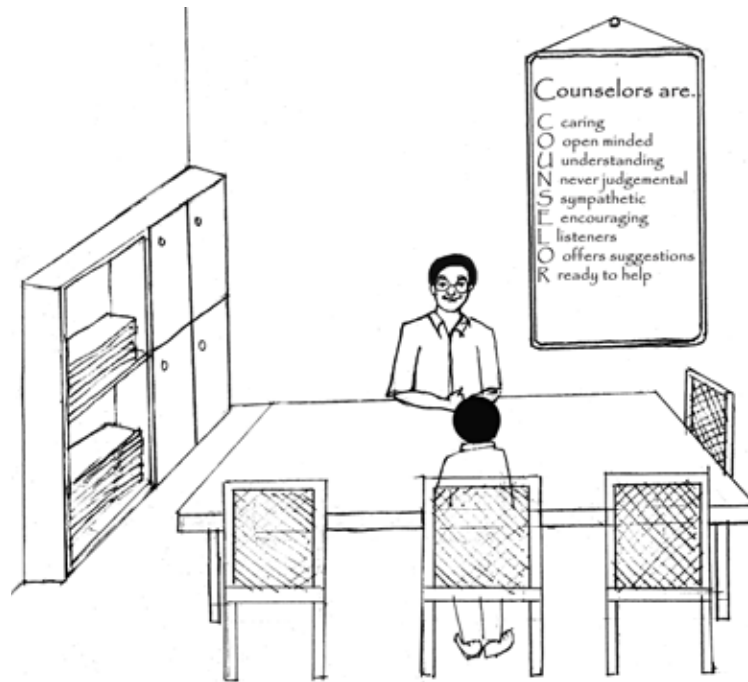
This room can be placed close to the administration block or the staff room block to allow parents and staff to attend to the children.



Medical Inspection room is a room intended for carrying medical examination or providing health care facilities to the students.

This room can be close to the sick room. Constant health checkup can be planned by the staff for ensuring good health of the students.

This room can have equipment like weighing scale, height scale, examination table and storage for keeping files. The area allocated for the medical inspection room is about 20-30 sq.m.



Counselling Rooms

Counsellors in schools provide guidance for personal, academic or career development, individual or group counselling of students and discussion with families of students, to meet the developmental needs of every child.

This room may be placed close to the office for access to parents, and also for the students to be under the watch of staff members of the school.

A counselling room can have about 3 - 4 chairs for students, a chair and table for the counsellor and a shelf to maintain records of students.

Age Group	Area in Square metre	Area in Cent	Area in Acres
Age 3-5	1000 sq.m	25	0.25
Age 6-10	4000 sq.m	100	1
Age 11-18	15000 sq.m	375	3.75

The table shows area provision for sports grounds for different age groups

Sports Facilities

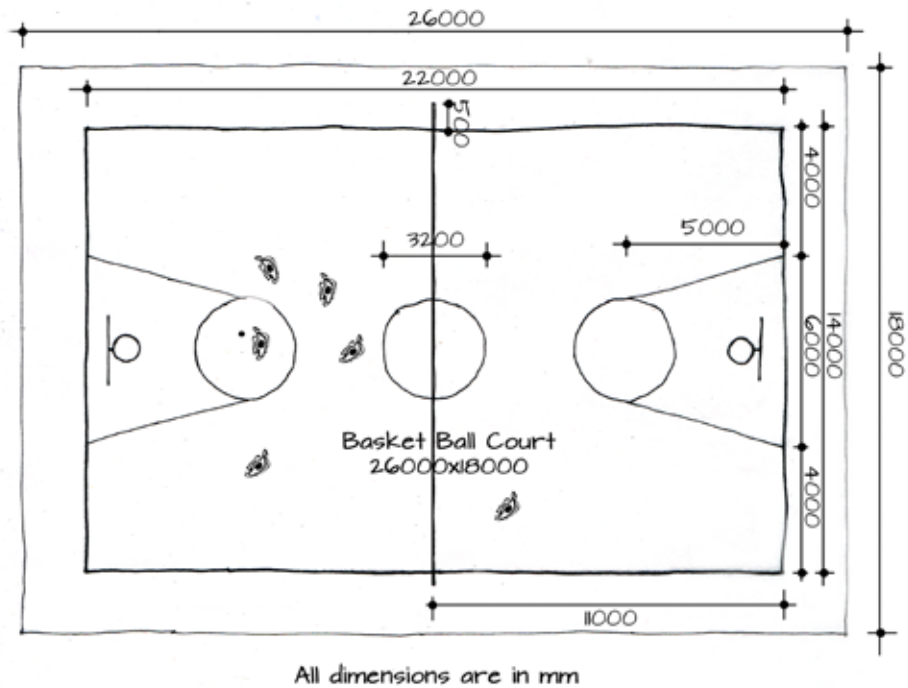
Physical education is an integral part of the school. It provides for physical fitness and a healthy lifestyle. Providing spaces for such activities is a vital factor of the school program.

Approximate area calculated for each age group for playing games like football, cricket, hockey, kabbadi and other games recommended by Bureau of Indian Standards has been given in the table.

An area of about 8 sq.m for each student can be considered.

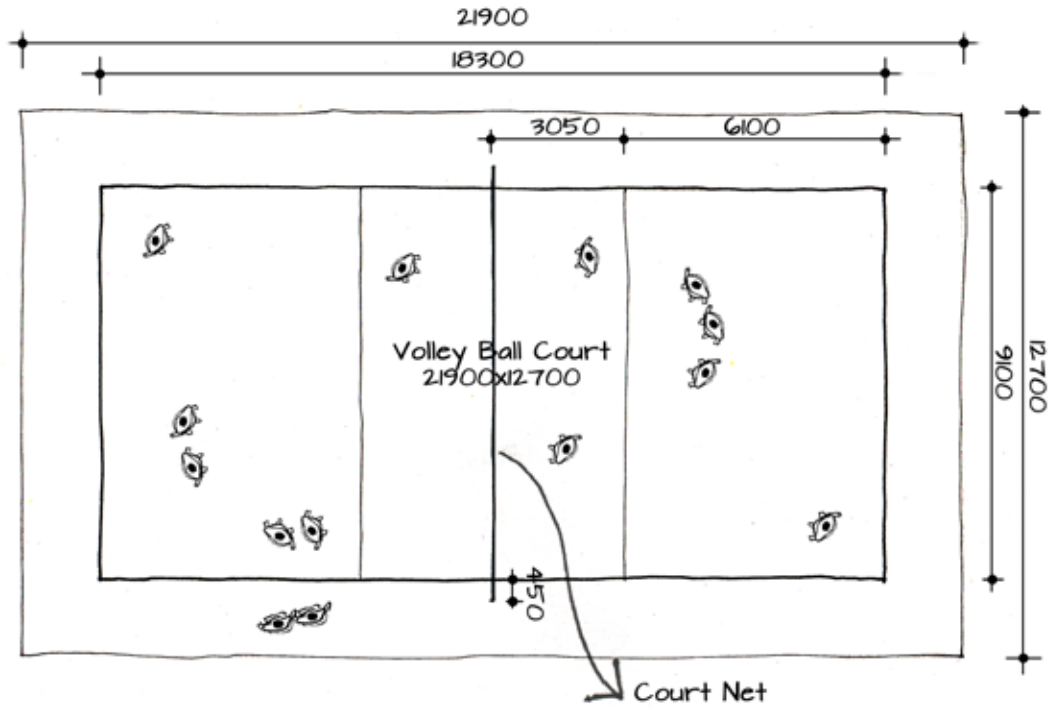
Provision of such large spaces such as a football ground for matches maybe difficult,

Sport	Recommended Area	Dimension	Orientation
Badminton	150 sq.m	Singles court is 5x13 m; doubles court is 6x13 m with a 1.5 m minimum unobstructed area on all sides.	Long axis to be north-south



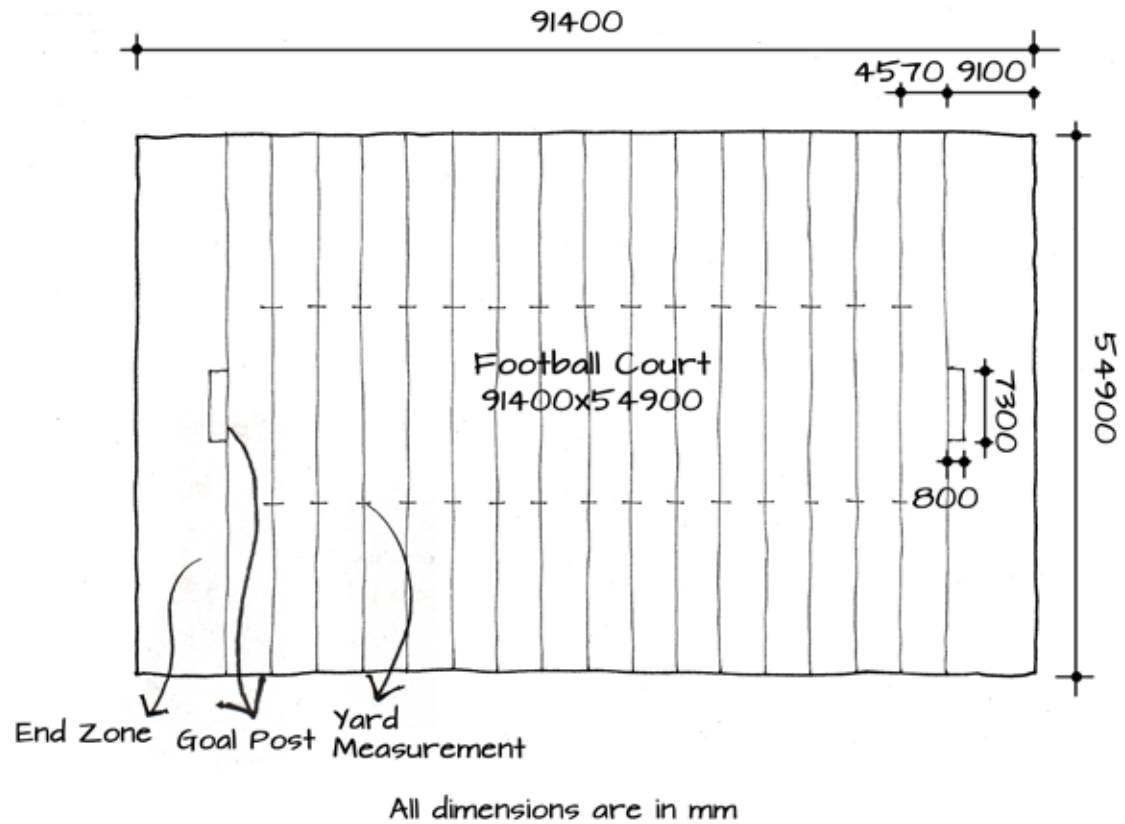
Area of a Basket Ball court with minimum standard dimensions shown in the layout is - 470 sq.m

Sport	Recommended Area	Dimension	Orientation
Basketball	Ground space is 448 sq.m minimum, to 540 sq.m recommended, including clear space.	Playing court is 14x26 m, with an unobstructed space of 1 m minimum to 2 m recommended on all sides.	Long axis to be north-south

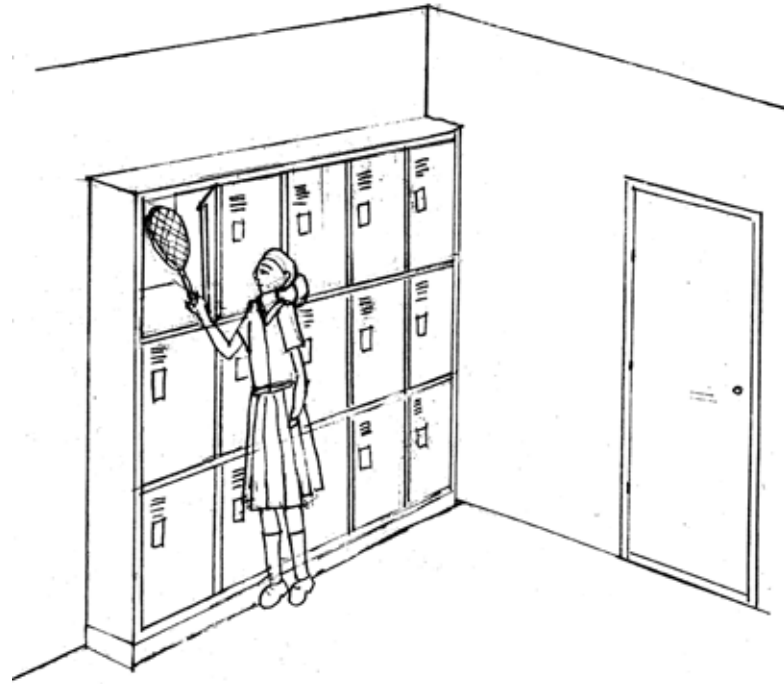


All dimensions are in mm

Sport	Recommended Area	Dimension	Orientation
Volley Ball	Ground space is 370 sq.m.	Playing court is 9x18 m plus 1.8 m minimum, 3 m preferred unobstructed space on all sides.	Long axis to be north-south



Sport	Recommended Area	Dimension	Orientation
Football	Ground space is 7000 sq.m	Playing field width is 59x68 m. Length is 100x110 m. Additional area recommended is 3 m minimum unobstructed space on all sides.	Long axis towards north-south



A physical education teacher can have a room area of about 25-50 sq.m.

There can be a provision for a common room along with the sports facilities. Changing or dressing rooms, lockers and other storage facilities can be provided in the room for the students.

The standard dimension for a locker is 300 x 100 x 450 mm, and the maximum length of each locker can be up to 1830 mm.

The store room for these sports facilities may have ample space for storage of sports equipment, as they are bulky and heavy. This room can be at close quarters to the sports grounds.



Kitchen and Dining

A kitchen for noon-meals preparation can be provided in schools. The planning of such a kitchen may have:

1. Pre-preparation area

The pre preparation space involves assembling tools and ingredients, washing, cutting and preparing the raw materials.

2. Pre-preparation

- Preparation tables of 600 mm width and 1200 mm length
- Sink of 1200 mm length
- Grinder- 5/10 liters- for preparing idlis
- Oven/ Microwave for heating food

3. Storage for equipments and vessels

- Water bottles and storage
- Cooking utensils and storage
- Storage of serving vessels

4. Storage for provisions

- Refrigerator
- Shelves for storage of provision

5. Cooking area

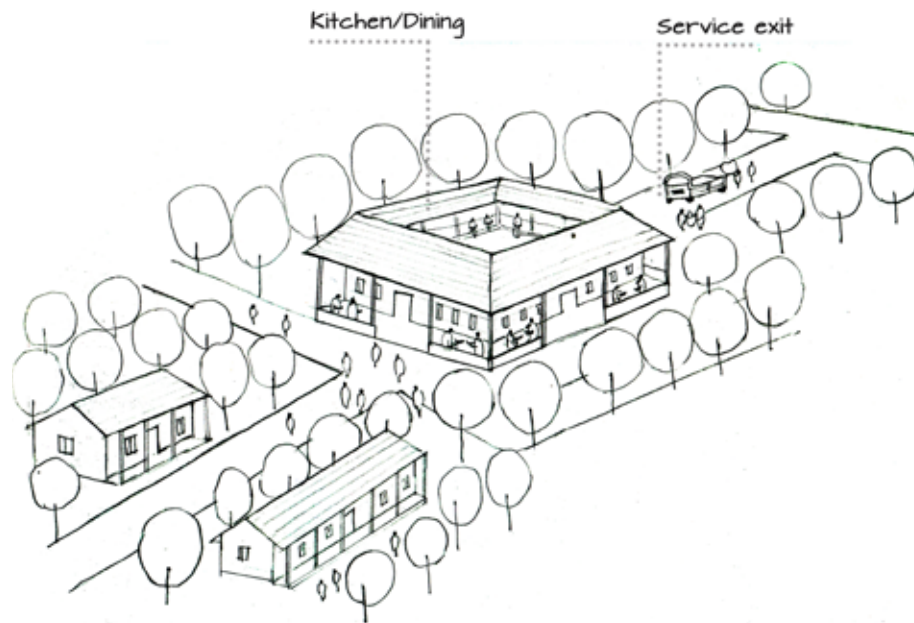
- Large bulk cooker
- Steam equipment - steam boiler
- Coffee/ Tea maker
- Cooking stoves.



The quantity of equipment required for preparation will depend on the number of students in the school.

The minimum area allocation for a kitchen in schools is about 40 sq.m including the preparation and cooking area. The cleaning and washing area can be outside the kitchen, depending on the sizes of equipment. A large platform with sink provision for bulk washing can be given.

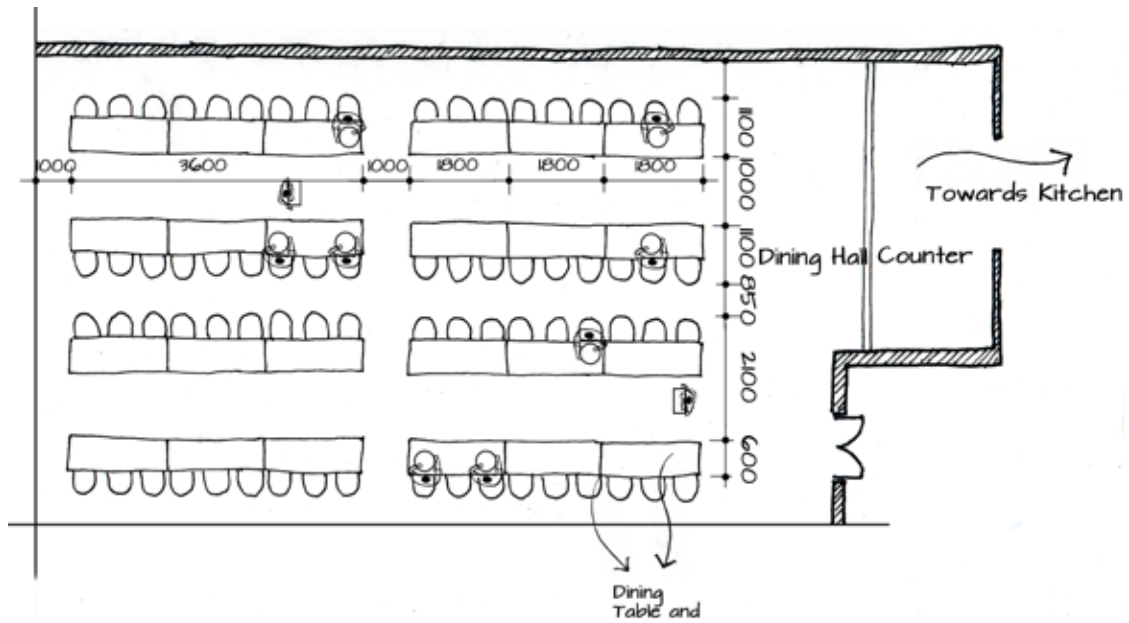
It is advisable to keep the kitchen on the ground floor, as it is easier to provide access to drain and waste disposal unit.



Kitchens can be positioned away from the administration, library, classroom blocks etc, to reduce the disturbance caused during the cooking process, though at an accessible distance for the students, teachers and visitors.

The distance of the kitchen may be at close proximity to the service entrance of the school, providing way to the passage of raw materials in and out of the kitchen.

Kitchens need access to natural light and ventilation.



A layout of a dining room in schools showing standard measurements

Dining Room

The meals can be served in dining rooms, if space allows. This dining space can be used in shifts for the different age groups present in the school.

Students can also be seated on the floor during mid -day meals. A semi-open shaded space maybe sufficient for this.

Built-in seating can be provided in between columns on verandahs for use during short breaks.

06. Student Amenities

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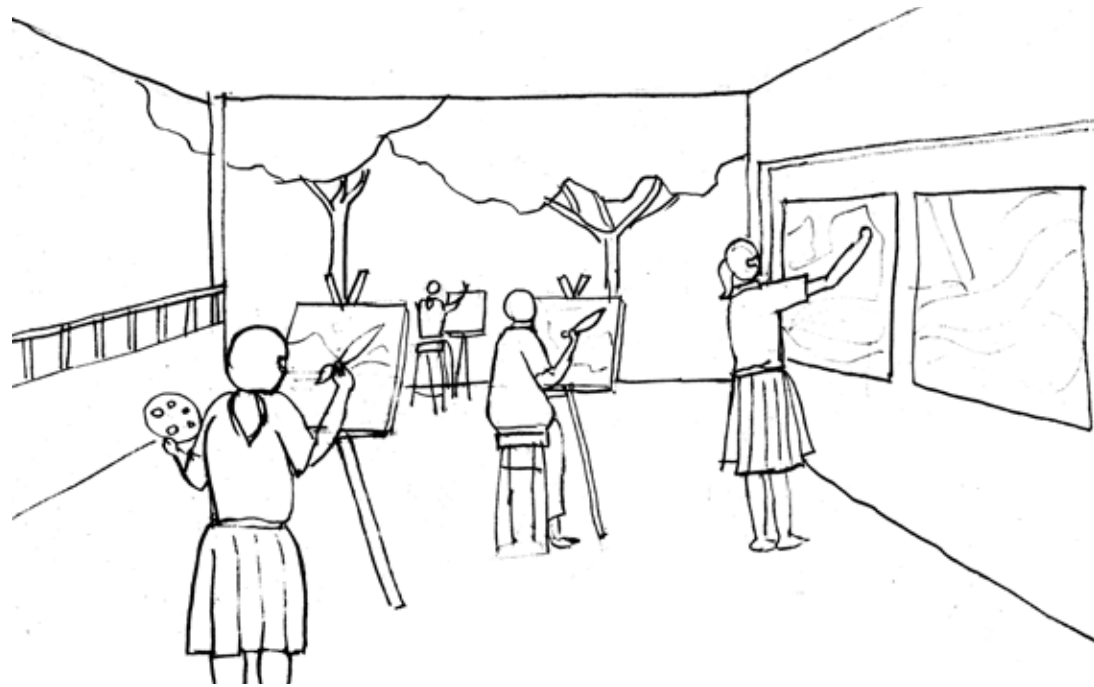


Providing spaces in schools that promote extracurricular activities in children, grow interests, hobbies and talent is highly appreciated.

These activities will help children try their hands at various fields other than academics.

Some of the activity spaces that can be provided are Arts and Crafts, Carpentry, Pottery, Weaving, Music, Film Making, Photography etc.

Student's clubs or amenities can take up an area of about 25-50 sq.m each according to the Bureau of Indian standards.



Arts and Crafts Room

Arts and crafts rooms are spaces that facilitate instruction in visual arts.

These rooms can preferably be placed on the ground floor to facilitate an outdoor venue for instruction and practice of arts.

Arts room can be placed close to a water tap facility, while working with paints and colours.

It can be placed alongside the exhibition space within the public zone to encourage access to the public for viewing.

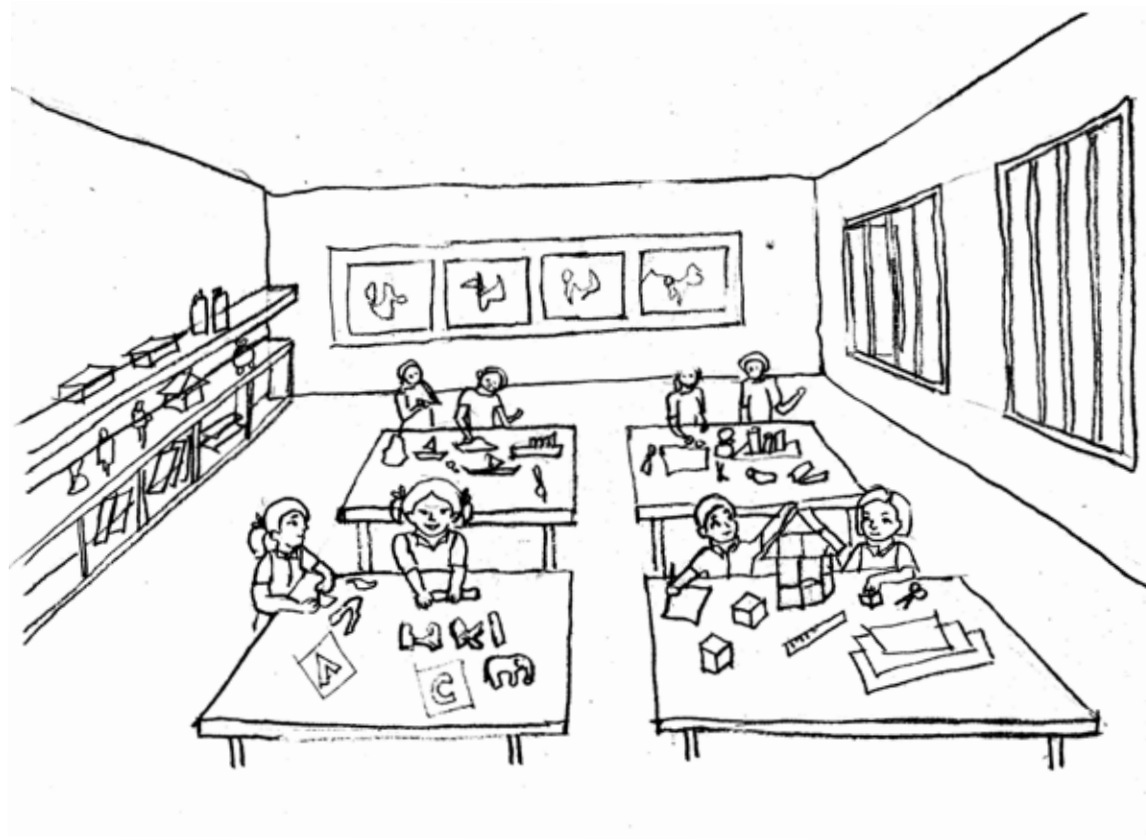


The typical furniture provided in these rooms are:

- Large flat table tops and chairs
- Drying rack sufficient for multiple students for drying art work
- Lockable flat storage to accommodate the art pieces

Provision of sufficient storage spaces for large quantities of art supplies like sheets, canvas, stationery, art equipment, and student's works may be made available in the room.

