



# ARCHITECTURAL DRAFTING & DESIGN

## Handout

- for DT 212 of Marikina Polytechnic College



*For the exclusive use of Marikina Polytechnic College*

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## Planning & Designing

A master plan of a house or any structure is also the designer's prescription based on the wants and need of his client.

A master plan is defined as a visual presentation of conceptual ideas supported by mathematical calculations aimed at giving convenience and comfort to the users or occupants. A good plan however, are those that are functional and economically designed adhering to the principles of "Form Follows Functions".

**Sound Planning Considerations** include:

1. Distribution
2. Circulation
3. Light and ventilation
4. Sizes, areas and shapes
5. Orientation
6. Zoning laws
7. Height
8. Electrical and mechanical facilities
9. Location of doors and windows
10. Superstition

**DISTRIBUTION.** Refers to the placement, location and arrangement of each room unit in relation with each other as to functions and coordination. One particular example is the relation between the dining and the kitchen which primarily requires accessibility on food servicing. These area units are interrelated and should not be far from each other. To make the handling of meals easy, the sequence of food preparation should be provided for in the layout of the kitchen and its equipment. Three work centers are necessary: the mix center, the sink center, and the cook center. Supplies and equipment for use at each center should be stored close at hand. There is a direct path between the work centers, forming a work triangle by which the efficiency of a kitchen can be judged. The sum of the distances between the work centers should not be less than 3.5 m. and not more than 6 m.

Costs can be minimized by locating the bathroom, kitchen, laundry, or washroom back to back or one above the other.

**CIRCULATION.** Circulation and movement of the occupants inside the building should not be hampered by any obstacles nor be detoured as a result of poor planning.

**LIGHT and VENTILATION.** There is no substitute for a good daylight and fresh natural air entering and circulating inside the building. Artificial lighting and ventilation is very costly to those who cannot afford, but others prefer it for maximum comfort regardless of costs. The design therefore, depends upon the likes and preferences of the owner.

*Rule VIII of the New NBC under the 2005 Implementing Rules & Regulations (No.8)*

“Rooms intended for any use not provided with artificial ventilation shall be provided with a window with a total free area equal to at least 10% of the floor area of the room but not less than 1.00 sq.m. Toilet and bath rooms and laundry rooms shall be provided with window with an area not less than 1/20 of the floor area but not less than 240 sq.mm. Such windows shall open directly to a court, yard, public street or alley or open watercourse.”

**SIZES, AREAS and SHAPES.** All rooms are intended for human use, and therefore should be planned according to human scale. Good design always provide ample areas to accommodate furniture, appliances, and other related facilities, including the most critical and important lanes or pathways for routinary movements inside the house. The shape as to plan and elevation should be strictly functional, not fancy in character.

*Rule VIII of the New NBC under the 2005 Implementing Rules & Regulations (No.7)*

Minimum sizes of rooms and their least horizontal dimensions shall be as follows:

1. Rooms for human habitation “ 6.00 sq.m. with a least dimension of 2.00 m.
2. Kitchen “ 3.00 sq. m. with a least dimension of 1.50 m.
3. Bath and Toilet “ 1.20 sq. m. with a least dimension of 0.90m.

When we say least dimension, it does not mean to limit the additional length or width the owner may want.

**ORIENTATION.** Refers to the position and direction of the sunrise and the sunset. It also includes the prevailing wind directions in the area for the year round. The kitchen laundry and bathroom is better oriented west for sunlight kills many types of bacteria.

**ZONING LAWS.** The zoning ordinance should be consulted first before deciding on the final site of the house or building. You might be constructing your residential house on an industrial or commercial zone. Of course, the family would be very happy if the house is constructed in residential areas provided with the right facilities like; market , school and playground for school children, church, etc.

**HEIGHT.** A moderate height ceiling allows fresh air circulations, comfortable atmosphere, and preserve aesthetic value of the room. Room with low ceiling, has warm atmosphere that requires artificial ventilation.

*Rule VIII of the New NBC under the 2005 Implementing Rules & Regulations (No.6)*

Ceiling Heights

- (1) Habitable rooms provided with artificial ventilation shall have ceiling heights not less than 2.40m. For buildings of more than 1 storey, the minimum ceiling height of the first storey shall be 2.70 m, for the second storey, 2.40 m. and for the succeeding storeys, 2.10 m. Above-stated rooms with natural ventilation shall have ceiling heights of not less than 2.70m.
- (2) Mezzanine floors shall have a clear ceiling height of not less than 1.80 m above and below it.

**ELECTRICAL LAYOUT.** Although this facility maybe considered secondary aspect in planning residential house, was included because common errors were committed when the location of the switches and outlets are not properly in-placed.

The location of convenience outlet should be planned simultaneously with the appliances to be placed on. The extension wire for appliances is the most unsightly obstacle in the room due to improper location of convenience outlet.

An ideal convenience outlet is installed 30 centimeters above the floor line , and not more than 1.00 meter away from the appliance to be served.

A satisfactory electrical layout and installation, is when you avail of its services without the need of an extension cord. Switches should be installed near the door of every room for convenience in switching-in and switching-off when entering and leaving the room respectively.

**LOCATION of DOORS.** When a door becomes an obstacle creating inconveniences to the occupant, that is the time we realized the mistake of not