Display areas on walls or pin-up boards within the rooms can be provided to showcase and promote student talent.



The craft room can be provided along with the arts room, as the storage of materials and stationery can be shared. The arts and crafts room can have an approximate area of about 65 sq.m including the furniture, fixtures, tools, storage etc.

Windows can go high up on the walls to bring in maximum light, with sufficient space underneath it for storage or cabinets.

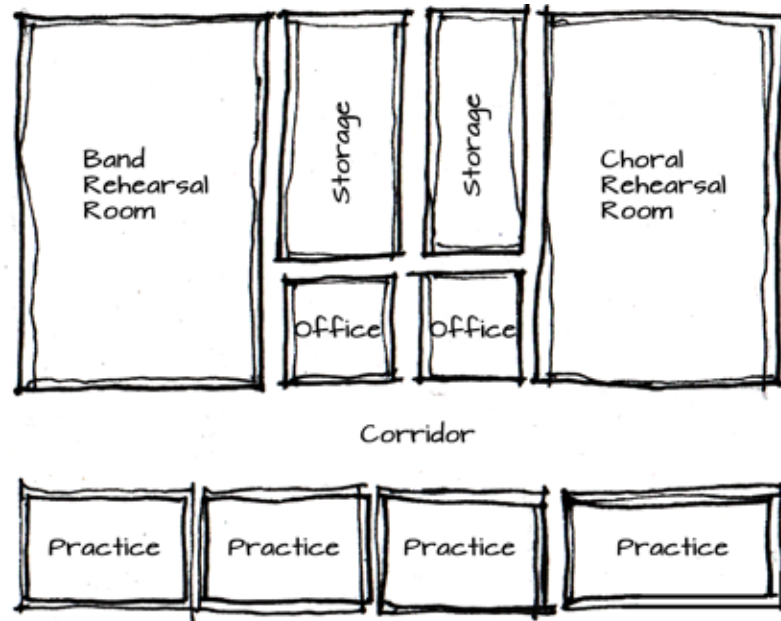
Creative craft work can be made by students out of waste materials produced in the classrooms like waste paper and scrap notebooks.



Music Room

The music room can provide space for vocal music and musical instruments like guitar, violin, flute, drums, tabla etc. which can be taught to students under the guidance of trained teachers.

The room can be a rehearsal space for students who have interest in music and for



Sample layout of a music room

The music room can have an interactive white board facility, with good audio and sound systems, recording facilities and storage of the music equipment.

- A studio space
- Recording room
- Control room
- Practice rooms
- Voice booth
- Store rooms can be provided.

A small elevated stage with orchestra space for about 10-15 students can help them perform recitals. The music room can provide with work tables and chairs, and file cabinets as storage. The walls of these rooms can be acoustically treated and well insulated.

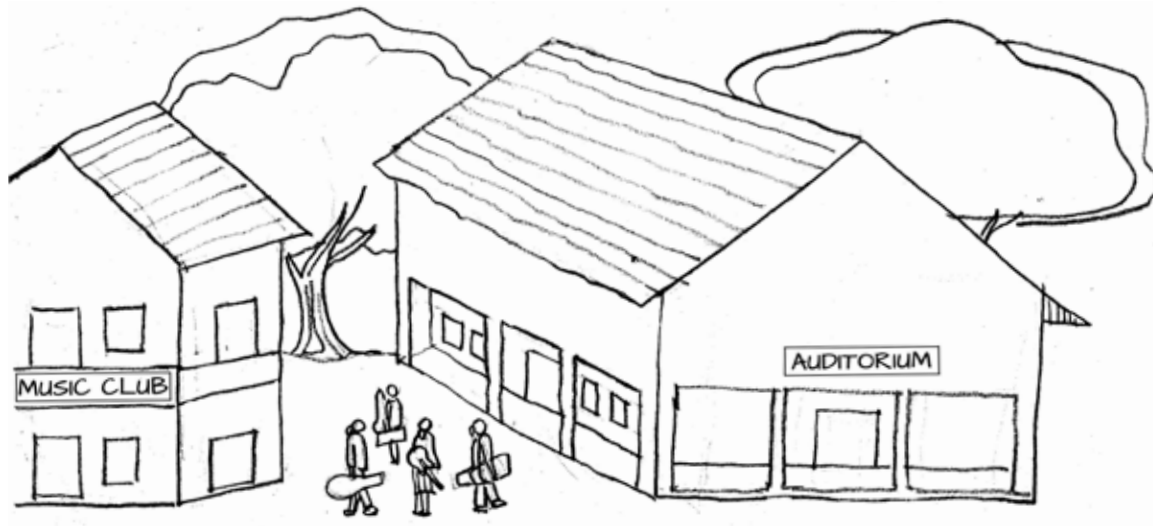


For a band/orchestra rehearsal room that accommodates 60-75 students, the room height can be between 5.5-6.7 metres and a floor space of about 230 sq.m.

Each orchestra musician requires a volume of 16-20 cu.m, while each choral musician needs about 10-14 cu.m.

Instead of rehearsal rooms sharing common walls, buffer zones can be created with non-playing areas like offices or storage rooms.

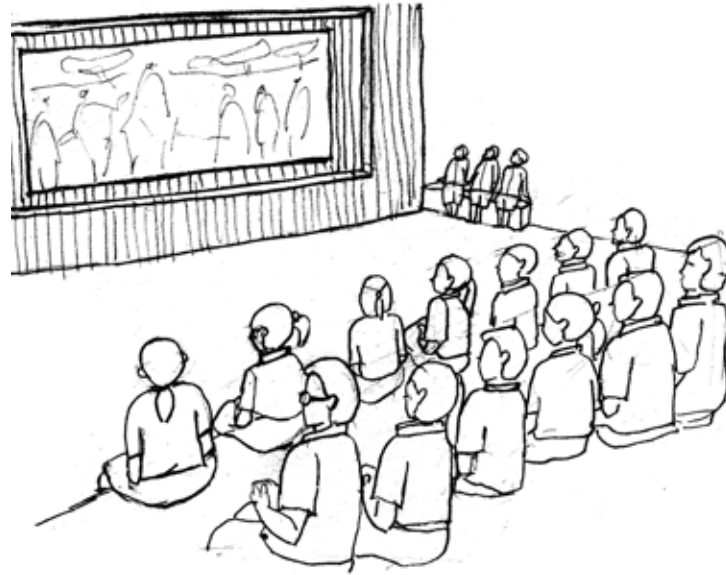
A music library can also be provided, that has storage of music sheets, notes, recordings and other resources for music education.



The music room can be placed away from the administrative office and the classrooms, to avoid the disturbance caused by level of noise produced within these spaces.

It can be placed close to the auditorium to carry the instruments into the auditorium with ease during a performance.

The doors of a music room can be as wide as 1800 mm for easy movement of instruments across the rooms when required.



Film Room

The film room provides the students with an opportunity of learning to work with film equipment, direction, cinematography, editing works and other processes of making a film.

This room may need access to computer systems, various levels of lighting, from filming in dark spaces, to focused lighting, to complete light allowance within the space.

It can also provide with a space to display and watch work done by students during or after school hours.



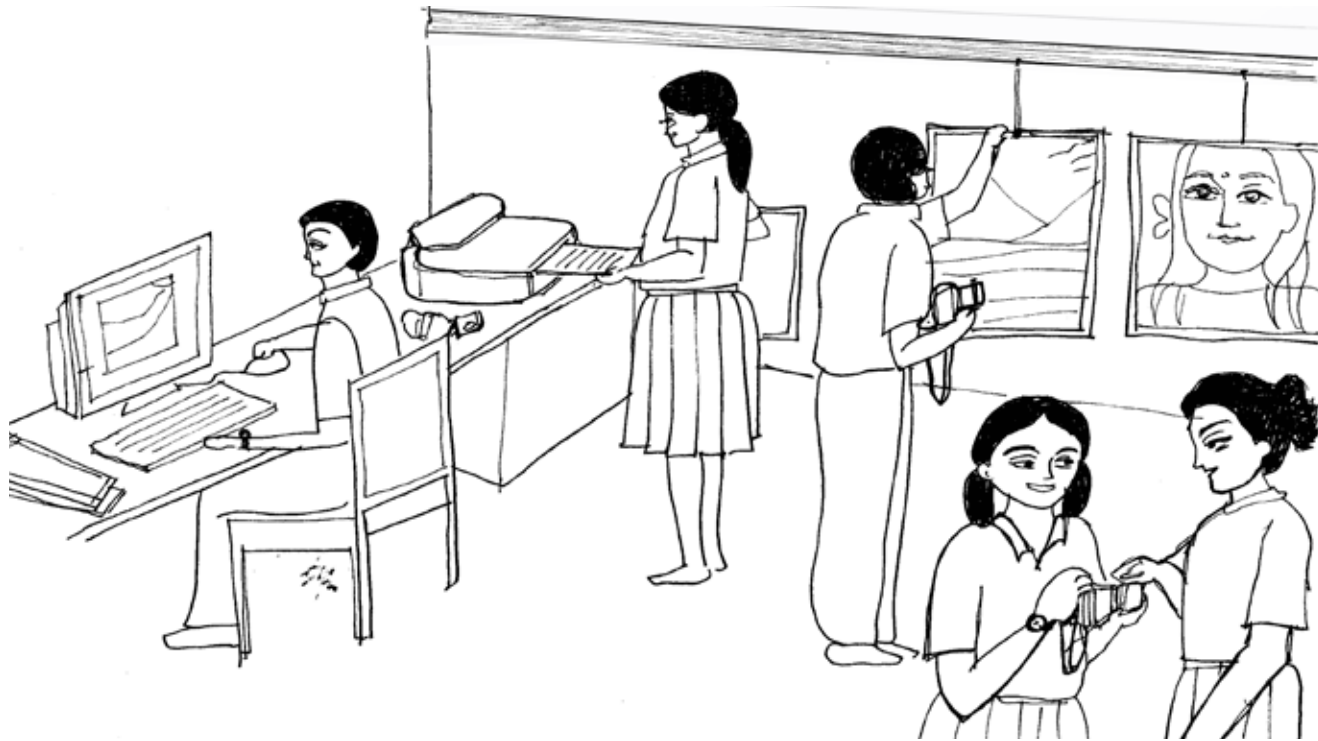
Photography Room

A photography club promotes creativity through the art of taking photos, share and critique the skills of fellow students, and to educate and improve technical skills.

A photography club allows students to study light, composition, and have a good understanding of their own equipment.

The photography club may occupy an area of about 35 - 40 sq.m. It may contain

Space	Area
Chemical mixing and film development	9 sq.m
Dark room printing	16 sq.m
Finishing	5 sq.m
Colour processing (optional)	7sq.m



Typical furniture that can be provided in the photography room is :

- Work counters or tables with chairs or stools
- Light tables for viewing negatives.
- Special photo lab sinks
- Wall cabinets for storing film, materials, supplies, and tools
- File cabinet

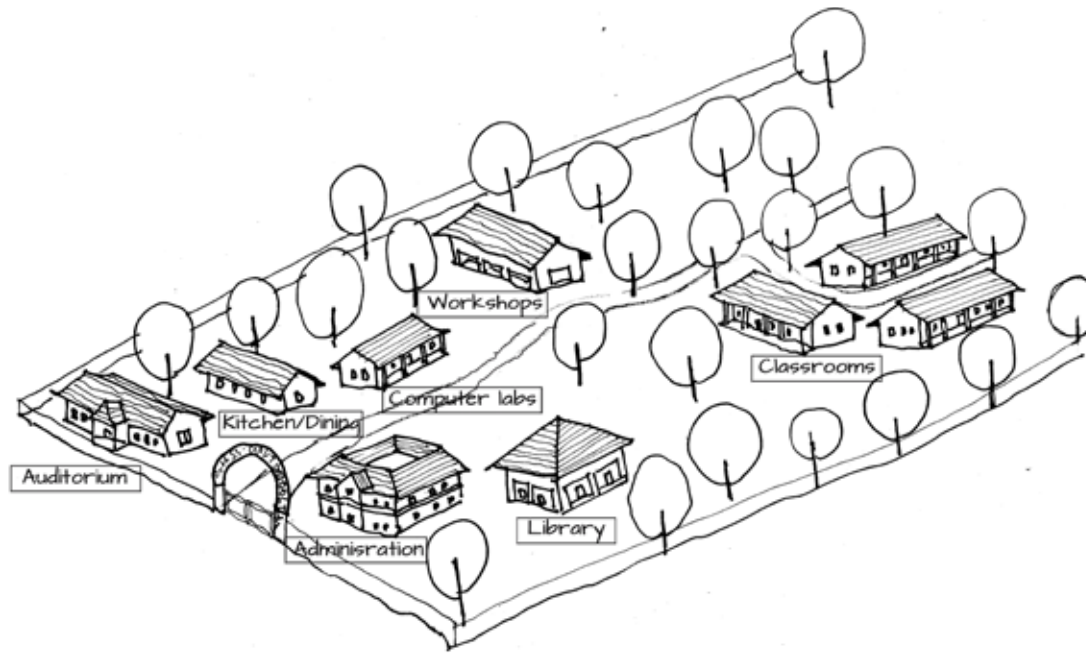


Workshops

Workshops seek to enhance personal, artistic and creative development within children. This helps them materialise from abstract to concrete ideas.

Workshops can include spaces like the carpentry room, pottery room, weaving room, blacksmith room, electrical workshop, or spaces where people from other professions and industries can come for demonstrations for the benefit of the students.

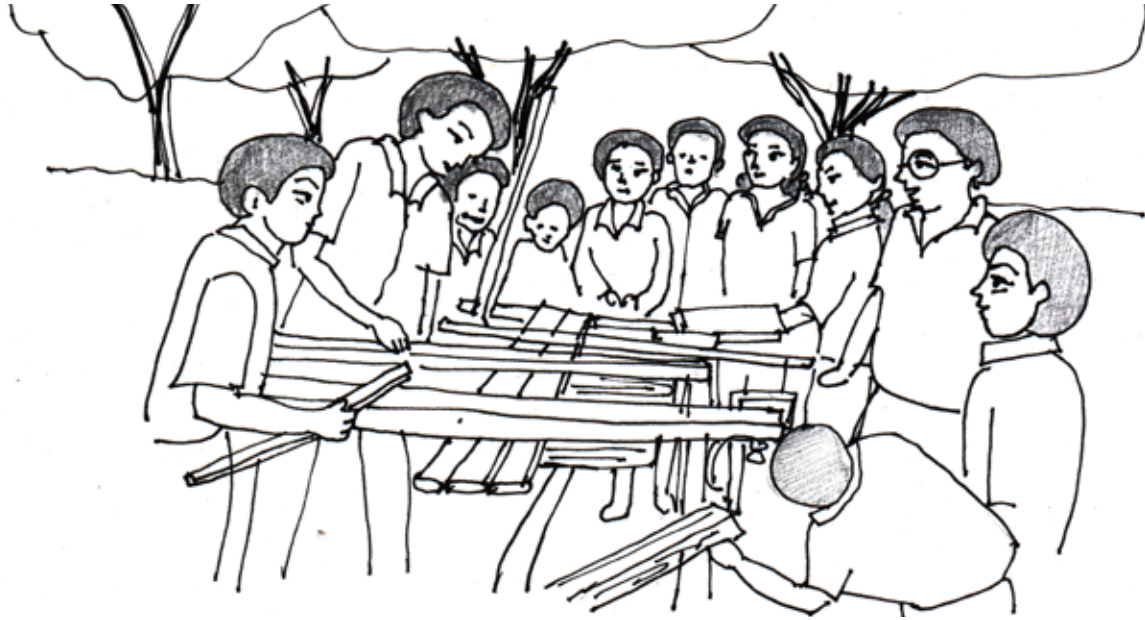
Allowing freeways within the workshop encourages movement of students, to interact and work, also avoiding close contact to the tools and machinery that maybe dangerous.



Layout showing common amenities at the centre of the school layout

The area required in workshops for 40 students is around 96 sq.m. Ideally all workshops are generally placed on the ground floor. These workshops are placed away from the classroom blocks of the school campus to concentrate the noise levels within the workshop areas itself.

They can be placed close to common or open grounds, such that they are accessible both by students and the public.



Students involved in a carpentry workshop

Carpentry Workshop

Carpentry is one of the oldest crafts practiced, which is an activity or occupation of crafting things using timber.

The workshop will provide students with knowledge of basic applications of various tools, equipments, machinery and techniques and facilitating use of raw materials into useful products and components.

This will involve cutting, sawing, marking and chiseling of the materials with appropriate tools.

Therefore, the presence of a teacher or a trained professional is important at all times. The students can be given prior training before the use of such machinery.



The planning of such spaces involves the work area, with the equipment and area provision according to the number of students in a workshop.

The storage can involve cabinets for storing raw materials, and storage for keeping the finished products. The space maybe planned such that it is open to evade collection of dust.



Children working with clay on a potter's wheel in a pottery workshop

Pottery Workshop

Pottery is the art of moulding clay into specific products. It requires spinning of wheel equipment, which is used to mould the clay.

A pottery workshop can provide workspace for

- The moulding process
- A damp rack to store damp products to dry
- Storage for clay
- A kiln for firing process
- A gallery space to display the works of students.

The students have to be supervised by an experienced teacher.



Cookery Workshop

Students can be taught cooking as an extracurricular activity. They can be taught to cut vegetables, learn cooking of simple dishes that can be sold in a cafeteria maintained by them.

Workshops can also inhabit the training of accounts and commerce for students in school.



Students dealing with the sales of products in their cafeteria

Using Cafeteria spaces for students to buy or sell products made by them can be implemented.

They can run the café, learn to sell their products and maintain accounts. Each batch or a set of students can run the café for a week, in turns.

The cookery workshop can be positioned in the public zone, close to the kitchen as well as the visitor's centre so that the parents and other visitors can also access it along with the students and teachers.

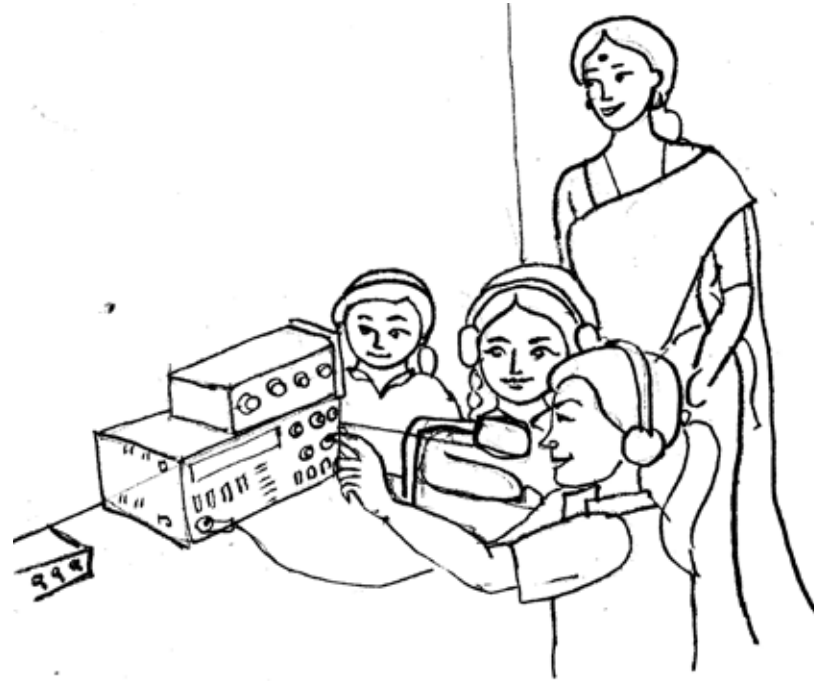


Children using recycled paper made from the workshops in schools

Miscellaneous workshops

A space can also be allocated for activities and workshops for recycling waste materials and products produced in schools.

Recycling paper, newspaper, strawboard, plastic water bottles and other household items and waste products can be recycled in the workshops to make handmade toys, books, art sheets, papier mache products and scrap books for students to



Public Address System

A Public Address system is a system of microphones, amplifiers and loudspeakers used for making school announcements, mention of students, teachers etc.

This room may need furniture for equipment like computer systems, networks, and mike systems.

This room does not require a lot of space, and can be placed along with the office block or the administration, where the office members have a check on the use of the equipment.



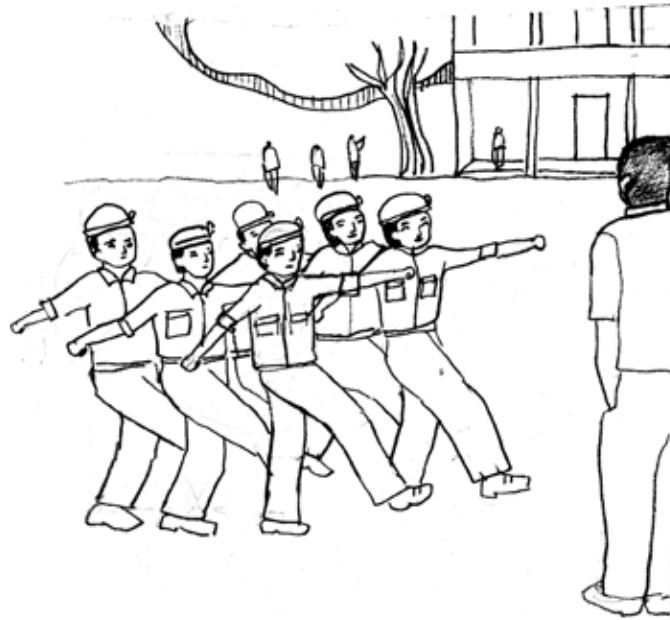
Children involved in cleaning activities as part of the National Service Scheme Training

National Service Scheme Room

National Service Scheme Room is a voluntary program that inculcates social welfare in students to provide service to the society.

Most government aided schools and colleges have a unit comprising of 20-40 students, who volunteer to be trained and conduct activities for the community like cleaning, transporting amenities, donations, that are unavailable in villages, construction camps, literacy camps, health camps etc.

A store room for storing the records, and all the cleaning equipment like brooms,



Students learning to march past as part of the National Cadet Corps Training Program

National Cadet Corps Room

It is a voluntary organization which recruits cadets from schools and colleges, giving them basic military training by trained officers and personnel.

The motto of NCC camps is to bring in unity and discipline among students, developing team work, leadership skills, self confidence, character development and dignity of labour of the students.

NCC camps include training in schools as well as camp training, mostly requiring the use of school grounds for parade practice.

The students may need provision of separate locker facilities and dressing rooms for the boys and girls to change into their NCC uniforms. There can also be provision for the staff to sit.



School museum displaying achievements of the school

School Museums

School museums can be spaces that are accessible by all students, teachers, and the alumni, where school records, achievements etc. are displayed.

It can have a timeline of events of the school, information on school alumni, dates of school history and can also display the following:

- Write up on the successful old students
- Write up on the old teachers
- Records and achievements of the school
- Collections donated by the students
- Project works done by the students
- Exhibits during science fair, work experience fair etc.



The museums can act as a useful resource for students of the school, if constructed, maintained and updated regularly.



Student Union Office

These spaces are planned for the students to get together for organisational activities, representation and academic support of the school.

Office bearers and the student union can meet regularly and plan various activities and events for the school.

It also provides with a platform for new and existing students to build a forum to communicate, and build relationships of a similar background with the alumni members.

07. **Activity Spaces and Play Areas**

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Outdoor Play	356
Indoor Play	370



Outdoor Activity Spaces

Outdoor spaces in schools can encourage students to learn from the outdoor environment. Sports activities such as athletics, volleyball, football and other outdoor activities, help in improving the children's gross motor skills (hand-mind coordination) along with learning.

Taking the children out of the classroom, and teaching through the surrounding environment, increases the grasping power.

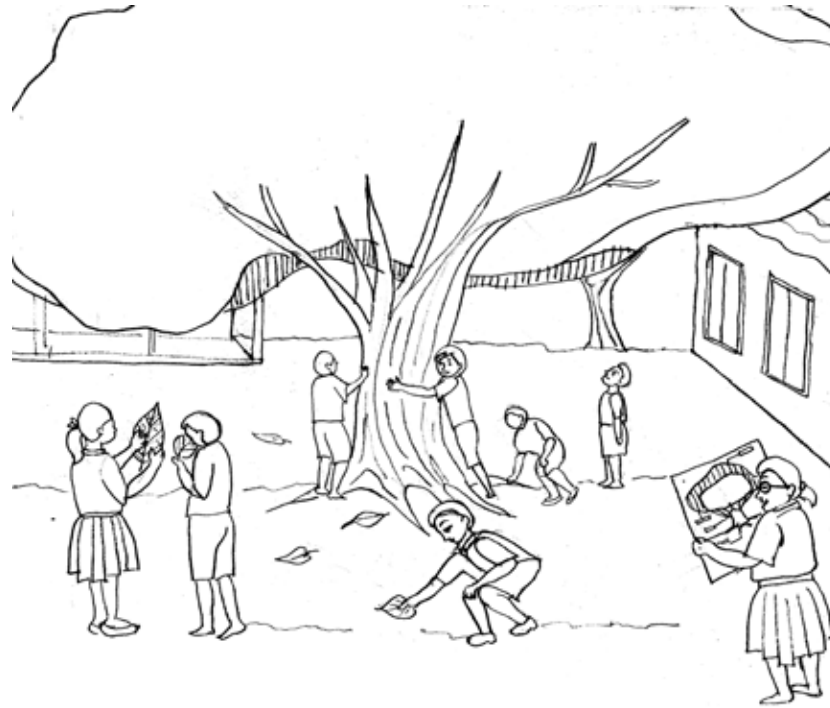
These activities also help the children develop innate qualities like sharing and



Outdoor Classrooms

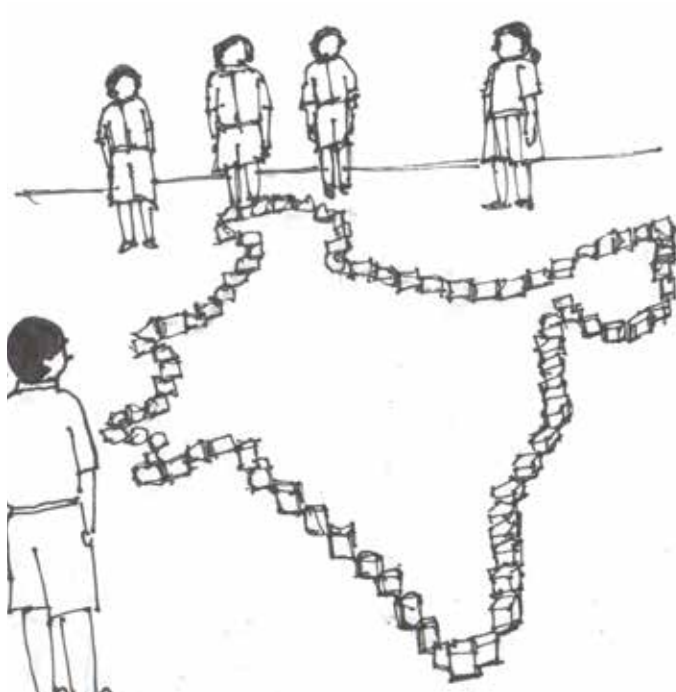
It should be possible to extend the teaching areas to the open spaces beyond classrooms. For this purpose, chalkboards, raised platforms, and low outdoor seating arrangements can be made available in these spaces.

Negative spaces between two building blocks, setback spaces, shaded spaces



Children learning about a tree in an outdoor space

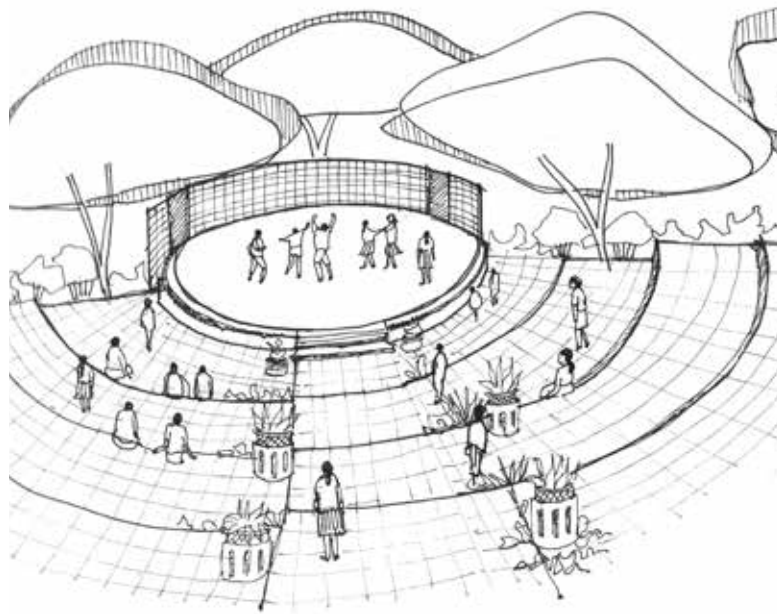
Plants, trees, birds, butterflies and similar elements can also be studied in such outdoor learning spaces. The students learn by interacting and observing the natural diversity in the campus.



Children building the map of India using materials available in schools

Activities like, map making out of waste objects can be executed in large open spaces.

This will help children understand maps, scale, measurement, aerial views and different ways of representation through available objects.



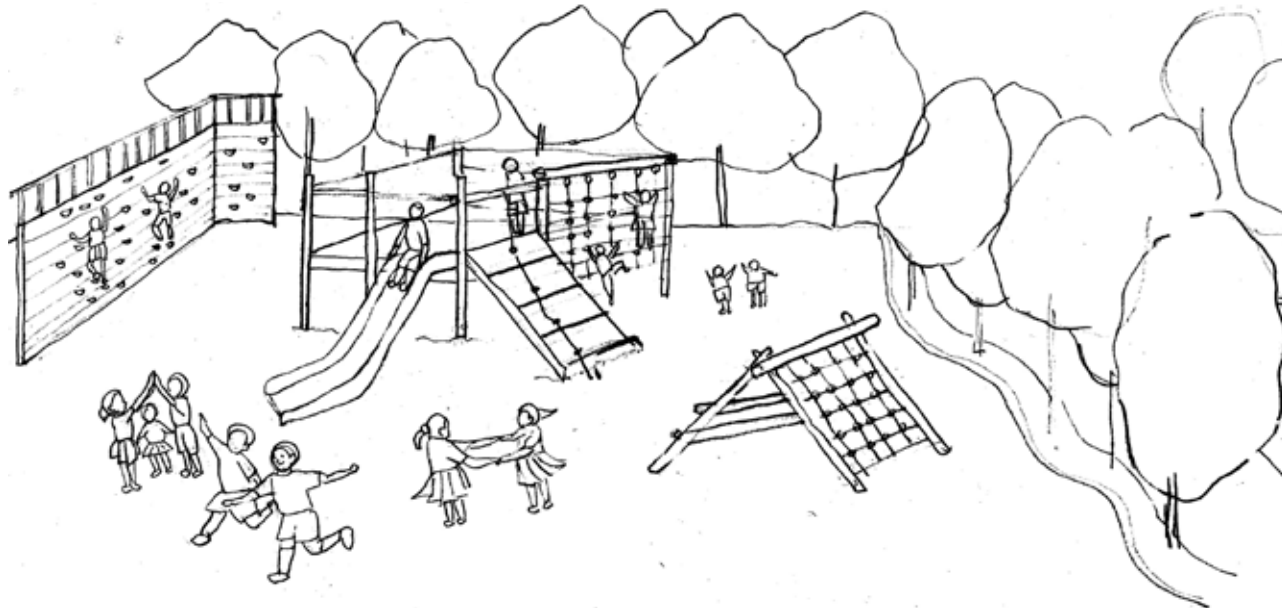
Students performing a drama session in an outdoor amphitheatre

Outdoor Arts and Theatre

As a part of the outdoor landscape, an open or semi shaded area can be designed for art related activities like drawing, colouring, painting, model making etc.

A platform of about 450 mm height can be provided here, to be used as the stage for performances such as drama and theatre.

Drama, dance and music shows can be conducted in the school by the students and staff members. These activities can also involve the community.



Outdoor Play

- Play areas that involve equipment like jungle gym, slides, seesaw etc.
- Mud, water and tyre playgrounds

Spaces like open air assembly spaces, lawns, courtyards, setbacks and spaces between buildings can be utilised for outdoor play.

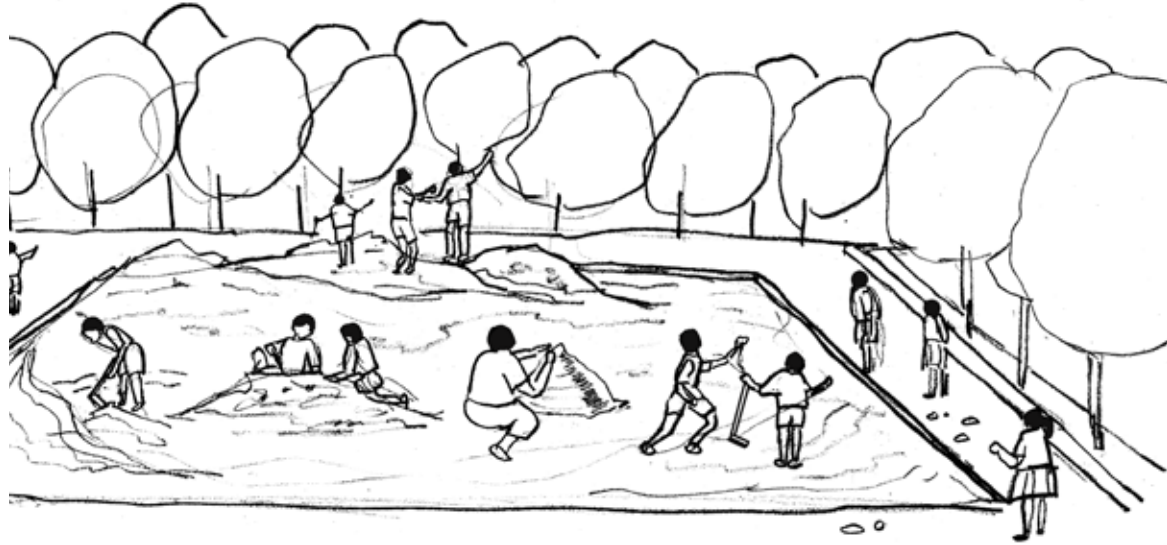


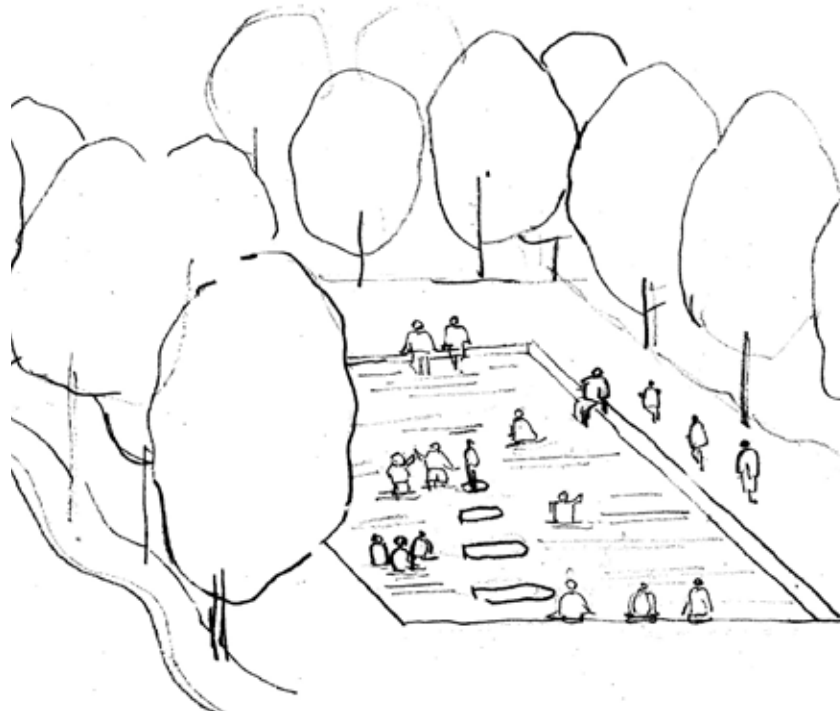
Illustration of a sandpit

Sandpits

Children love to build with earth and sand. Providing a space for them to dig, build and mould with the material will develop their muscular coordination and creativity.

A 200 mm pit filled with sand or earth can be provided for this purpose.

An open wash area with taps can be provided adjacent to the sand pit for students to clean up after playing.



Children playing with water in an outdoor water play area

Water Play

The water play area can have a water dome, water bubbler, a shower etc.

The water used for these activities can be sourced from the rainwater harvesting system, to ensure a judicious use of the water resources available.

A rough flooring surface can be provided to avoid slipping and falling.

The sandpit and water play areas can be placed adjacent to each other.



Tyre Playground

It becomes difficult for schools to get good sturdy play equipment. Using discarded tyres as play material becomes safe and economical.

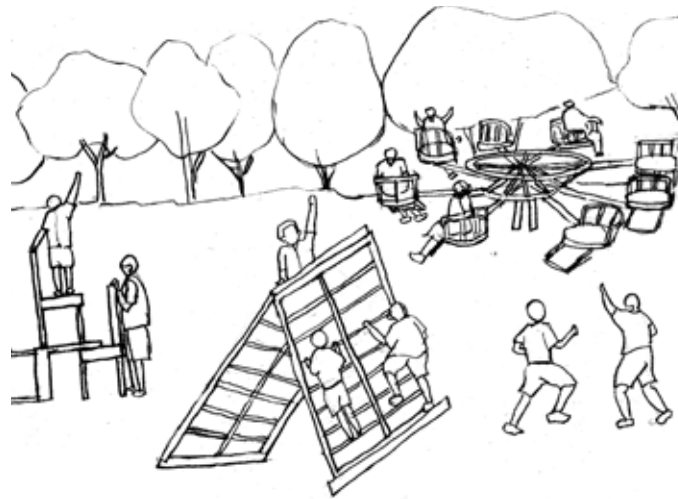
It can be used in the following ways:

- Tyres can be fixed one above the other, with a distance of 450 mm from the ground and in between rods as play equipment. Mud, water and tyre playgrounds
- A bunch of tyres can be arranged in a particular order for children to hop, skip and jump.



Children using tyre as swings

- A number of tyres can be fixed on ground to form a tunnel for children to crawl beneath.
- These tyres can also be fixed at a height with a chain and can be used as swings.
- The tyres can also be used as planters.



Reusable waste products like grills, timber logs, plastic chairs being used as play elements by the children

Play Equipment Using Waste Products

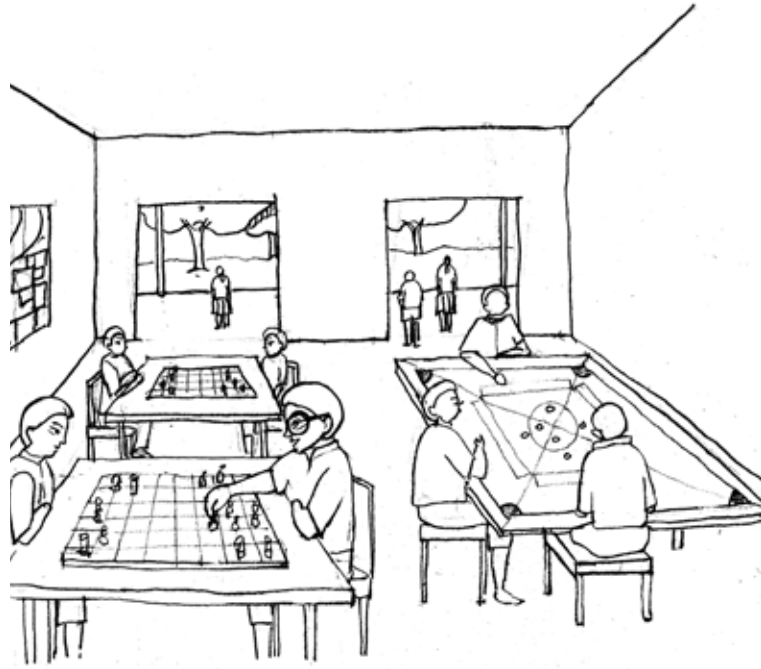
Reusing waste available within the school campus for playing can also be encouraged.

- Using old window grills as ladders or jungle gym.
- Rubble stones, logs, unused bricks can be used for seating.



Children in play spaces designed out of waste or discarded materials like tyres, tubes, ropes

- Swings hung from the branches of a tree.
- Reusable timber logs as part of play.
- Reusing plastic or old wooden chairs as seating in merry-go-rounds.



An indoor play room with board games for children

Indoor Play Spaces

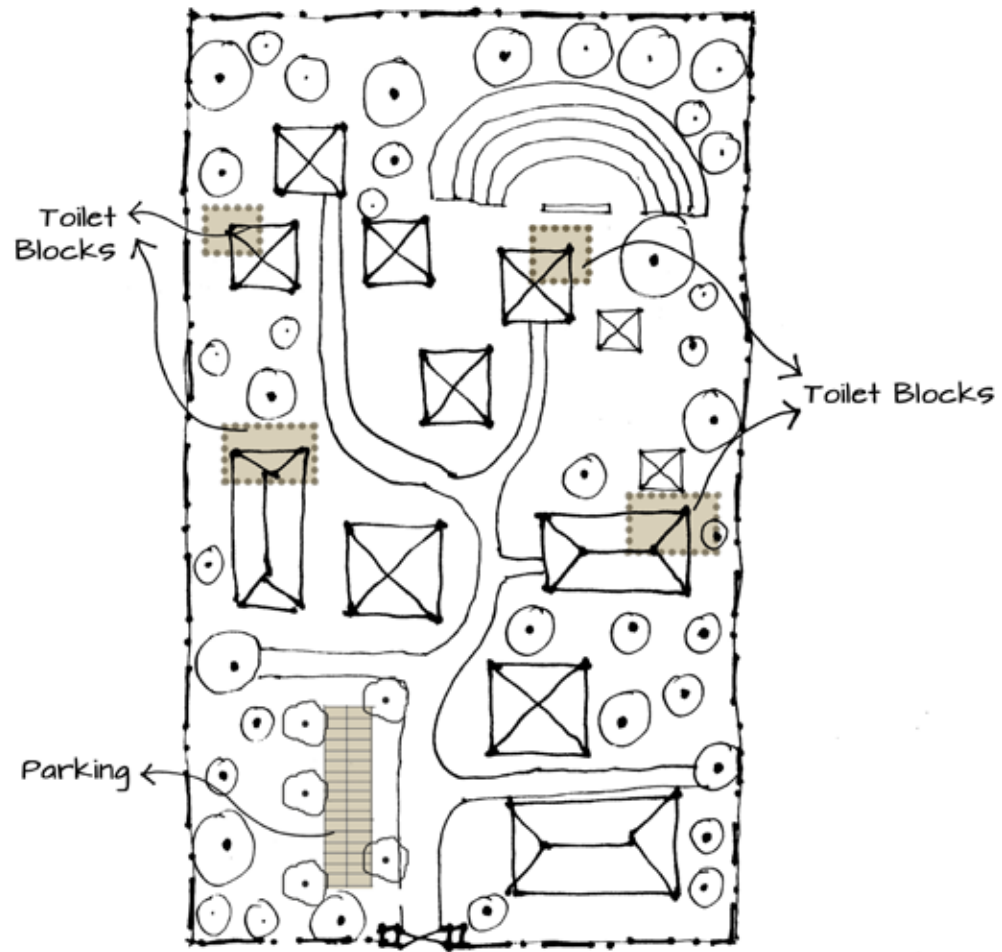
Indoor play spaces can be placed in common spaces shared by the students inside the school building.

These spaces can be used for indoor games like carrom, chess and other board games. They can also be used for shared activities or as common areas for students to mingle and interact.

The non-tiered auditorium layout can also be used as an indoor play area since it has a large area and may not be occupied throughout the day.

08. Service Sector In Schools

Toilet Facilities	376
Parking Facilities	394

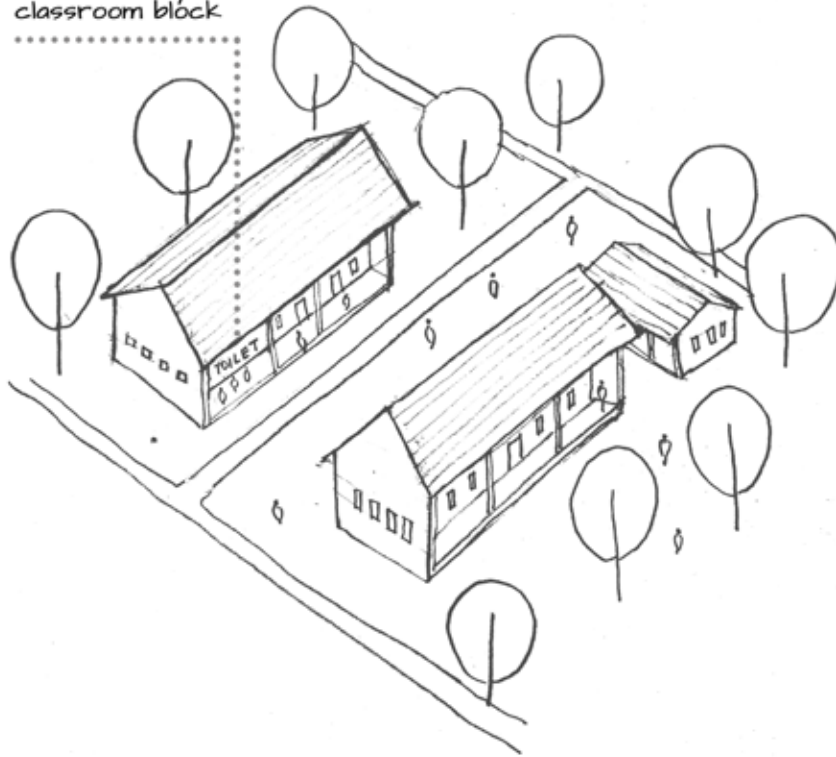


A school may have provision to provide other basic services offered for the benefit of students and teachers of the school.

These services include:

- Toilet facilities
- Parking facilities

Toilet facility within the classroom block



Toilet Facilities

Providing toilet facilities for maintaining a clean and healthy lifestyle is important. Children learn from this lifestyle practiced in schools.

As much as possible, construction of separate toilet blocks in the campus can be avoided. The facilities can be provided within each block of the school.

In case the space does not permit, or in the case of an existing heritage building, building new blocks for toilet facilities may be considered.

Separate facilities for girls and boys shall be provided.

It can be kept in mind that the facilities are not provided in dark and dingy corners of the site, considering the safety of the children.



Addition of toilets in the verandah of old buildings will lead to the damage of buildings

The facilities can be provided:

- Within the block, or on each floor of a building. This method is preferred in schools.
- At a convenient distances within the campus, if being constructed as a separate block.

Converting verandahs or classrooms of existing buildings into toilet blocks or adding toilets on the first floor of a heritage building is not recommended, as the timber used in these buildings may get rotten.

If it is being constructed as a separate block, a shaded pathway can be provided to access the toilet block.

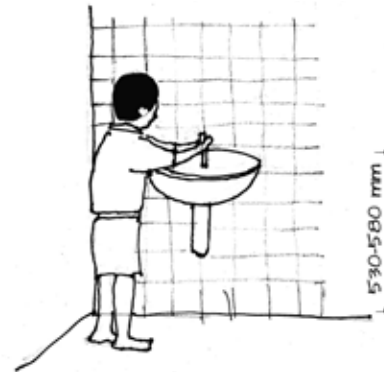
Fixture	Nursery (Age 3-6)	Boys- Age 7 and above	Girls- Age 7 and above
Water Closet	1 per 15	1 per 40	1 per 25
Ablution Tap	1 per Water closet	1 per Water closet	1 per Water closet
Urinal	Nil	1 per 20	Nil
Wash Basin	1 per 15	1 per 60	1 per 40

The table shows the number of sanitary fittings to be provided in schools

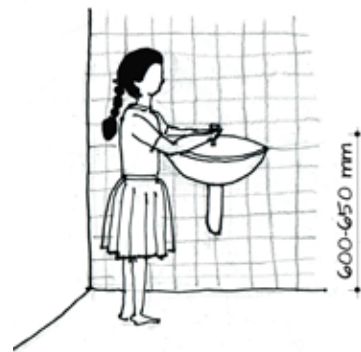
The National Building Code of India specifies the facilities to be provided according to the number of students in the school.



Age 3-7



Age 8-10



Age 11-14



Age 15-18

Different wash basin fitting heights for various age groups

Wash Basin Heights

The standards for each student age group vary according to the physique of the child.

Wash basins need to be fitted at different heights according to the age of the child.

A table showing the heights of the wash basin fitting, for different age groups is given:

Age Group	Wash Basin Height
Pre- Primary Age 3-7	460-510 mm
Primary Age 8-10	530-580 mm
Secondary Boys & Girls Age 11-14	600-650 mm
Higher Secondary Boys & Grils Age 15-18	660-680 mm

Indian Toilets	Western Toilets
Indian toilets are more hygienic, as it avoids contact of the human body to the toilet seats.	Western type toilets may need to be maintained and cleaned more often in order to avoid spreading infectious diseases.
Children from rural backgrounds are more used to Indian toilets.	It is difficult for children from rural backgrounds to adjust to western toilets.
These toilets do not get easily damaged.	Public toilet seats get damaged over a period of time.
Indian toilets have a wet area and are difficult to maintain dry.	These toilets can be maintained dry and clean.
It is difficult to use by aged and physically challenged people.	The physically challenged and the aged can use western toilets by providing hand rails along with toilet seats.

The table shows a comparison between Indian and Western toilets for use in schools

Toilets need to be cleaned and maintained in schools to look after the student's health and hygiene. Indian type water closets might be more hygienic and easy to maintain. The differences between Indian and Western toilets are given to compare the use and efficiency of the toilets.

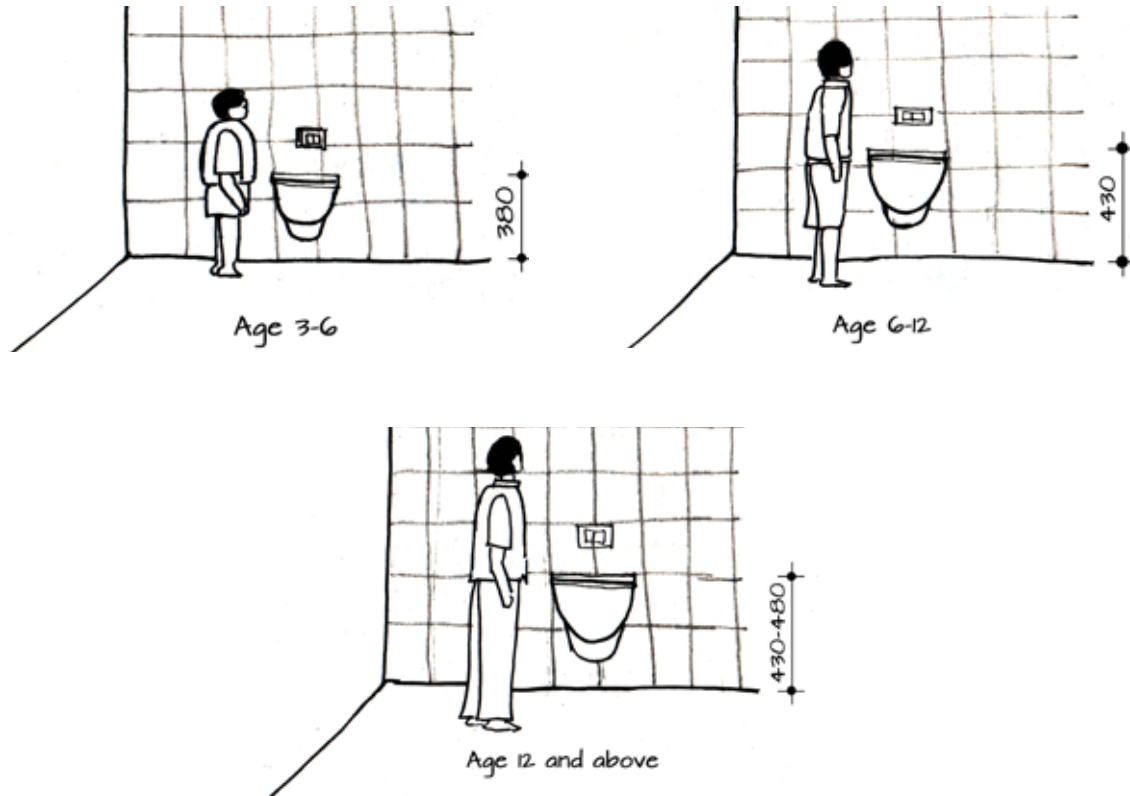


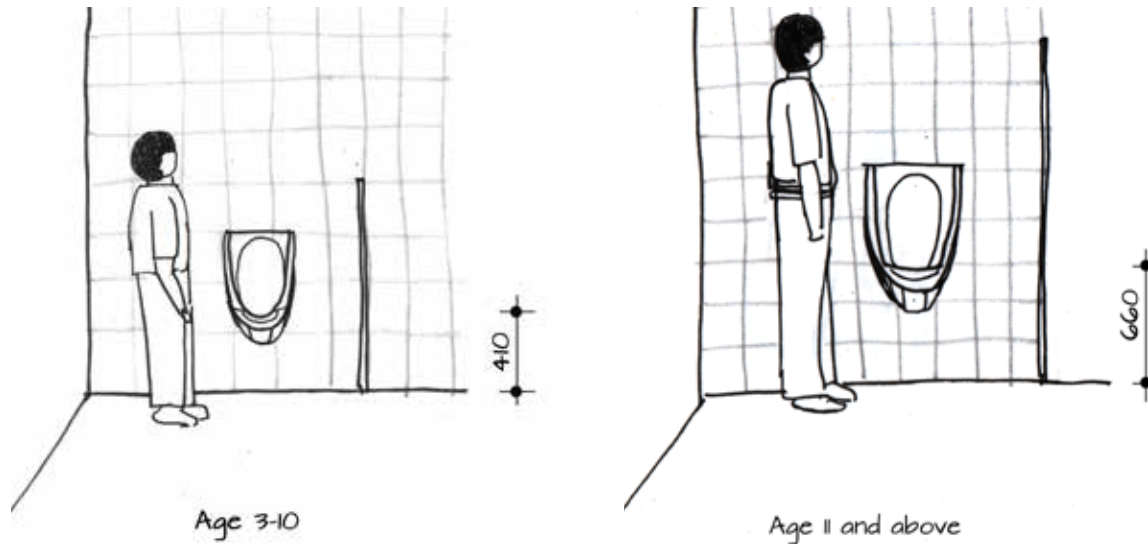
Illustration showing different toilet seat heights for different age groups

Closet Fitting

The standards for providing western toilets in schools at the appropriate toilet seat height for different age groups is to be considered.

The measurement of height is from the finished floor level to the height of the fixture.

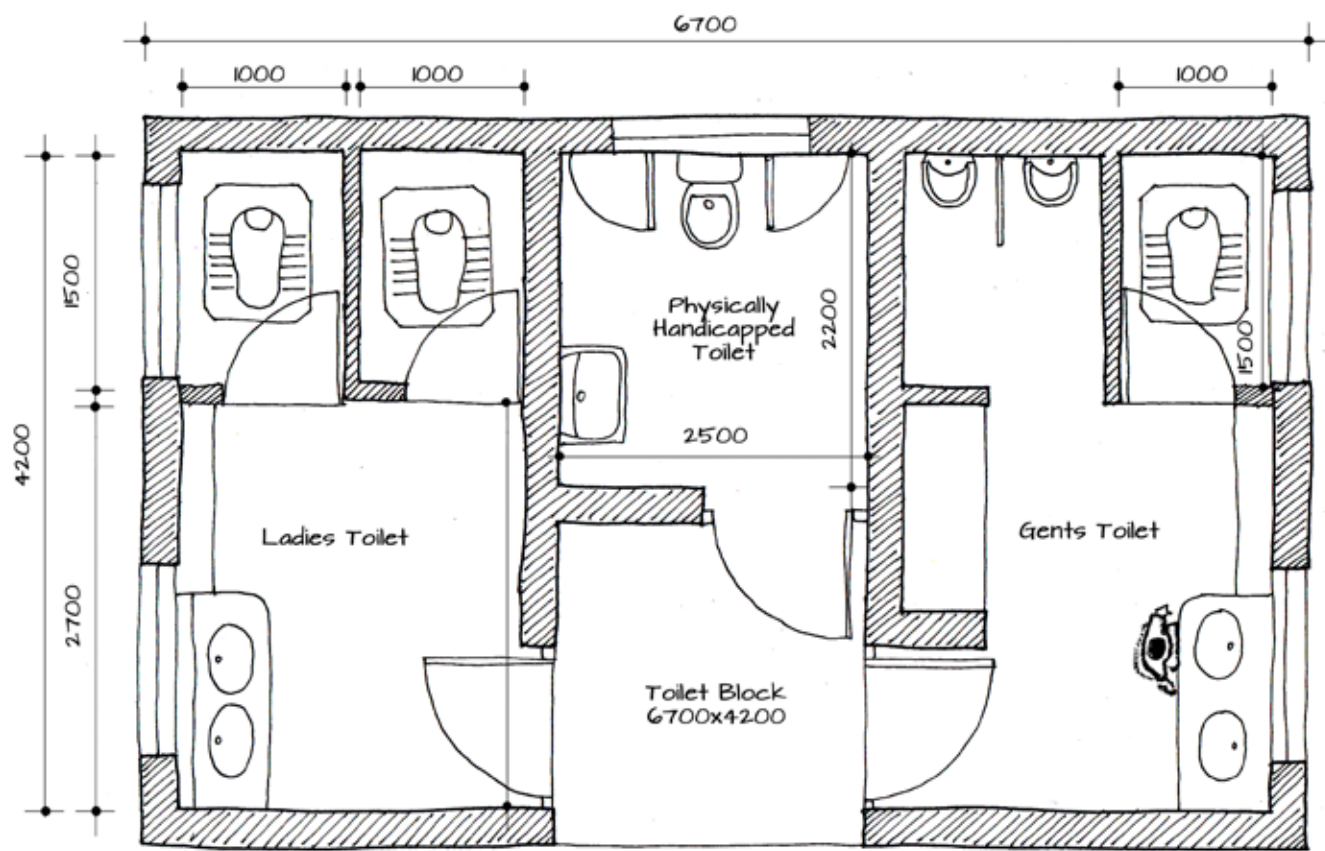
Age Group	Toilet Seat Height
Age 3-6	380 mm
Age 6-12	430 mm
Age 12 and above	430-480 mm



Urinal fixture height details for different age groups

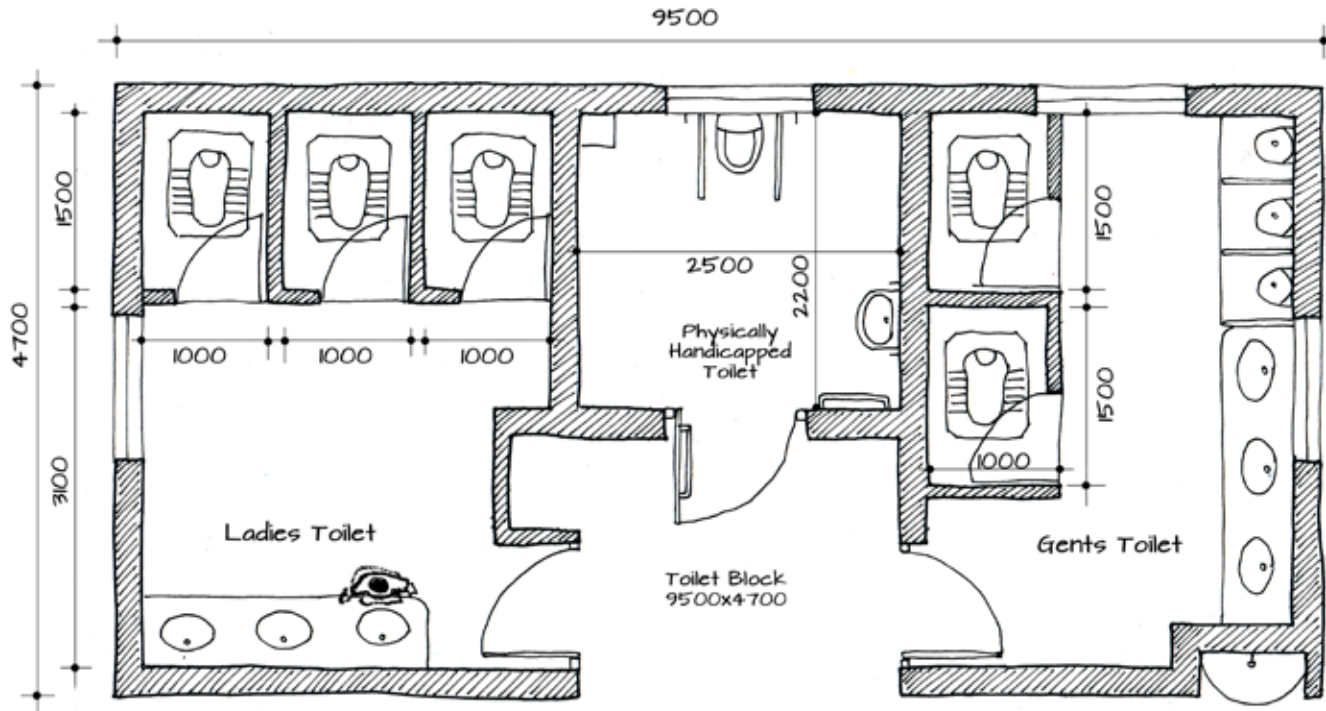
Age Group	Height of Urinal	Height of Flush valve
Age 3-10	410 mm	765 mm
Age 11 and above	660 mm	1015 mm

Standards for providing urinals for the boy's toilet are:



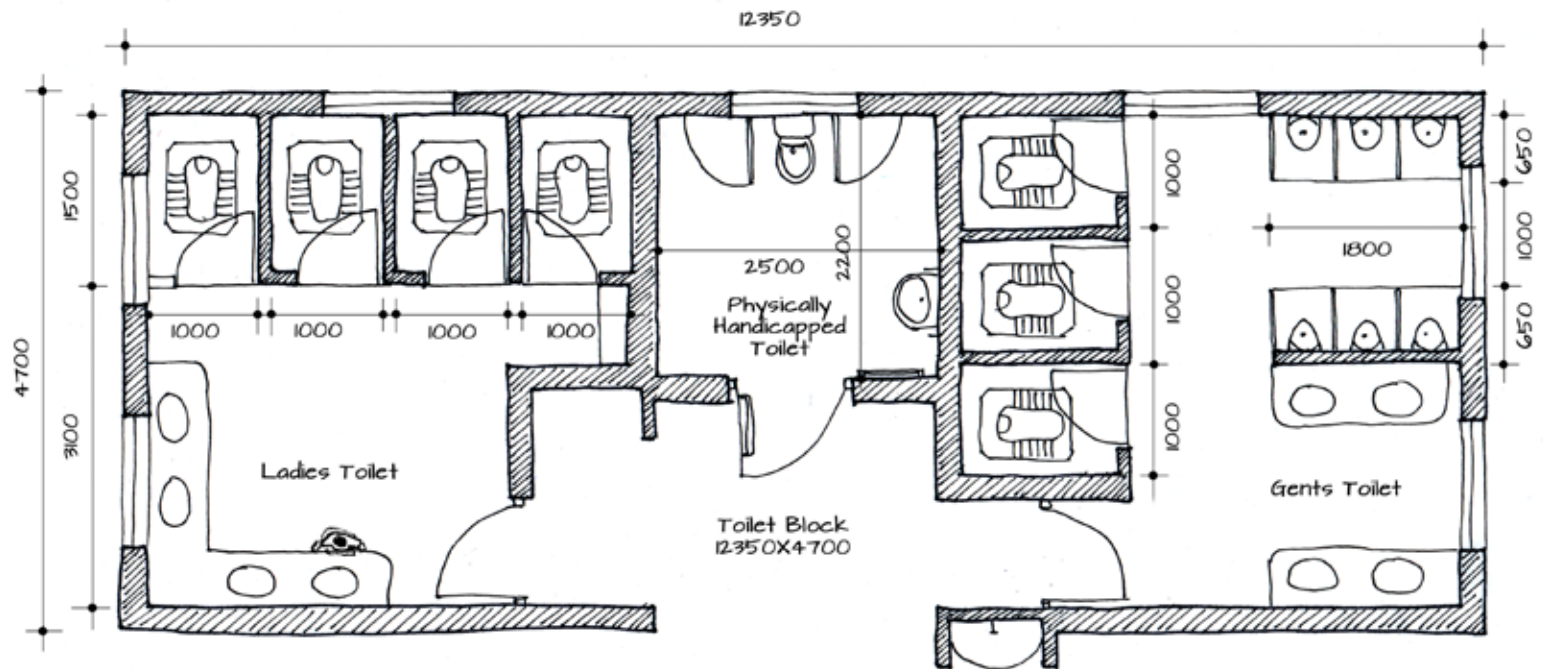
All dimensions are in mm

Sample Drawing 1



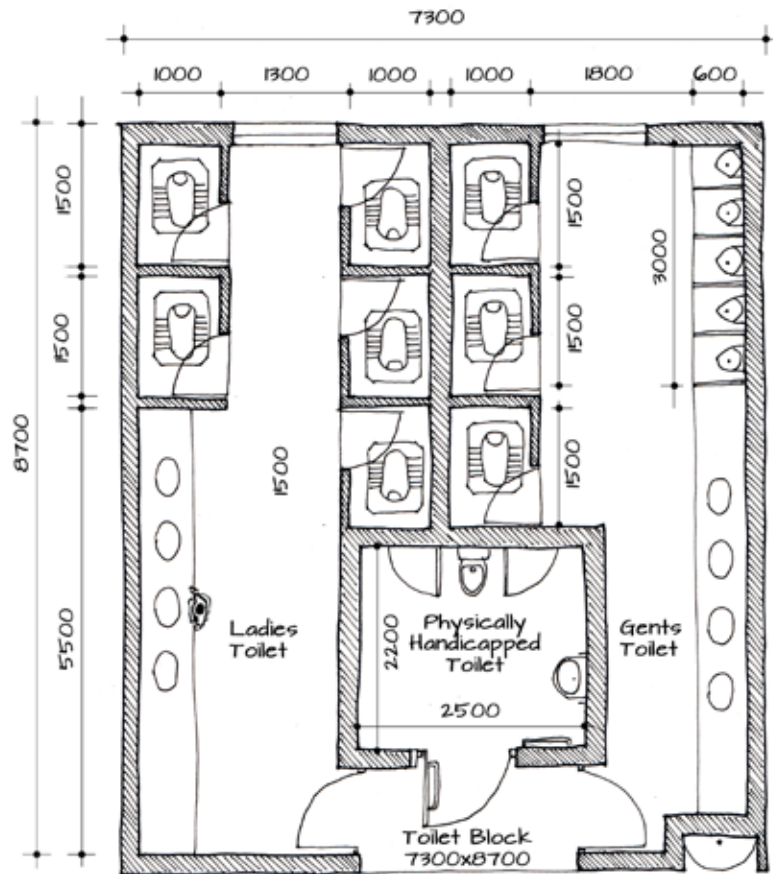
All dimensions are in mm

Sample Drawing 2



All dimensions are in mm

Sample Drawing 3



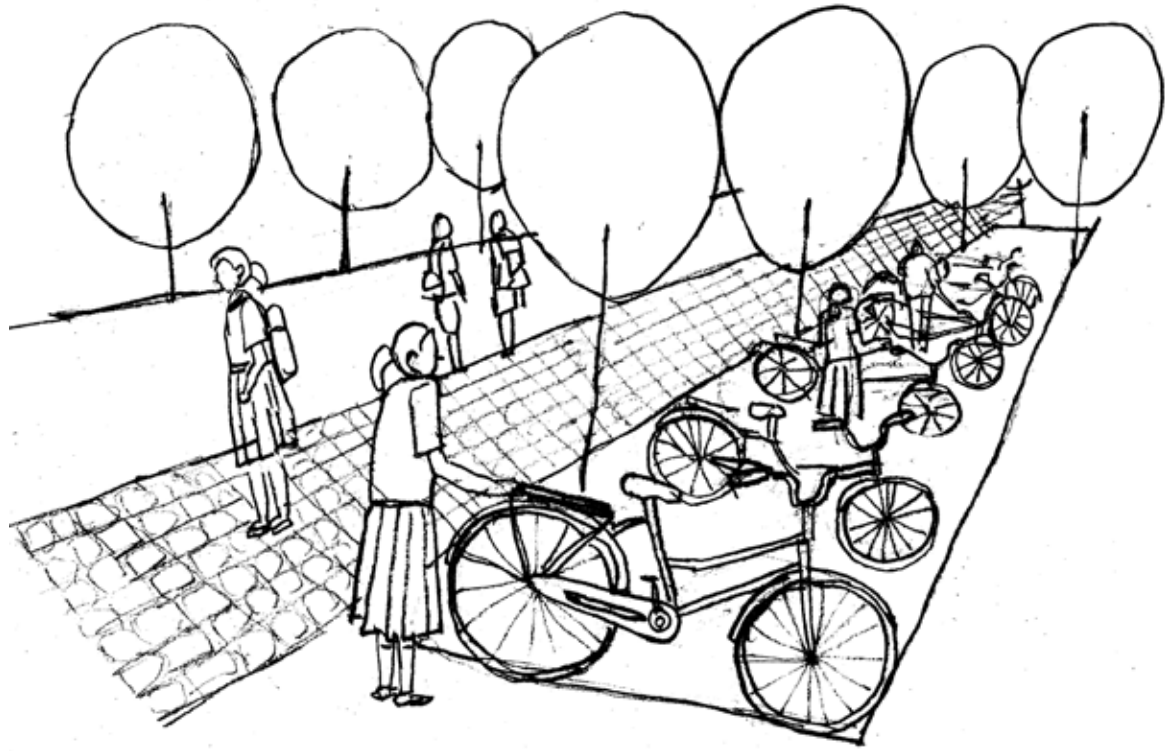
All dimensions are in mm

Sample Drawing 4

In case of a western toilet, there are two types, namely - wall mounted and floor mounted toilets. Wall mounted toilet seats are preferred as they can be fixed at any height, whereas floor mounted toilets of different sizes are not available in India.

Wall mounted Toilets
It can be used in smaller spaced bathrooms, as it occupies minimal space.
It is more expensive and also needs special mounts to prevent pulling down of the wall.

Floor mounted Toilets
It occupies more floor space.
Plumbing lines have to be provided from the floor when the toilet seat is going to be placed.

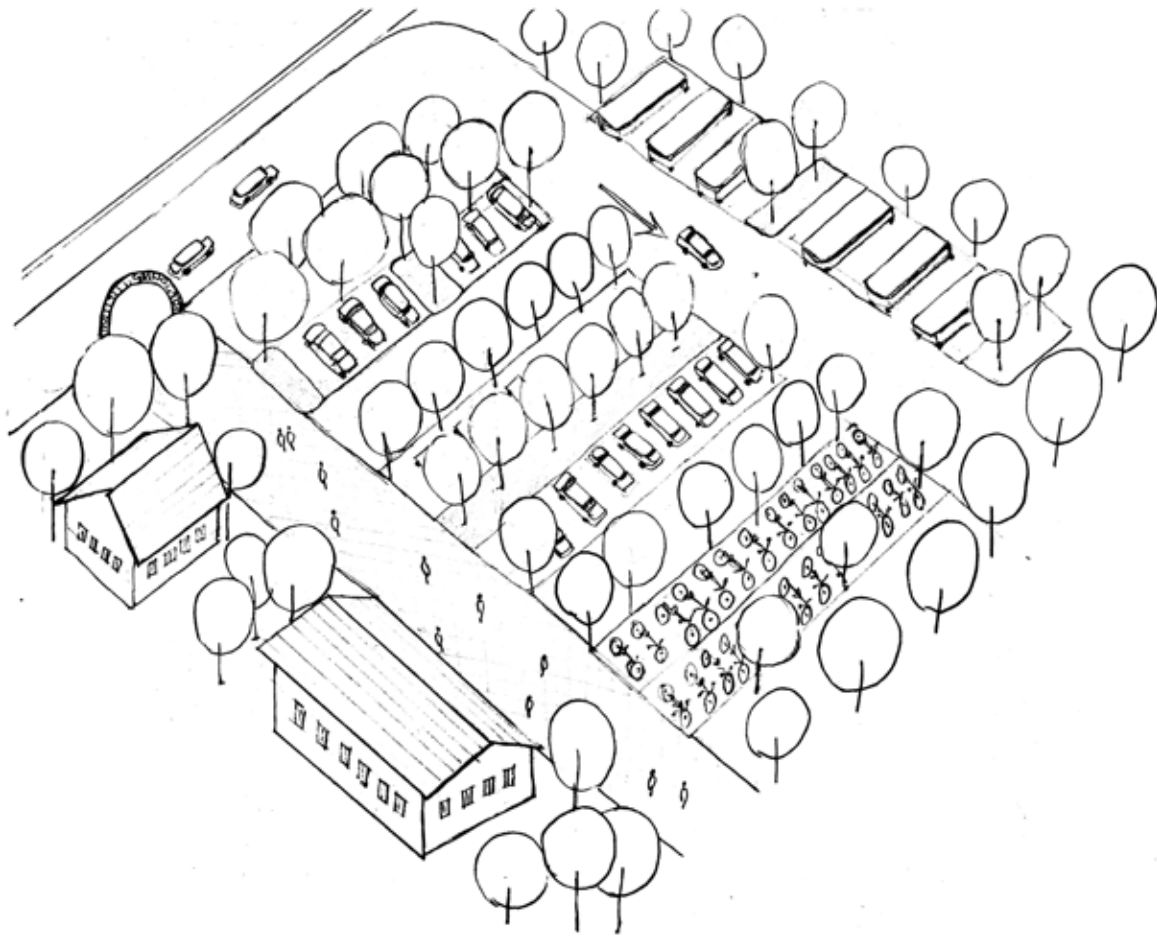


Parking Facilities

Parking facilities for teachers, students, and other staff members of the school need to be provided.

Provision of more cycle parking facilities may encourage students and teachers to commute by cycles, rather than two-wheelers or four-wheelers.

Use of public transport can also be encouraged.

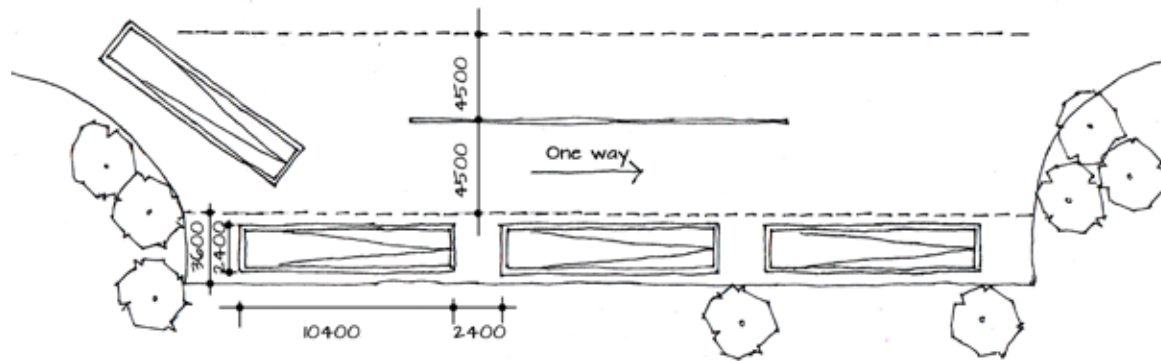


The vehicular movement can be restricted to the entrance of the school campus, providing vehicle free zones for the children.

The average area for parking of cycles, bikes, cars and schools buses recommended by the Bureau of Indian Standards is given.

This area calculation includes circulation spaces in between vehicles, and road width.

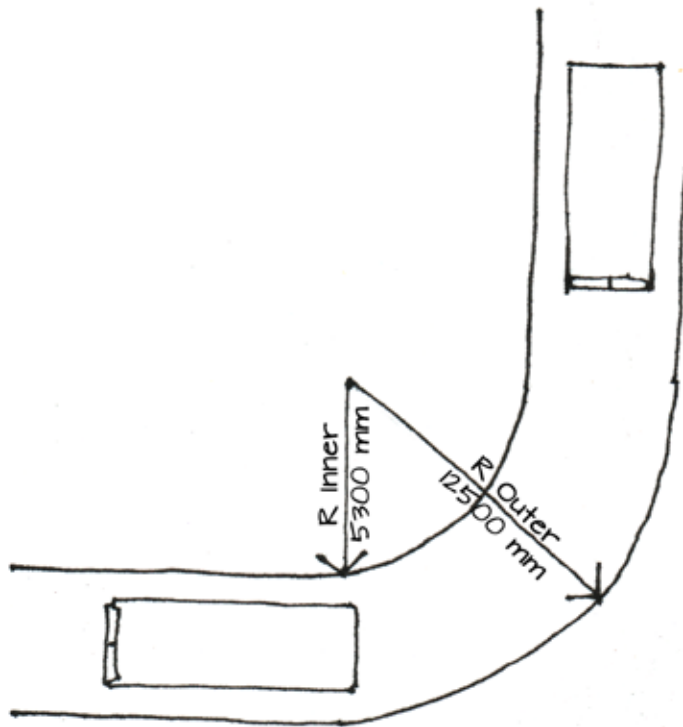
Parking Facility	Area per item
Cycles	1.1 sq.m per Cycle
Two- wheeler	3 sq.m per Bike
Four- wheeler Cars	25 sq.m per Car
Four- wheeler Bus	60 sq.m per Bus



All dimensions are in mm

Illustration showing a parallel bus parking system with minimum standard dimensions

The most efficient parking layout is the 90 degree layout, as it utilizes least area, because the angle is reduced. Though, greater turning effort is required to park at 90 degrees.

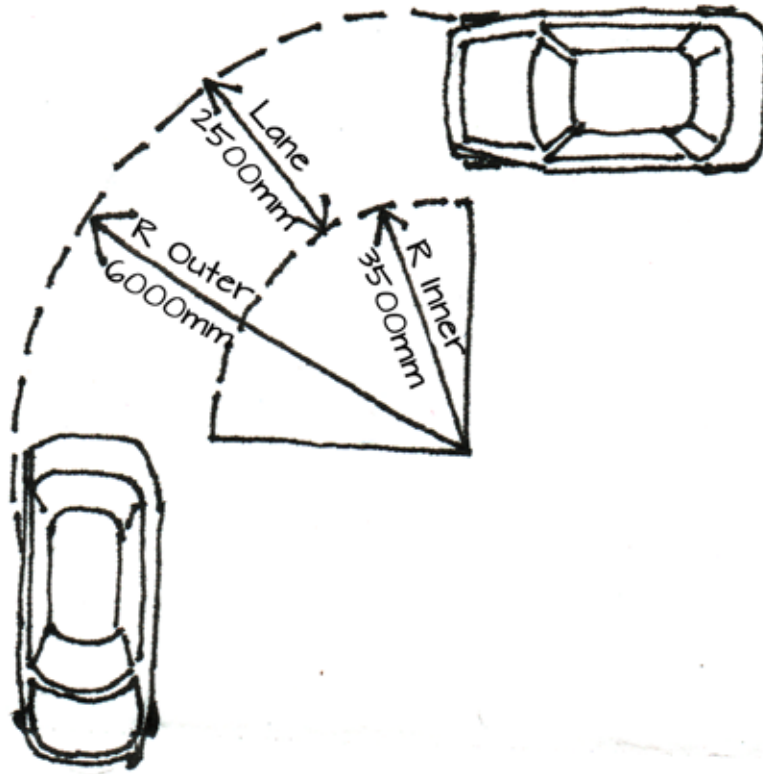


The inner and outer turning radius for a bus is shown with the required dimensions

A bus parking stall uses 10000 x 2400 mm area. The turning radius to be provided for a bus is:

- Inner radius: 5300 mm
- Outer radius: 12500 mm.

A two way bus driveway can have an approximate road width of 8000 mm.

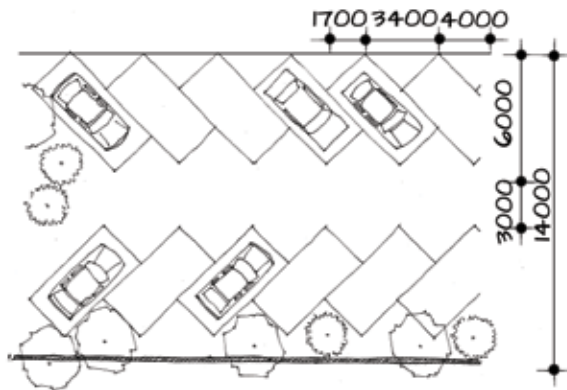


The inner and outer turning radius for a car is shown with minimum dimensions

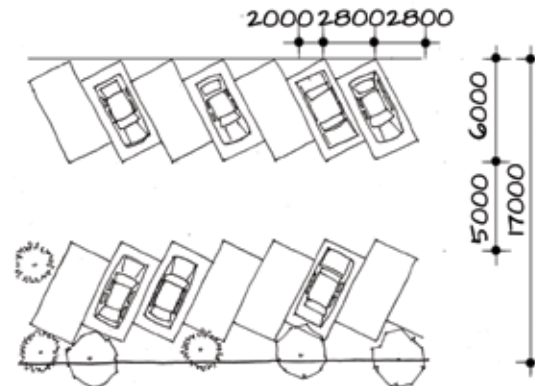
One car parking space can be provided for every 300 sq.m of built up area in schools.

A minimum of 25% of this parking space must be provided for 2 wheeler and scooter parking, however, this number can be higher in the case of schools.

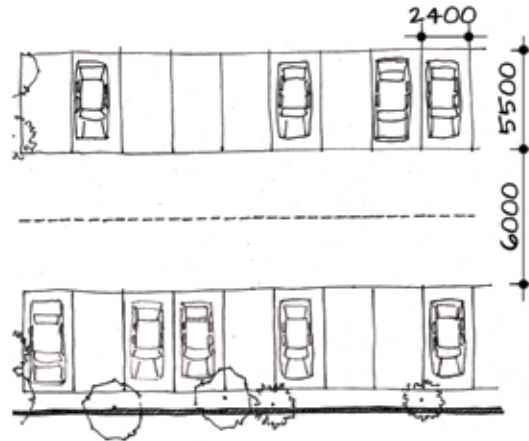
The parking space can preferably be provided with a covered roof, due to the high amount of rainfall observed in Kerala.



45° Parking



60° Parking



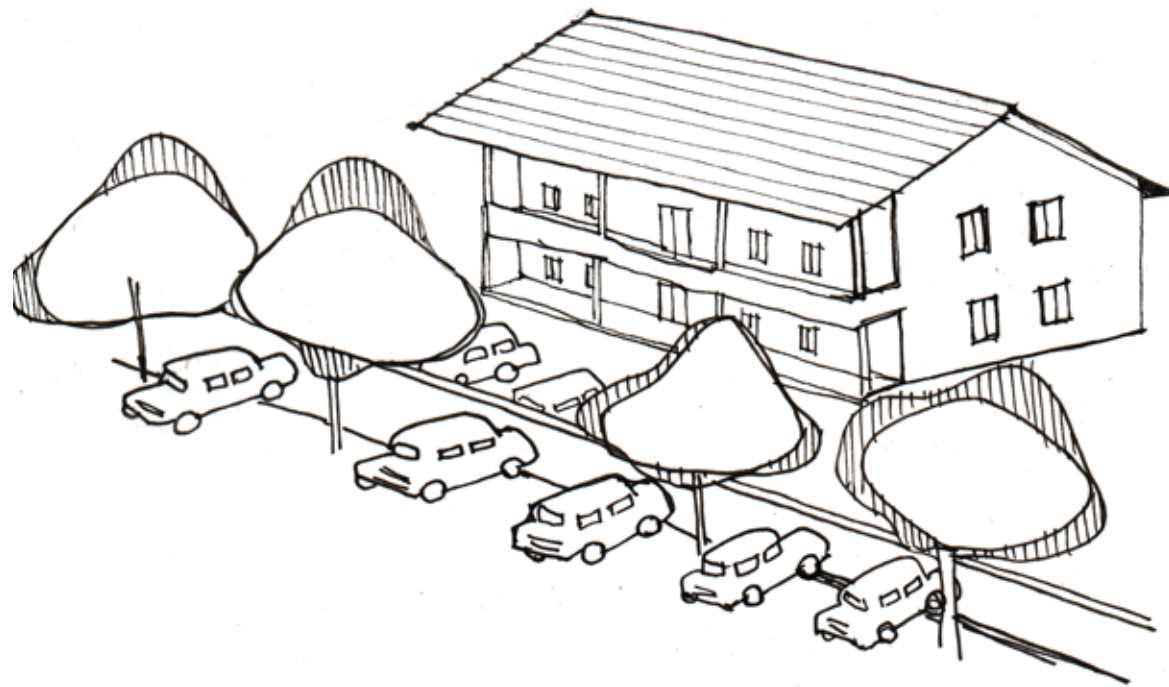
90° Parking

All dimensions are in mm

The car parking space to be provided with respect to the Kerala Municipality Building Regulations is about 5500 x 2700 mm. The minimum stall to be provided is 5000 x 2400 mm.

The driveway or aisle space to be provided for a 90 degree car parking is about 6000 mm for a two way and 3000 mm for a one way bay.

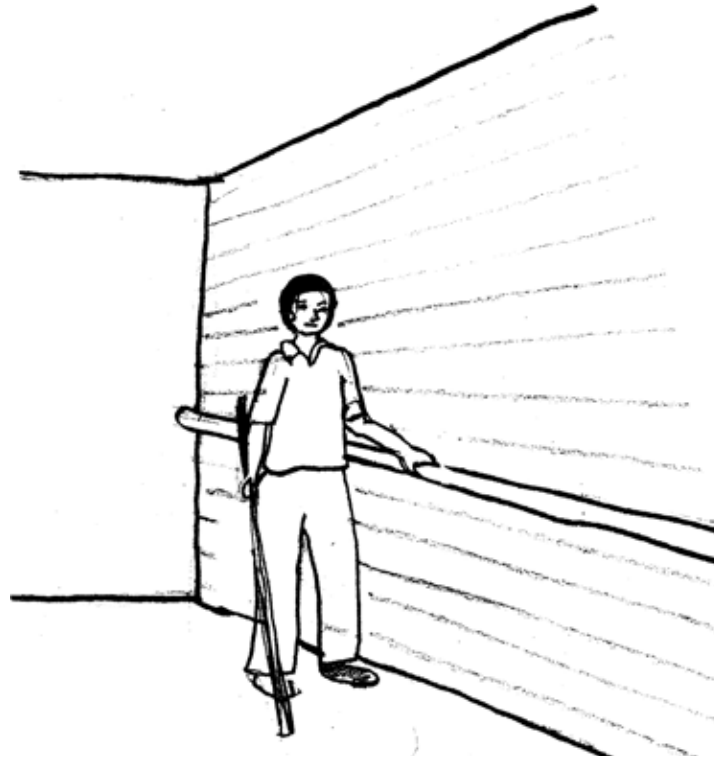
The turning radius provided for a car or minivan can be about 3500 mm for the inner radius, and 6000 mm for the outer radius.



If space allows, the visitor's car parking can be provided inside the campus with restricted movement, while in the case of restricted land areas, the visitors can park their vehicles outside the compound.

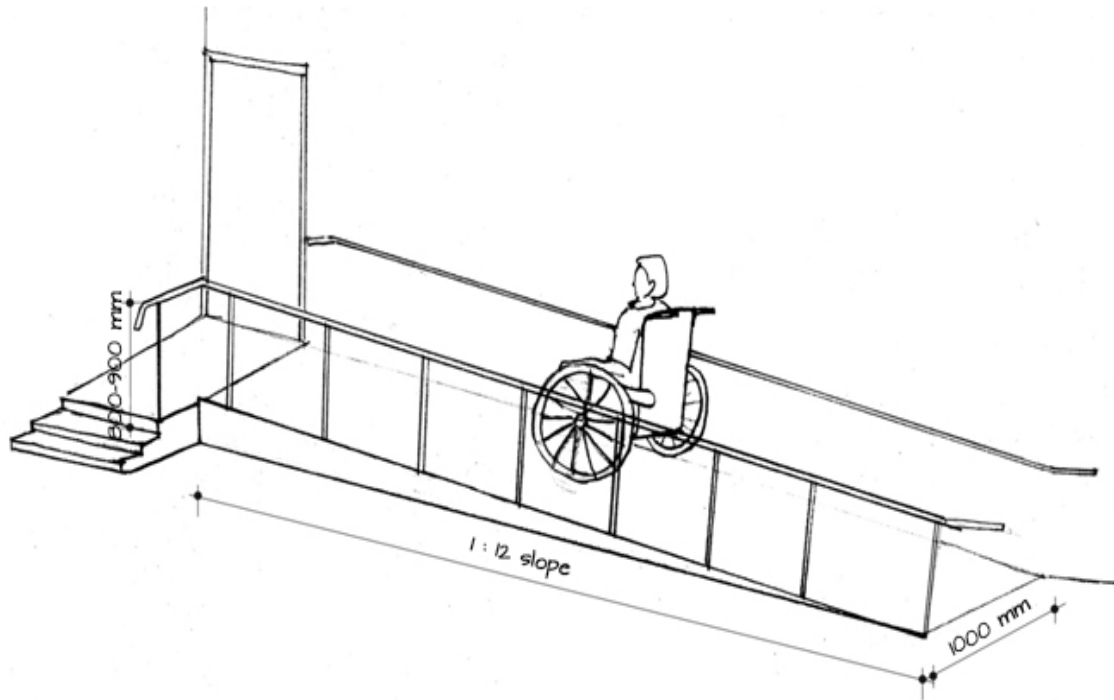
09. Design For Differently Abled

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It is important for the school layout to be sensitive to the differently abled, and implement some techniques into space planning, catering with their needs. Due to lack of knowledge, this section of the design process is generally neglected completely.

Some of the elements that need to be considered while planning the layout are ramps, entrances, door widths, corridor widths, window sill heights etc.



The illustration depicts the minimum width and slope of a ramp with the aid of handrails

Ramp Design

The slope of a ramp with a minimum width of 1000 mm can be 1:12. This means that for a height of 1 metre, a horizontal distance of 12 metres must be provided. If possible, provision of a 1:20 slope of ramp is preferred.

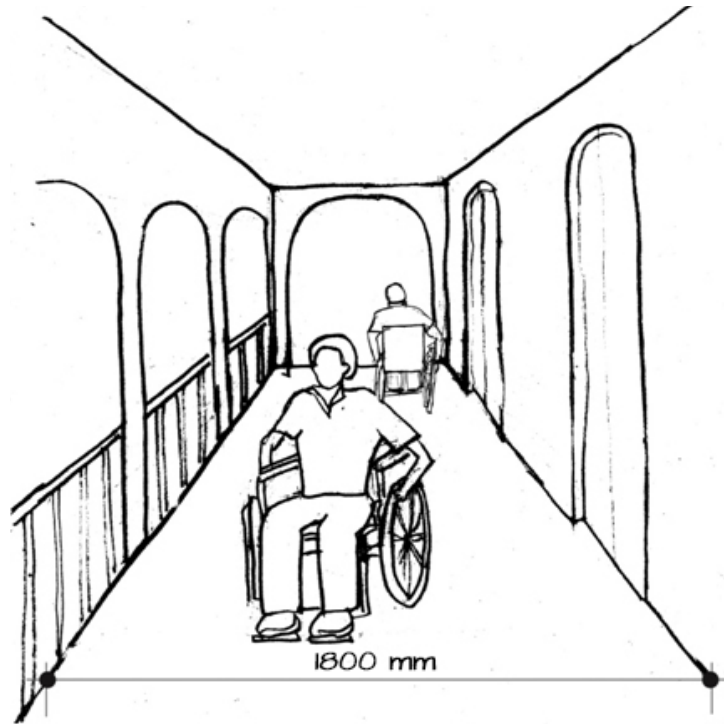
A landing can be introduced after distance of every 9000 mm, to pause and prevent wheelchair runoff. The minimum length of a ramp landing can be about 1525 mm. The ramp can have a non-slippery floor finish.

Ramps
Ramps take a large floor area.
Ramps have a high cost of construction, even higher than that of lifts.
Ramps require no maintenance costs.

Lifts
Lifts take much lesser area.
Lifts have a high cost of installation.
They require regular maintenance and running costs.

The table shows a comparison between the advantages and disadvantages of ramps and lifts

Ramps required for moving from different building heights may also be considered. In this case, a comparison between ramps and lifts has been done to understand the advantages and disadvantages.



Minimum width for two wheelchairs to pass is 1800 mm

Corridor Design

The measurement of the space occupied by a wheelchair is 760x1220 mm. The minimum width of a corridor for two wheelchairs to pass can be 1800 mm.

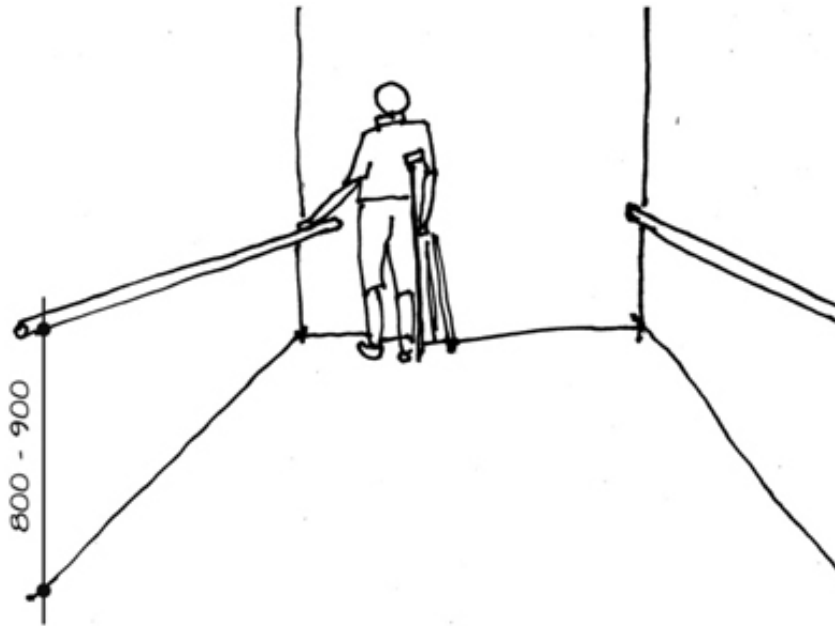


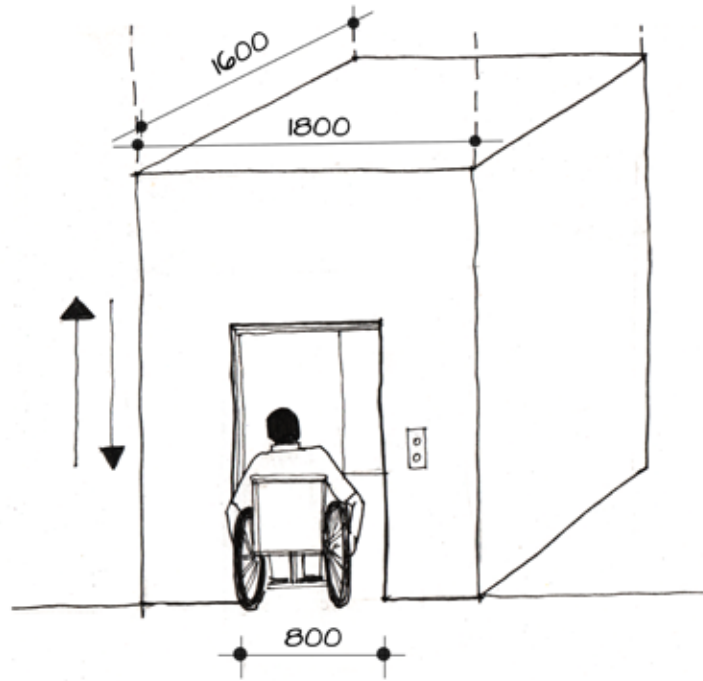
Illustration showing handrail provision for the physically challenged

Handrail Design

Handrails can be provided along walking spaces, on either or one side of the ramp, stairways, corridors etc to assist the people who are physically challenged.

The height of the handrail can be about 800-900 mm and a gap of about 50 mm between the railing and the wall must be provided.

A consistent height for the handrail can be followed.

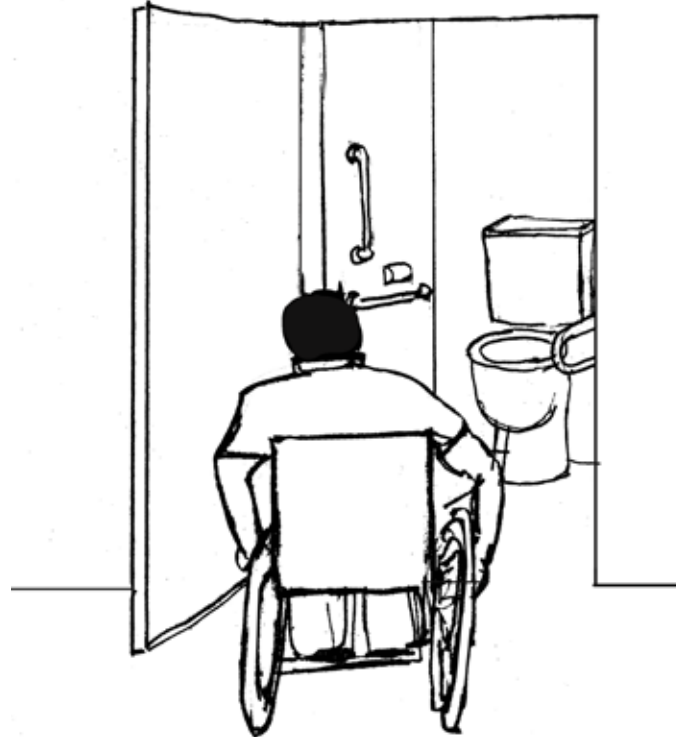


The illustration shows measurements and use of lift for a differently abled within the school

Lift Well

The width and depth of a lift well with respect to a wheelchair user can be 1600 x 1800 mm, with a clear opening of 800 mm.

The opening width provided in most of the lifts is 700 mm, which is not sufficient for a wheelchair user.

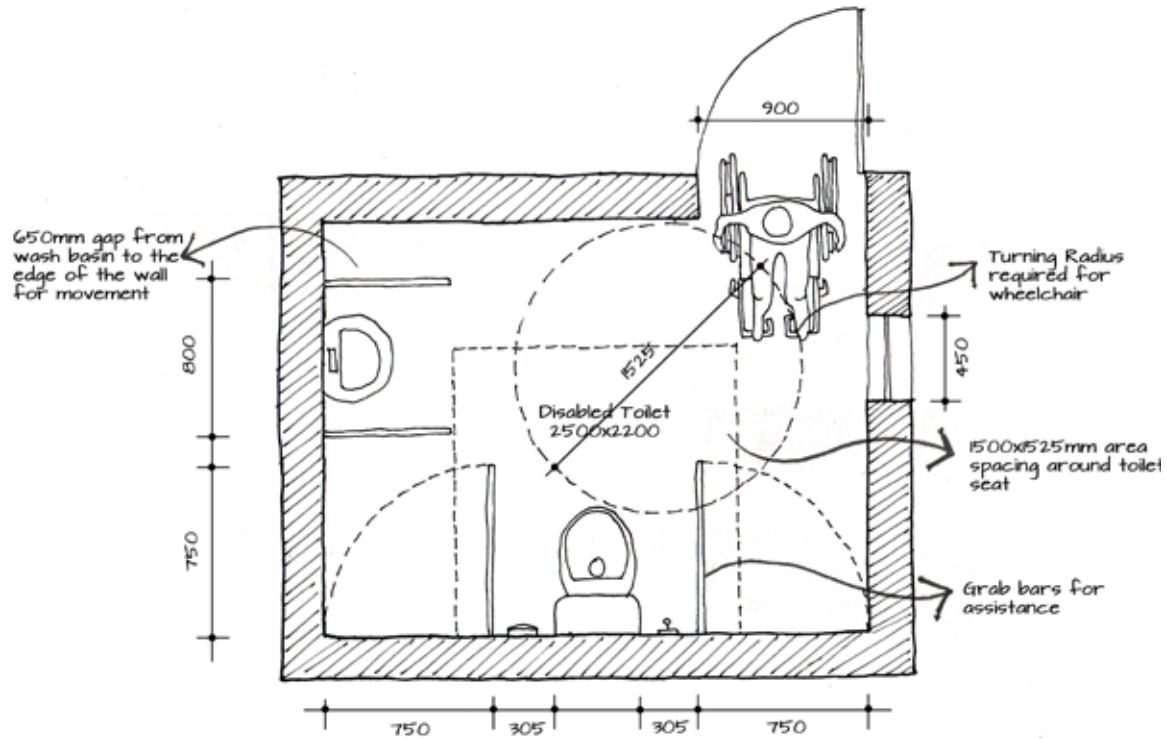


The door of a physically handicapped toilet shall open outwards or have a sliding door

Toilet Design

The minimum size of a disable friendly toilet is 2500 x 2200 mm. The water closet in the toilets can be positioned adjacent to a wall, to provide the aid of a grab rail. The space around the toilet seat that must be provided for turning space is 1500 x 1525 mm.

The door of the toilet needs to have a clear opening of 900 mm, and must have an outward swing or a sliding door, so that it is easier for the disabled person to move inside the toilet and close the door.



Minimum standard measurements for a disable friendly toilet is shown

The toilet can preferably avoid a level difference, and can rather demarcate using difference in the colours of tiles. Suitable arrangement for vertical and horizontal grab rails shall be provided.



The illustration shows the height at which the toilet components are to be fixed for differently abled students

The height of the wash basin from the finished floor level can be 700-750 mm till the top of the fixture.

The height of the urinals can be about 430 mm from the floor level.

The height at which the toilet seat is fixed can be such that it is easy for the disabled person to transfer from the wheelchair to the closet.

Age	Toilet Seat Height	Grab rail Height
Age 3-4	280-300 mm	455-510 mm
Age 6-8	300-380 mm	510-630 mm
Age 9-12	380-430 mm	630-685 mm



Pathways

In a school layout, specific pathways can be planned to provide access for the disabled. Outdoor spaces, grounds, administration block, library, kitchen spaces, sanitary block can all be connected by a clear accessible route.

Minimising levels in between routes can help movement of the disabled person easily.

10. Light and Ventilation

Orientation	432
Openings	434
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Shading Devices	438
Natural Ventilation	442

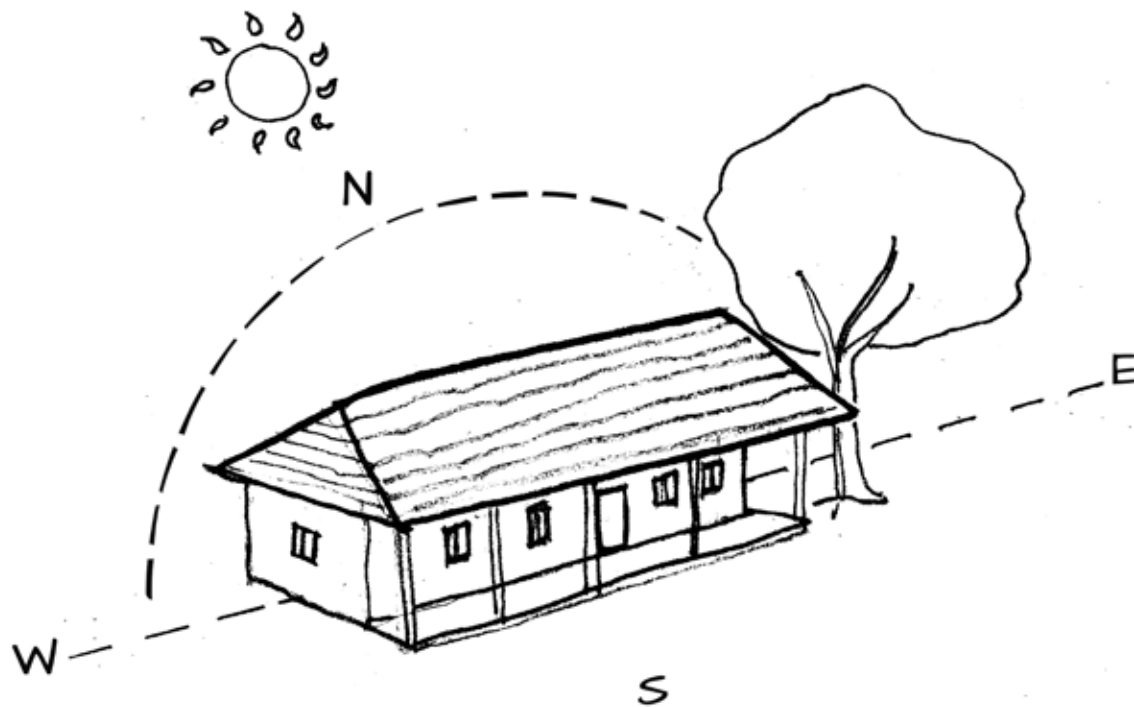
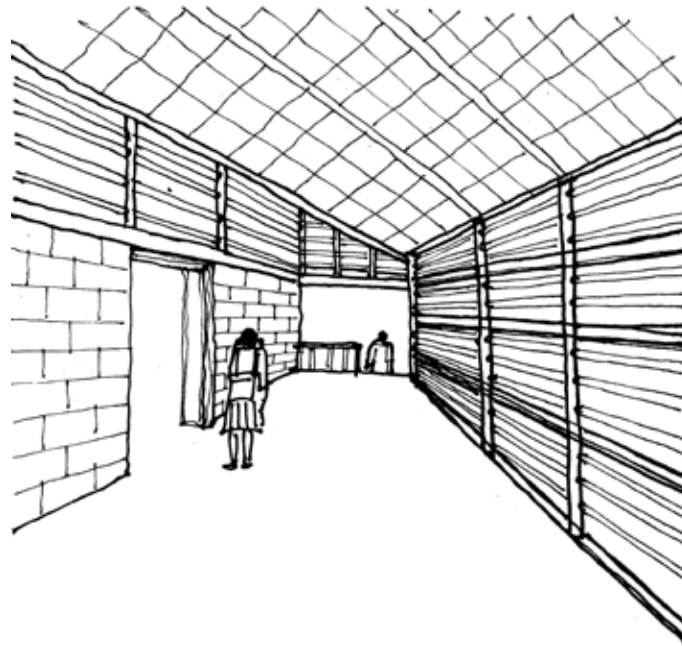


Illustration depicts use of north light for day lighting in schools

Orientation

Buildings elongated along the east-west axis allow maximum daylight from the north. North light is less harsh and less harmful to humans and so is suitable during school hours.

If the buildings have longer facades perpendicular to the east-west direction, the chances of the building getting heated up is higher, because of the sun's rays falling on the longer sides.



Horizontal louvres in a verandah for light penetration into the classrooms

Openings

Windows, skylights and jalli walls can be used instead of full height masonry walls, to bring in ample daylight and ventilation within the spaces.

This reduces the use and expense involved in providing artificial lighting especially

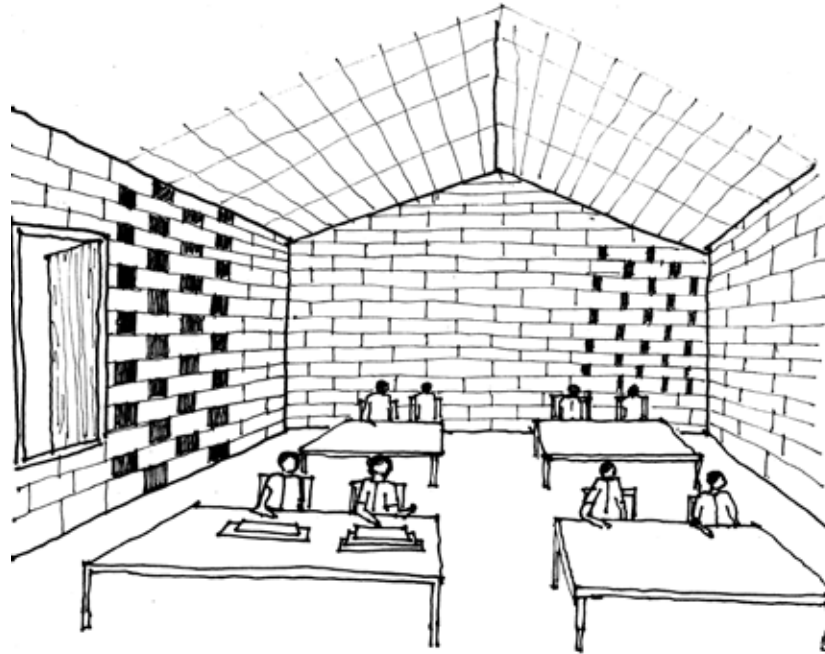


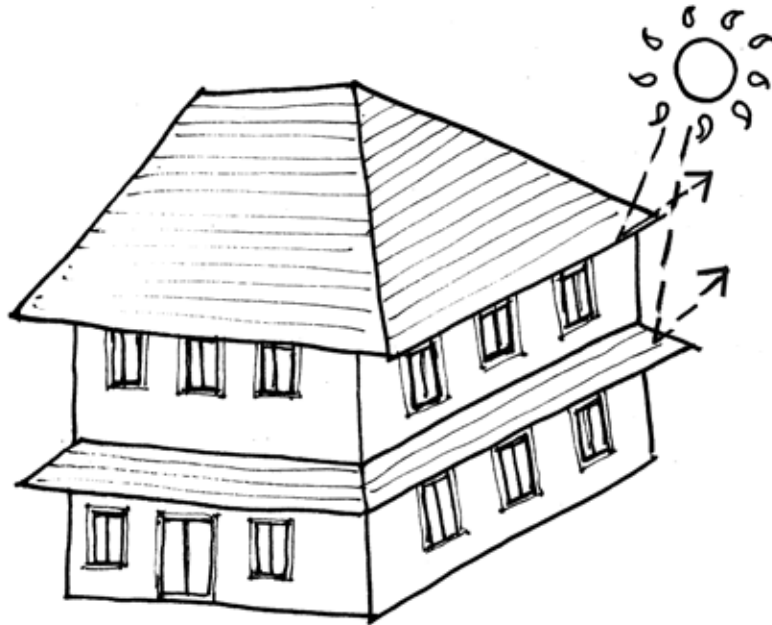
Illustration showing brick jaali walls in classrooms

Jaali Walls

Using cost effective methods like jaali walls, other than windows and other openings can be useful.

It allows air to flow within the room through its openings thus ventilating the rooms, making the interiors more comfortable.

Jaali walls can also be a source for light to enter, providing interesting patterns

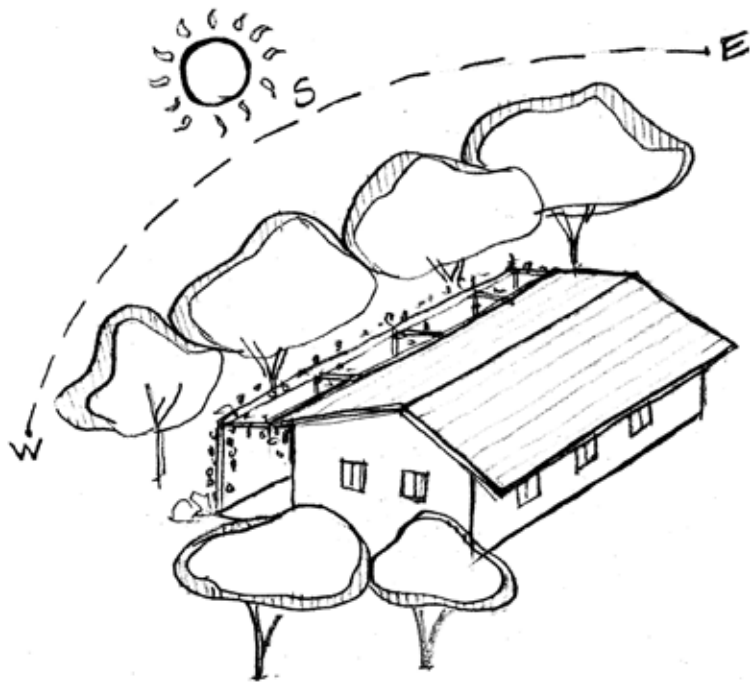


Continuous sunshade will protect the windows as well as walls from sun and rain

Shading Devices

Exterior sunshades act as shading devices and prevent sunlight from falling directly, avoiding glare and sending uniform light into the rooms.

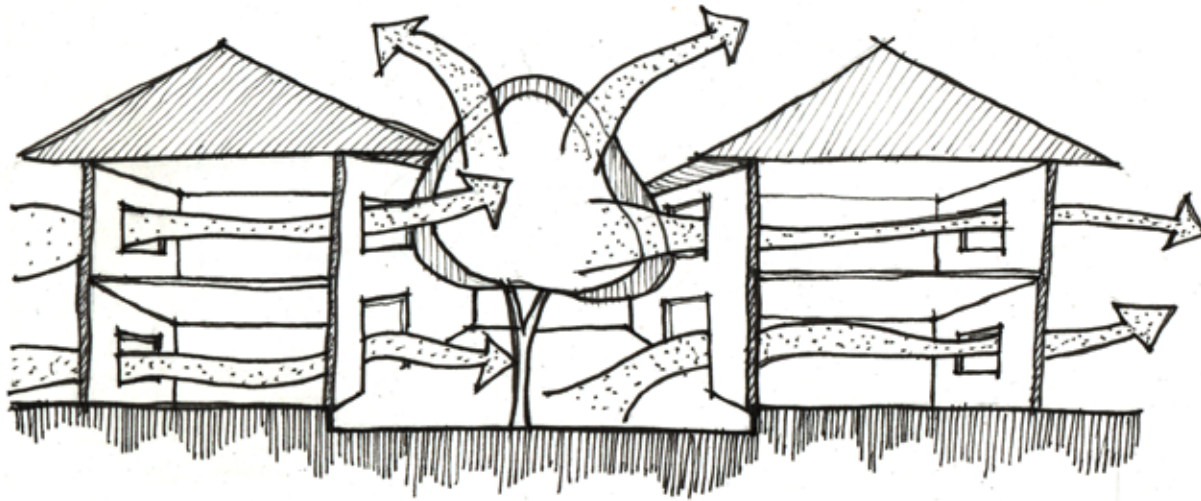
Sunshades are generally provided over openings like windows and doors, though it is advisable to construct a continuous sunshade along the entire wall, avoiding absorption and transfer of heat through the walls.



Trees will protect the building from hot sun making the interiors cool

Trees and shrubs are natural shading elements. Growing creepers on the south walls of the buildings will avoid harsh direct sunlight from entering the rooms.

Thus the positioning of trees in the layout plays an important role in the school.

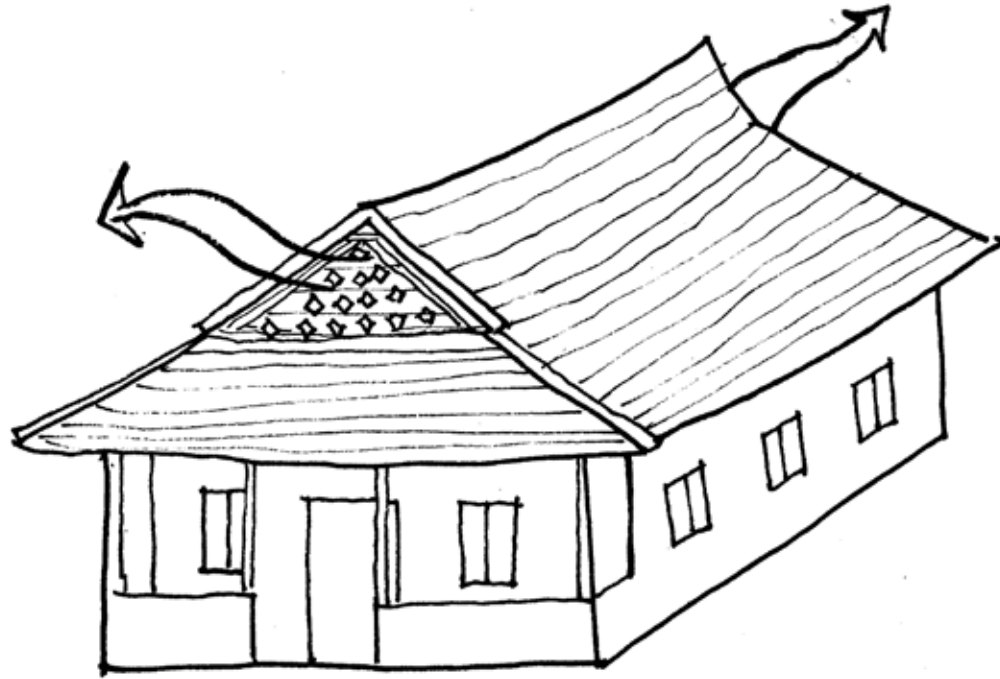


Provision of a courtyard to aid in ventilation

Natural Ventilation

Having internal courtyards facilitates natural movement of air within these spaces, thus aiding cross ventilation.

It also acts as a light well in buildings with a floor wise design.



Illustrations showing openings at the roof level for effective ventilation

Warm air is light, and hence rises up. Cool air which is heavy, enters the space left by the warm air within a room. This helps in having wind movement.

Appropriate openings at the top of the room, or at the roof level, will allow rising warm air to escape, bringing in prevailing cooler winds into the rooms.

This will help in keeping the rooms well ventilated as well as in maintaining cooler temperatures inside.

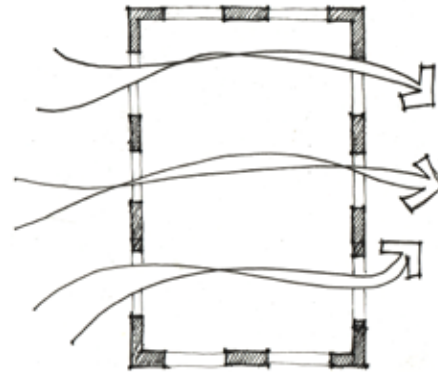


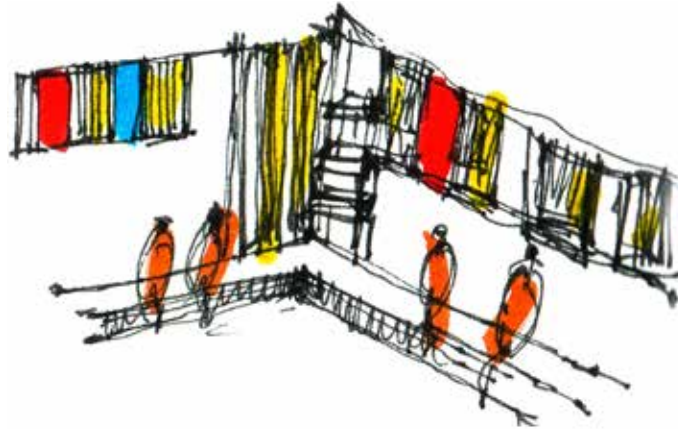
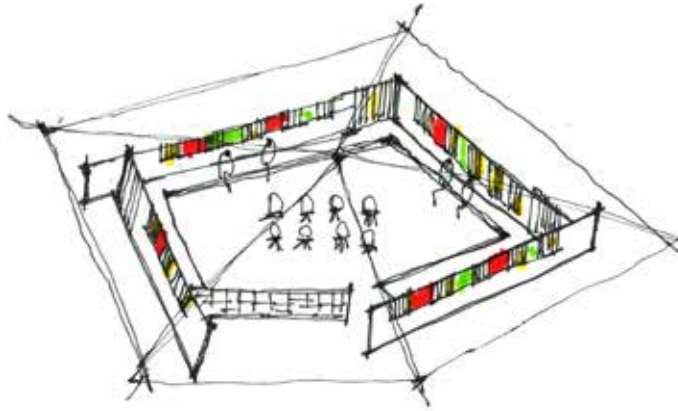
Illustration showing verandahs, openings at the roof, window and door openings for ventilation purposes

The position of openings plays an important role in the school design. The openings should be in the windward direction for the air to get inside, as well as on the opposite wall, for the air to get out. This ensures cross-ventilation and air movement within the spaces.

In a tropical climate like Kerala, with high humidity, air movement gives thermal comfort. This is why, while standing on the beach under the hot sun, one does not feel the heat due to the flow of wind.

11. Design Features

Colour	450
Signage	456

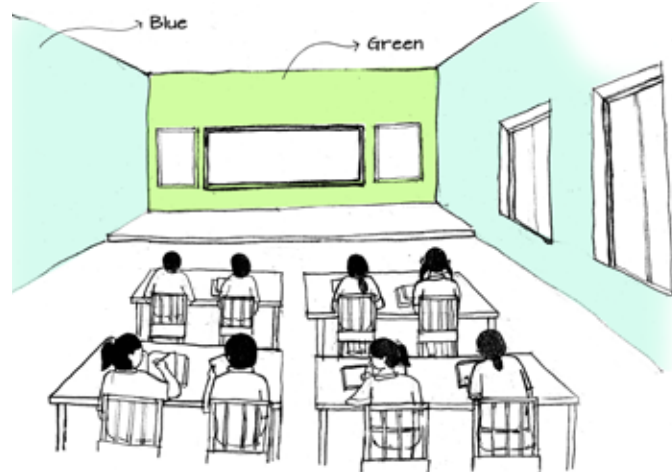
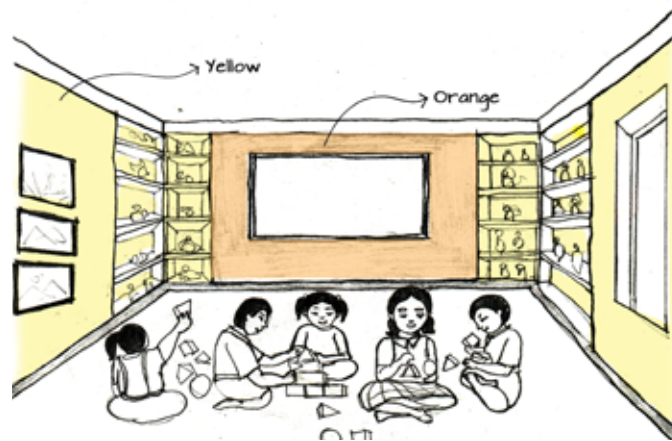


Various colours can be given on the walls of schools

Colour

The interior of a school makes a great influence on the learning experience of a child.

Using colour as a design technique has a psychological effect on children. Colour and light can affect them on a cognitive and physical level. It affects the mood, attention, creativity, feeling of safety and comfort levels in a space.



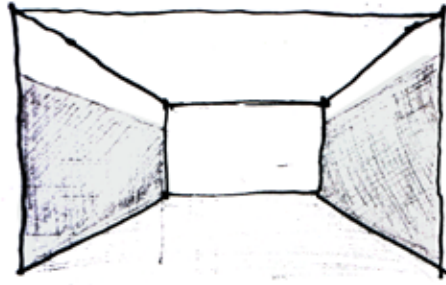
Pre- Primary and Primary

Young children find high contrast or bright colours like orange and yellow stimulating. Yellow increases adrenaline levels, improving spirits of learning new concepts.

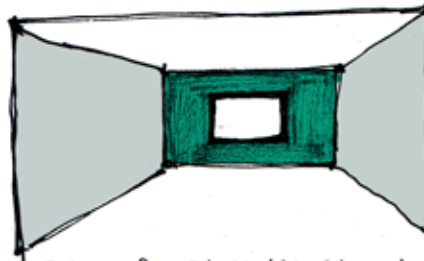
Secondary and Higher Secondary

Adolescent children respond to colours such as blue and green, as they are less distracting and stress inducing.

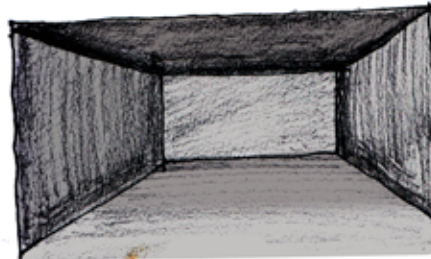
Colour red is said to increase both aggression and appetite and therefore is not widely used in schools.



Ceilings or upper portions of the wall could be white to aid in providing good lighting.



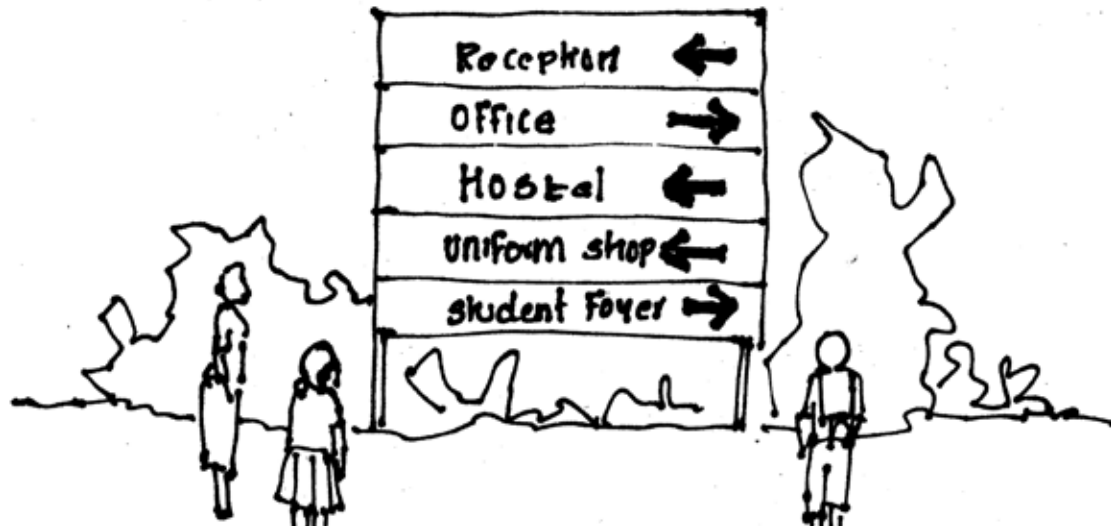
Colour of wall behind blackboard darker, aiding to vision of blackboard



Using dark colours on walls may make the room dull leading to improper vision for the students.

Colours for the Interiors

- Using light colour shades for the interiors makes the room bright with just daylight. Using dark colours on walls may make the room dull leading to improper vision for the students.
- Ceilings or upper portions of the wall could be white to aid in providing good lighting.
- Colors in the front of rooms behind marker boards and projection screens should be darker than in other areas to reduce light reflections.



Signage

The necessity of signage in schools is to orient the children, staff and also the public within a school layout. Signage will help direct them from one space to another, also giving information of all the rooms in that space, activity spaces and other amenities available in the school.

These can be represented by labeling the buildings, showing maps, routes, mile-stones that can be installed within the campus.

The most important blocks that can be mentioned in a school layout maybe, entry, exit points, administration block, classroom blocks, toilet facilities, parking etc.

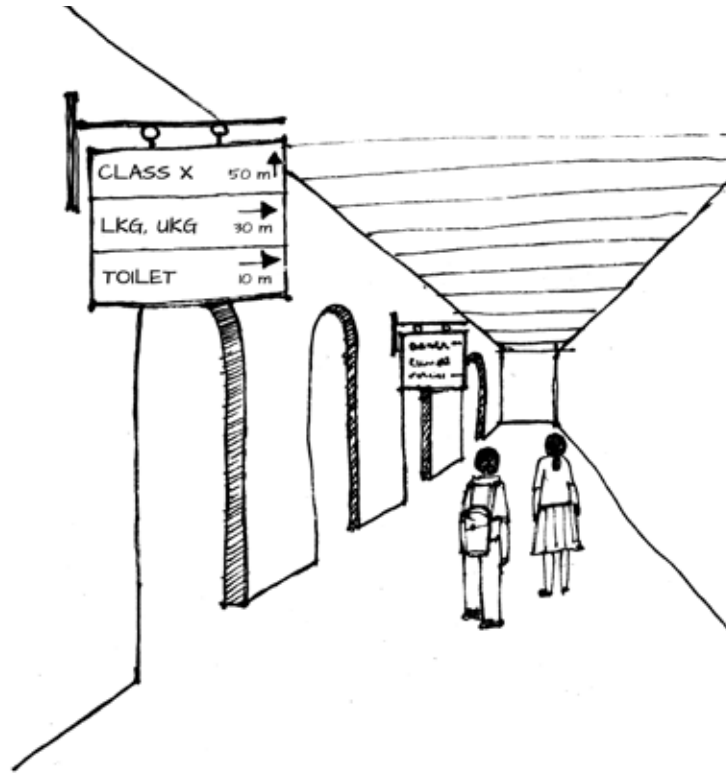


You Are Here maps at the corridor and entrance of the school

“You Are Here” maps can be installed within the campus of the school to help orient students, teachers and visitors.

These maps can be at the entrances, corridors, and at other gathering points within the campus.

This can also be a learning exercise to help children read and understand maps, improving their spatial reasoning skills.



Signage can also be represented on boards, walls, corridors, floors etc. This can be done by mentioning the destination along with the distance.

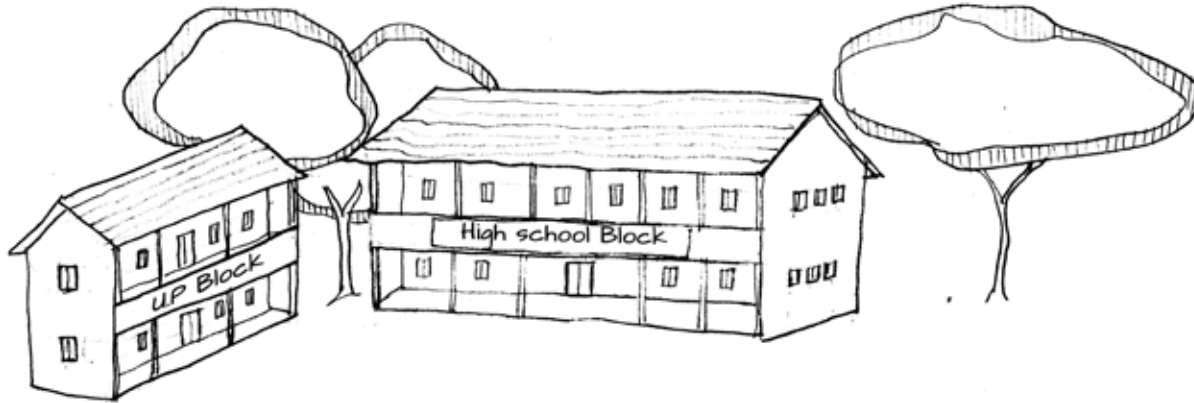
For example, music room is 20 metres away from the classroom. This will help the students to have an awareness about the distances and measurements.



Milestones are one of the methods of signage in schools. Visually well located milestones can act as guides for children to know the distances between various spaces from different points located within the school premises.

It can be given along pathways, corridors, junctions and help children to plan the shortest route to the destination.

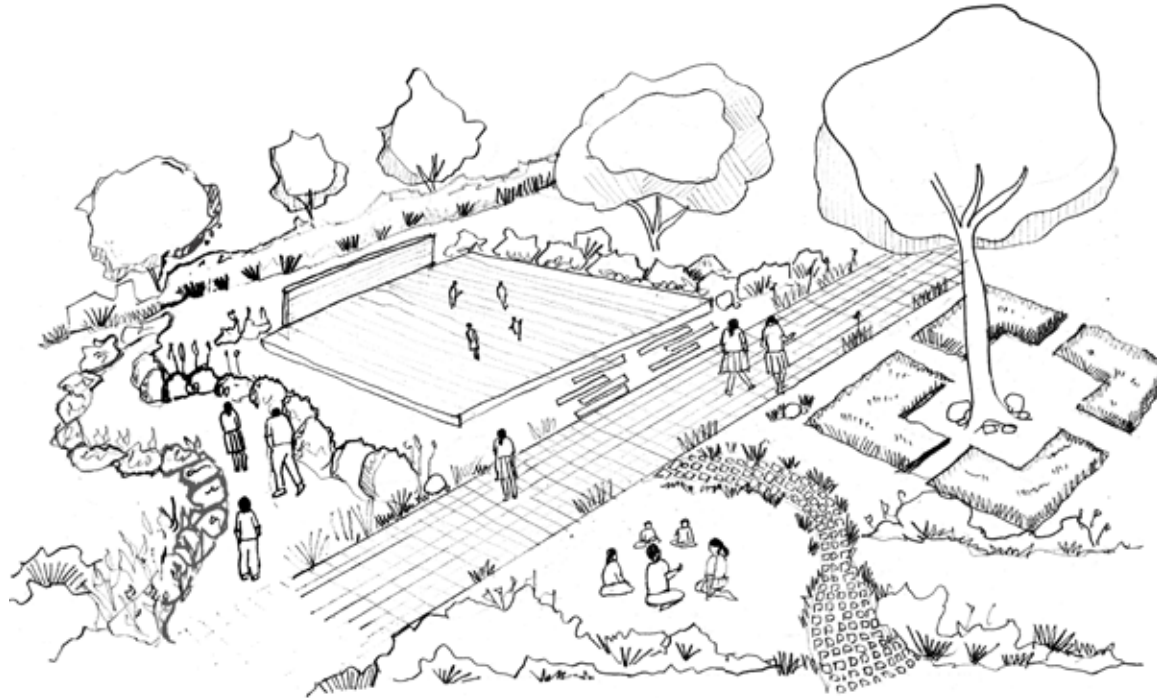
The signage can also be depicted on the structure of the building or elements like columns, dustbins, seats etc.



Labeling of different spaces, buildings, blocks, indoors and outdoors can be done within the school. It is an effective way of helping children locate and relate themselves to their environment.

12. Landscape Design

Landscape as a Learning Aid	474
Botanical Garden	480
Farm School	482
Herbal Garden	484
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Landscape plays a major role in the learning experience of a child.

A school campus not only comprises of the buildings in a school, rather it also involves the design and presence of landscape as well.

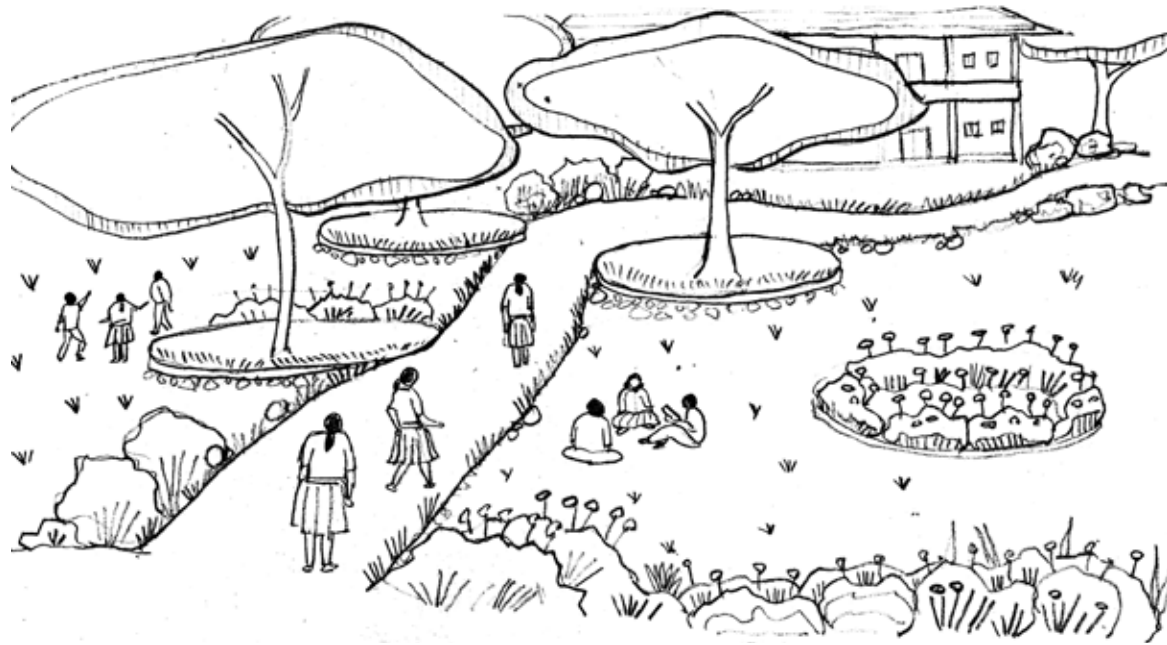
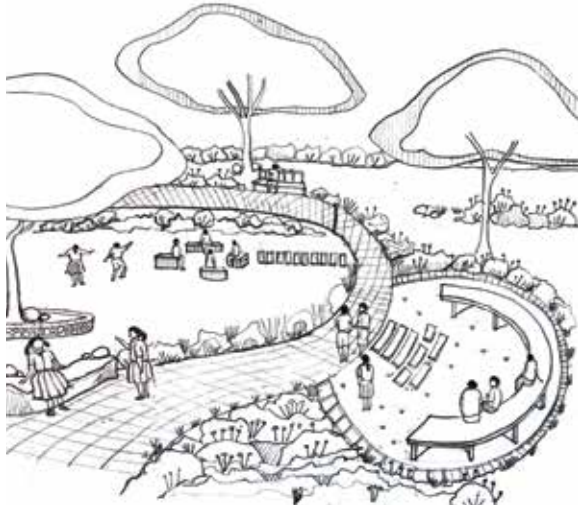


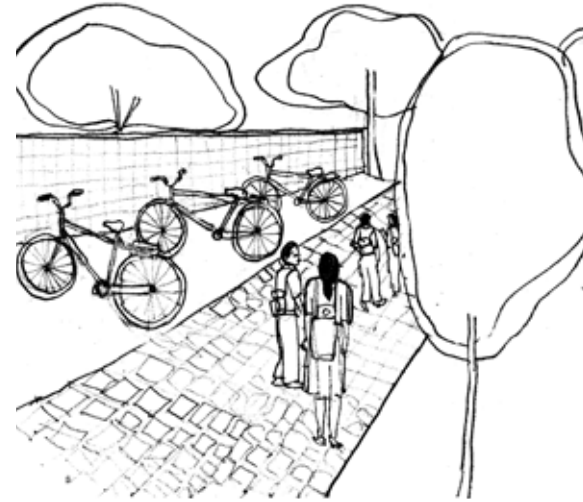
Illustration shows use of different softscape elements like plants, trees, lawns etc within a school layout

Retention of trees, shrubs on the site, and proper selection and placement of new plants, which provide a visual screen, give shade, reduce noise, separate different kinds of activities and also serve as play elements.

These spaces provide convenient movement patterns, as well as places to study and relax.



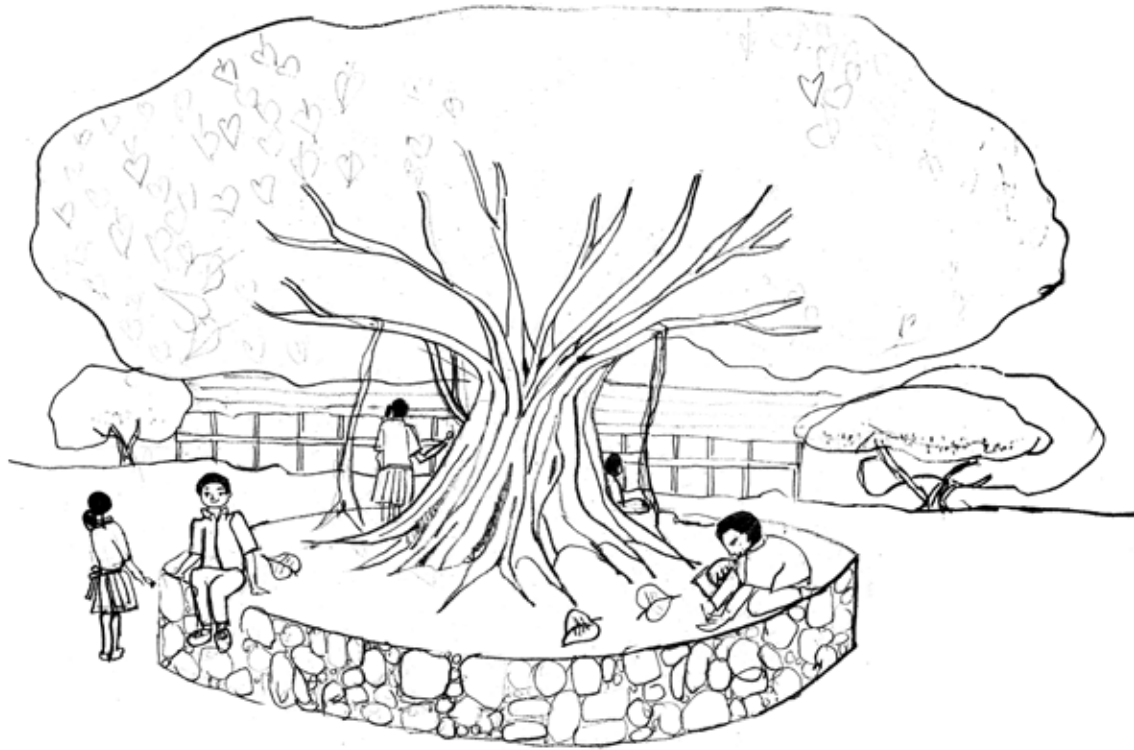
Elements like pathways, outdoor seating, stepping stones etc. within a school layout



Provision of sidewalks next to vehicular pathways

Solid elements like paved areas, driveways, pathways, retaining walls, stairs, fences, outdoor furniture etc. can be planned within the school layout.

Natural feature on site like wooded areas, stones can be retained and used for seating. Sidewalks can be provided in schools, to avoid students from accessing the vehicular roads. Since children tend to walk in groups, the sidewalks on a school site can be about 1500 to 2400 mm wide.



Various uses of a banyan tree, giving shade, seating, and the use of roots as play elements

Landscape as a Learning Aid

- Shading elements - Giving natural shade.
- Learning elements - gaining knowledge about the trees, species and their nature.
- The seeds of the plants can be used for playing games.
- Fruit or flower bearing trees can be of use.



Children observing various trees that grow in different seasons

Seasonal trees can be planted within the school campus. This will encourage children to learn about the trees and automatically recognise the seasons.



Waste water channeled towards plants and shrubs

A place to grow flowering plants can be introduced in the beds near drinking water points, or taps. They may thrive on runoff waste water.

Instead of creating puddles, such channels can be provided to water the plants.

Source - Building As a Learning Aid



Botanical Garden

Botanical gardens generally comprise of gardens which display a wide variety of plants of different nature.

Flowering plants, fruit bearing plants, seasonal plants etc can be grown and studied. These can be appropriately labeled with local and botanical names for children to learn.



Children learning to farm, cultivate and harvest vegetables in schools

Farm School

Implementing farming activities in schools will involve training students in agricultural practices, teaching them to grow, cultivate plants or crops, maintain them and harvest them.

Workshops related to small farm management, basic courses in fruits and vegetable cultivation may be organised.

Students develop basic skills to bring a garden to life with fresh, seasonal vegetables and crops, and enjoy crafting, cooking, nature exploration, along with other hands-on activities.



Children learning about some medicinal plants grown within the school campus

Herbal Garden

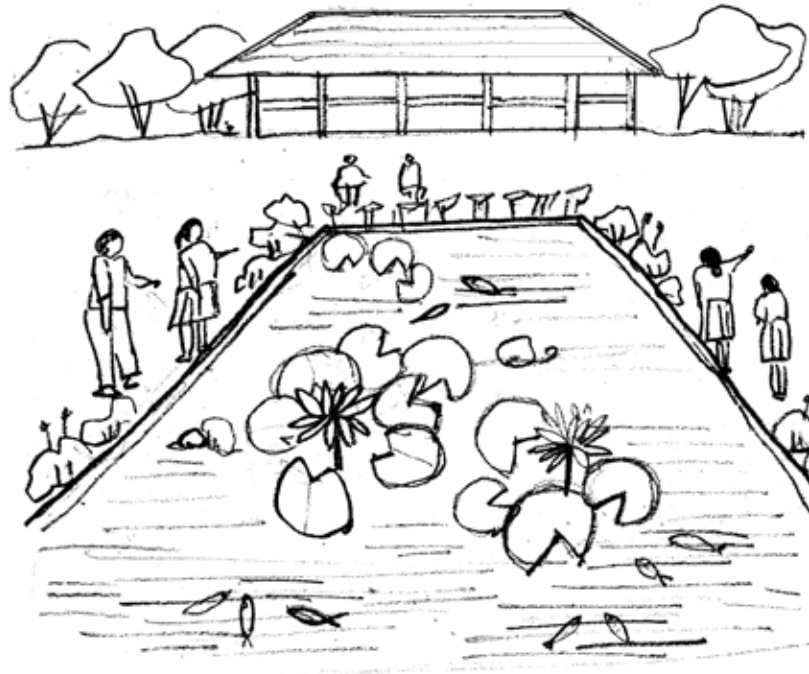
Medicinal plants can also be planted in the farm activity spaces. Benefits of a

medicinal plant farm:

- Teachers and students study and acquire basic knowledge of the medicinal plants available locally.
- It will help students recognize some species of herbal plants and their medicinal properties and uses.

Plants like Tulsi, Senna, Nelavemu, Ashwagandha, Neem, Turmeric, Vayambu, Aloe Vera etc. can be planted.

Information boards can be prepared by students on details of plant names, its medicinal use, plant cycles, growth seasons etc.



The illustration shows a pond with water plants, fish etc

Aquarium

Plant and animal behavioural patterns can also be observed and studied by implementing aquariums in the school layout.

One of the methods of executing an aquarium may be by rain water harvesting tanks. These tanks, that are filled naturally by rain water, can be placed in the outdoors under observable environments where aquariums can be installed.



Butterfly garden in a school campus

Butterfly Garden

Another variety of animal species that can be studied within secure school environments can be butterflies.

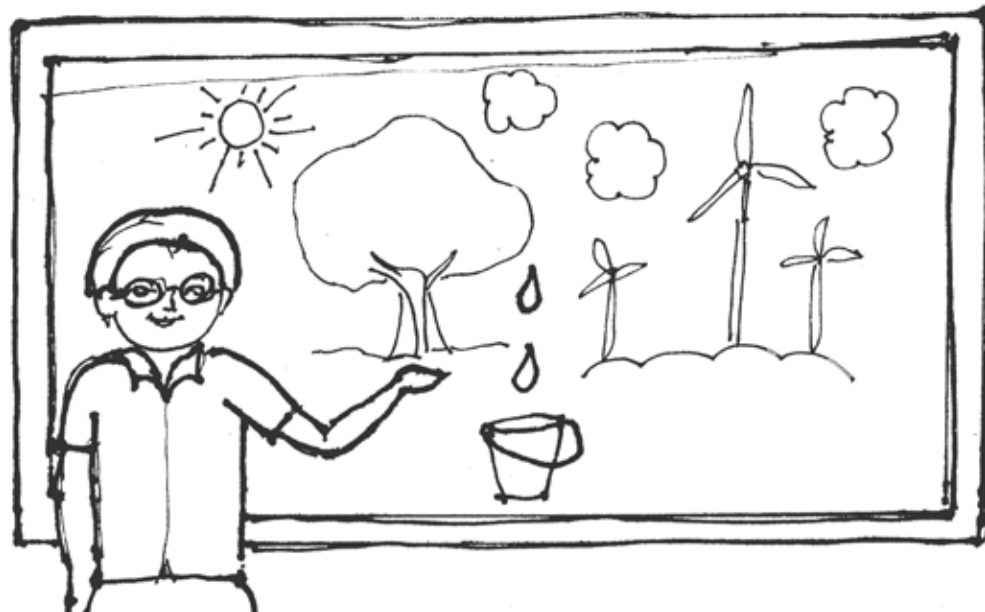
Butterflies have short life cycles and also react quickly to environmental changes, making it easy for children to study and understand them.

They are also colorful organisms that encourage children to be playful by running around to catch hold of them.

Children will be able to observe and explain animal behaviour and interactions between plants and animals.

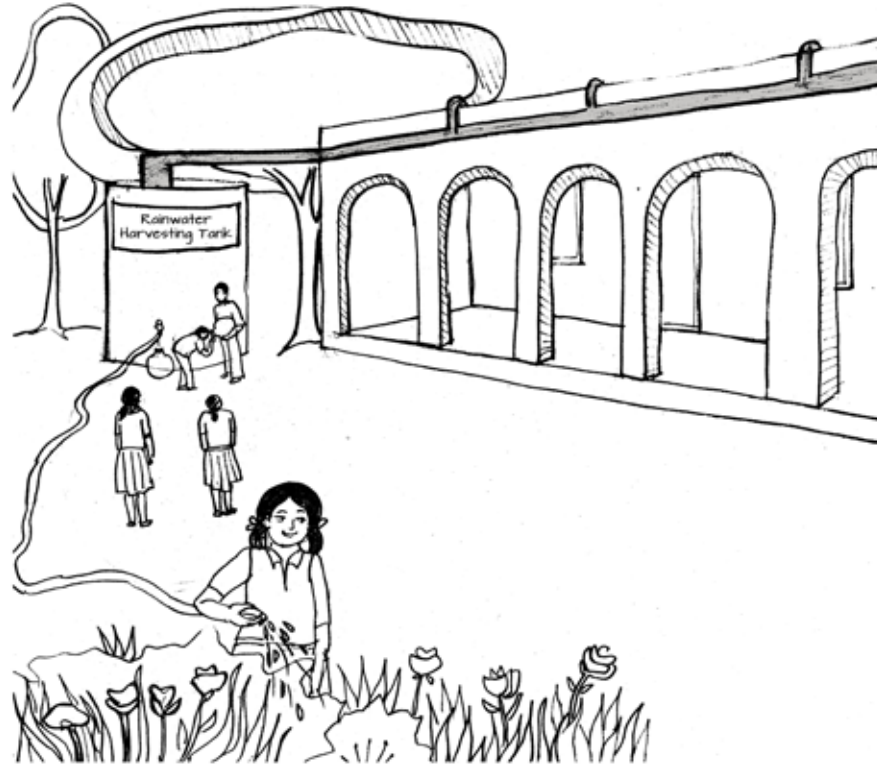
13. Sustainability

Rain Water Harvesting	494
Solar Panels	496
Segregation of Waste	500
Biogas Treatment	510



Sustainability is a practice that seeks to minimize the negative impact of buildings on the environment by efficient and moderate use of materials, energy, and development of space.

The idea of sustainability is to ensure careful use of resources for today, as well as maintaining it for the future use. Some of the concepts discussed can be executed in the school layout such as rain water harvesting, solar heating, compost pit waste disposal etc.



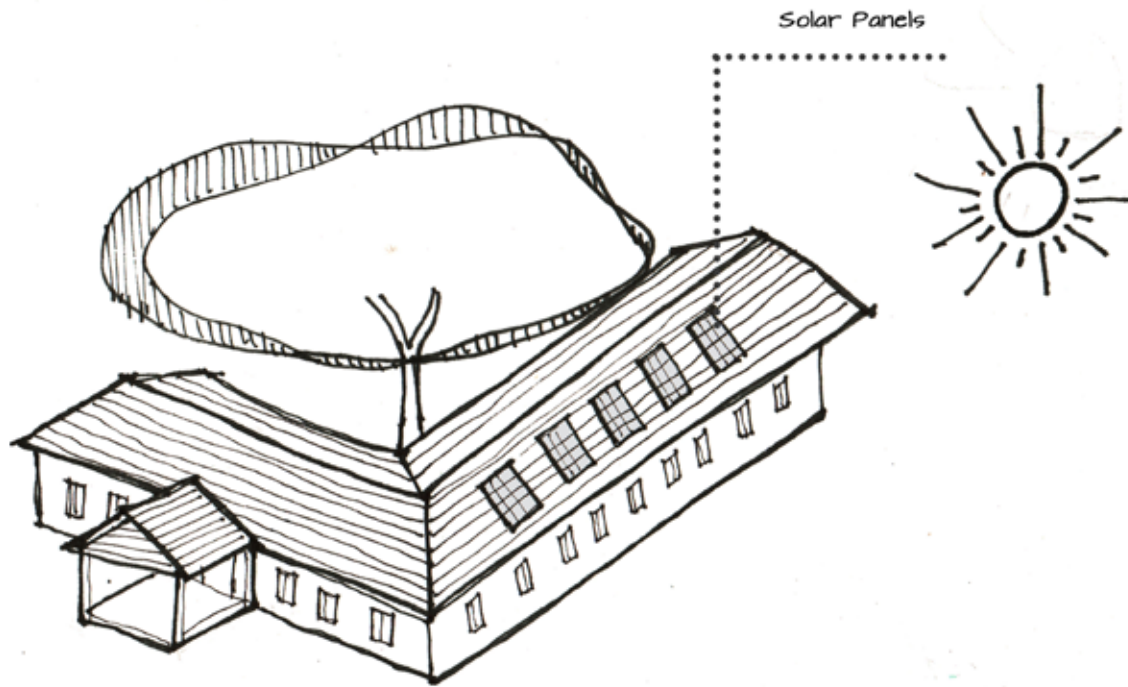
Collection and use of rain water for irrigation

Rain Water Harvesting

Rain water harvesting is a technique of collecting runoff water from the roofs. This water can be stored for school purposes.

The water collected from the gutter can be channelled to a storage tank, which can fill every time during rains.

Otherwise, the water can be directed towards the ground for groundwater recharge.

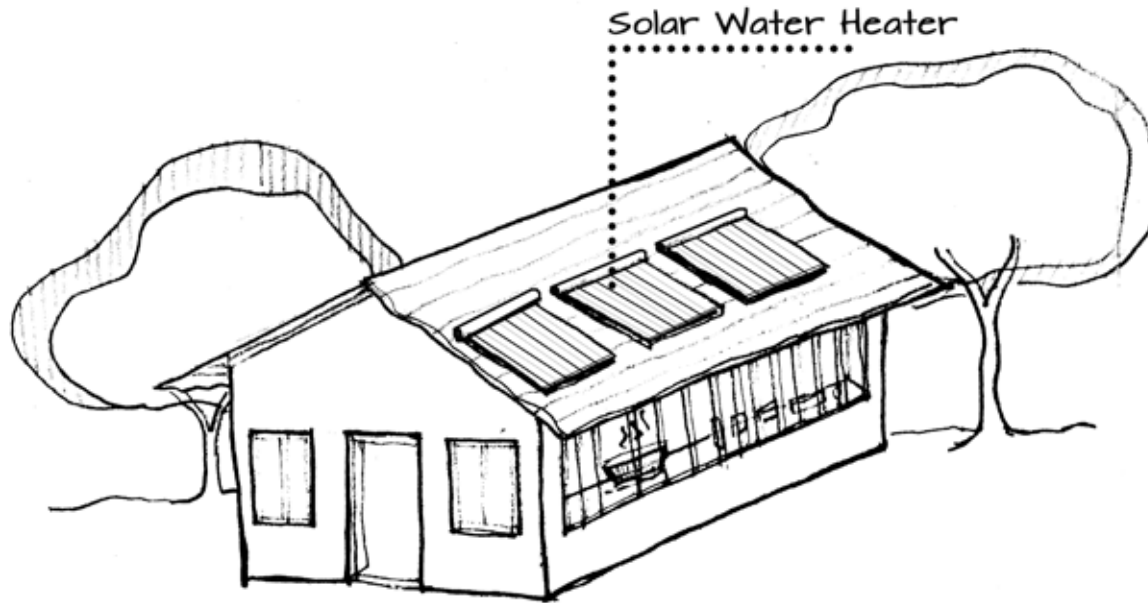


The illustration shows use of solar panels in schools

Solar Panels

Solar panels are designed to absorb the sun's rays as a source of energy for generating electricity.

The photovoltaic system supplies solar electricity, which can be utilized for school purposes.



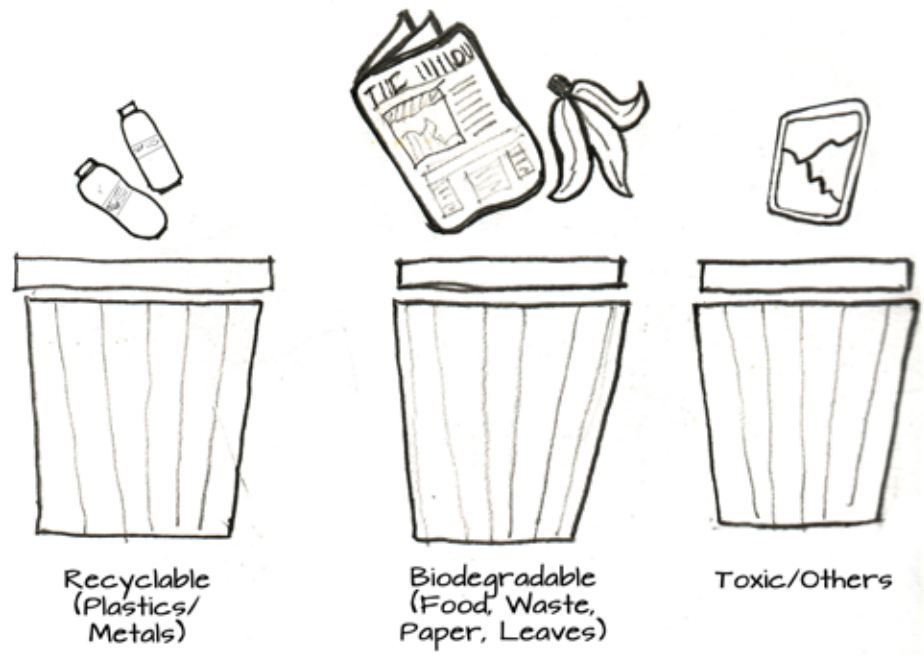
Use of solar panels for solar water heater being used in the school kitchen

Solar Water Heater

Since cooking in schools is done in a large scale, the solar heater gives hot water for bulk cooking purposes.

A solar water heater consists of a collector to collect solar energy and an insulated storage tank to store hot water. It can be installed on roof-tops, building terrace and on open ground where there is no shade.

Around 60-80 degree Celsius temperatures can be obtained on clear sunny days. It has a life span of about 15-20 years and almost no running cost for the hot water.



Segregation of waste in schools

Segregation of Waste

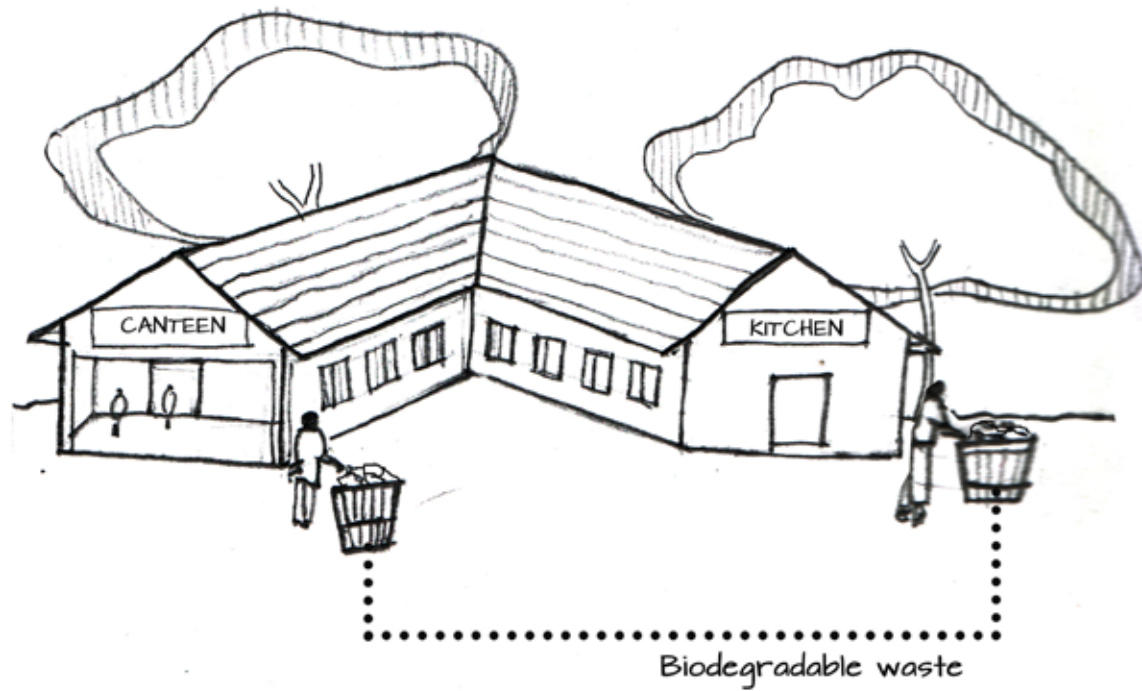
Waste produced in schools can be segregated so as to recycle, reuse or dispose them with ease.

Some waste materials are harmful to the environment, hence it is important for the schools to be aware of the kind and amount of waste produced.

Waste can be :

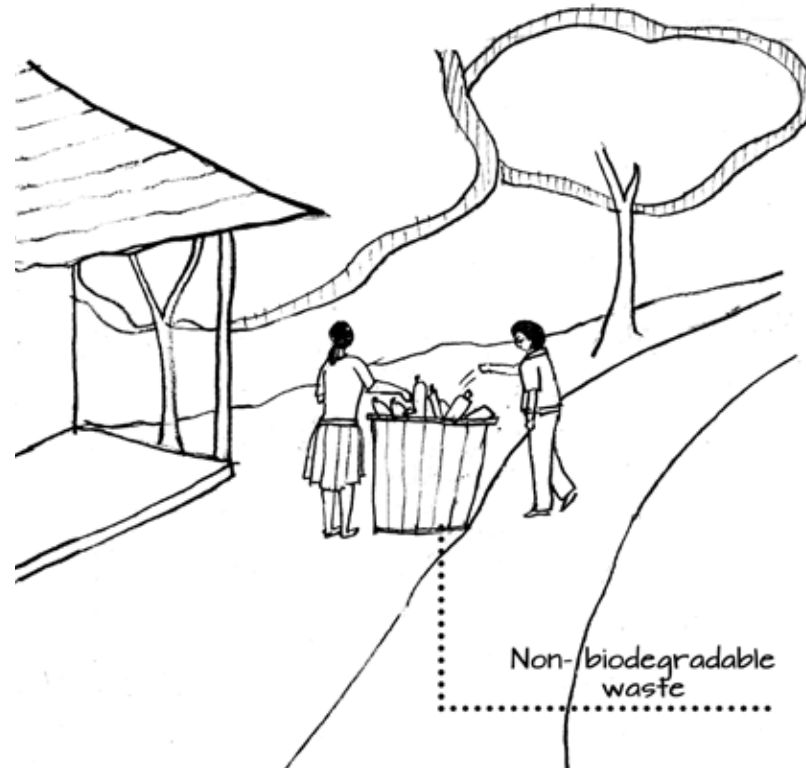
- Biodegradable waste
- Non-biodegradable waste
- Toxic waste

The bins or containers can be kept throughout the campus for efficient disposal of the waste within the school. This will also encourage children to segregate the waste at home.



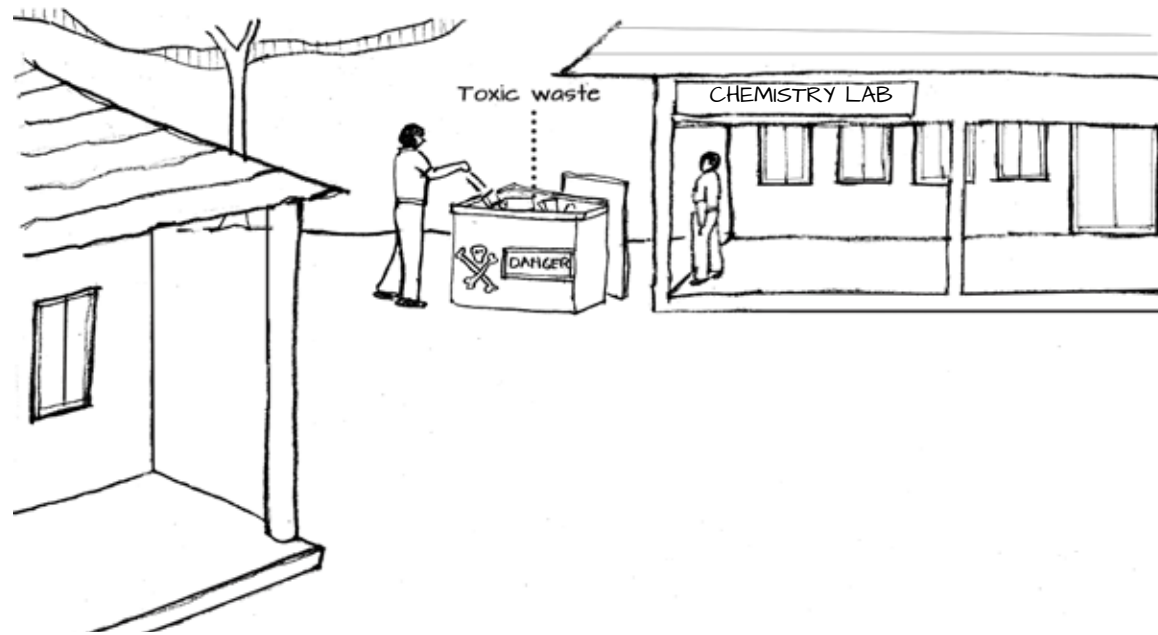
Biodegradable waste includes organic waste like kitchen waste, vegetables, fruits, flowers, leaves from the garden, paper etc.

Waste is further distinguished as wet and dry waste. Wet waste, which consists of leftover foodstuff, vegetable peels, etc., can be put in a compost pit and the compost could be used as manure in the garden.



Unlike biodegradable waste, non-biodegradable waste cannot be dissolved and decomposed by natural agents.

Some dry waste like cans, aluminum foils, plastics, metal, glass etc. are non-biodegradable waste products that can be recycled.



Careful disposal of toxic waste from the chemistry and computer labs in schools

One can also keep a bin for toxic wastes such as chemicals from labs, medicines, batteries, dried paint, old bulbs, etc.

Construction wastes, electronic and E-waste are some of the non recyclable wastes produced that may need to be disposed with care.

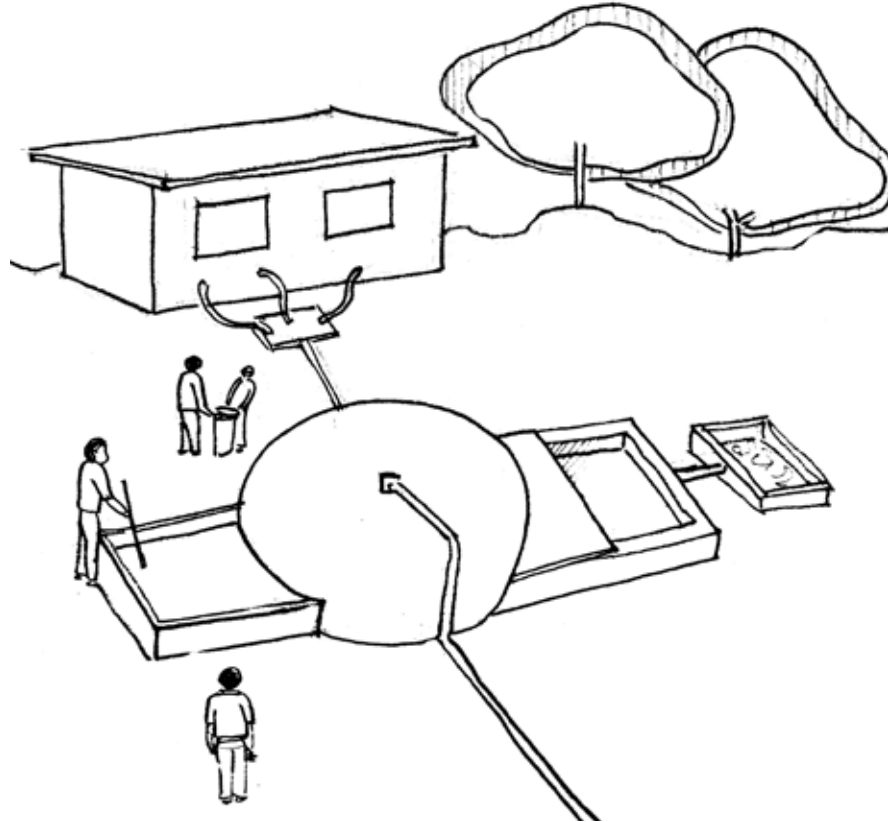
Each of these can be segregated and disposed separately. A bin for different types of waste products along with special hazardous waste bins can be provided in schools, to safely dispose the toxic wastes and to carefully use the resources available (by recycling).



Use of stainless steel plates in the café instead of disposal paper plates and cups, will

Some waste reducing tips :

- Encourage reuse of office supplies, i.e. paper clips, rubber bands and brass fasteners, etc.
- Requesting suppliers to deliver products on pallets or in metal drums and take them back.
- The cafeteria can switch to reusable utensils and dishes instead of throw away whenever possible. This reduces the amount of waste produced.
- The possibility of switching to refillable containers for milk and juice can also be taken into consideration.
- Disks, CD's, toner & printer cartridges, etc. can all be reused.



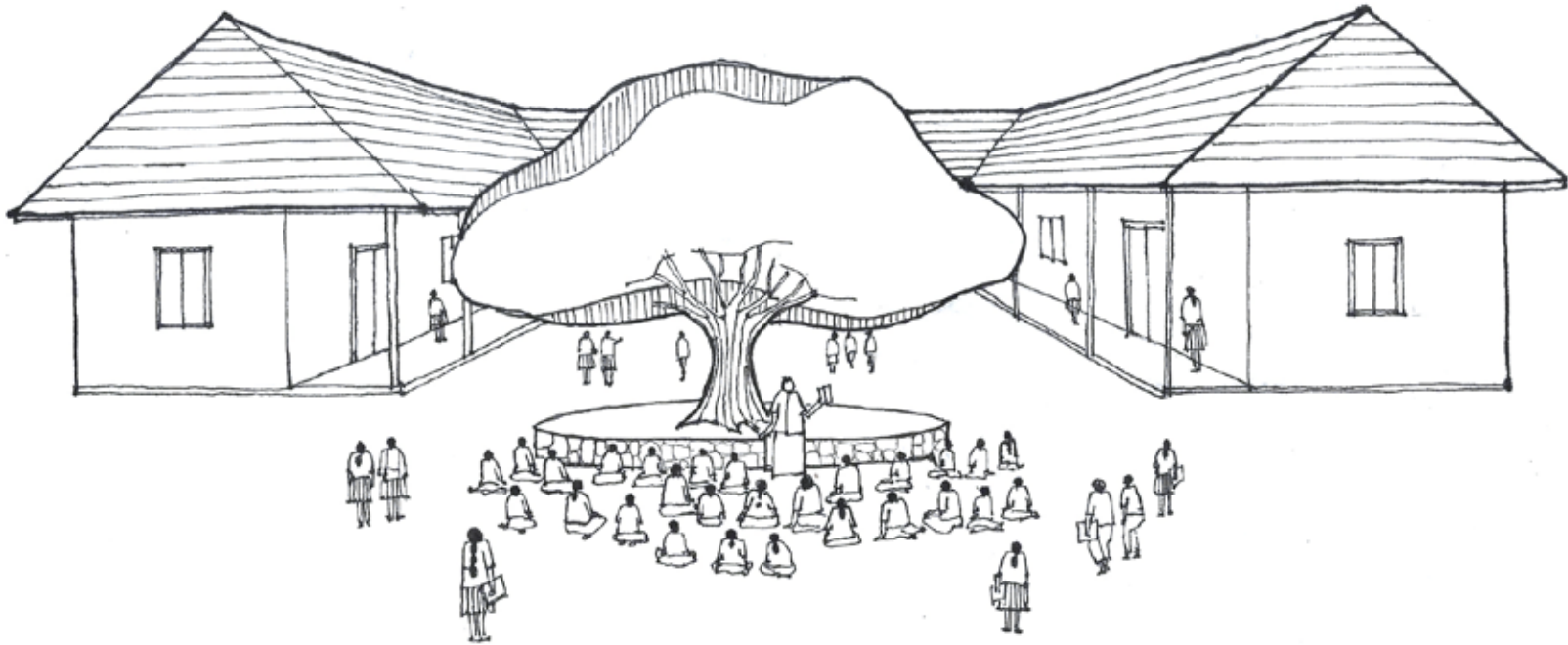
A dome shaped biogas treatment plant

Biogas Treatment

The biogas plants would generate methane from the waste on the school premises.

The biogas would be used in school kitchen to cook food for children, while the sludge obtained as a by-product could be used as organic manure for the vegetable garden.

A dome shaped biogas plant is preferred in schools as it combines all the components in one unit, including the gasholder, thus reducing maintenance requirements.



Benny Kuriakose
Flat F, Springwoods Apartments,
No: 6, Ranjith Road,
Kotturpuram, Chennai - 600 085
Phone : 044 - 24471172, 24474794

info@bennykuriakose.com
www.bennykuriakose.com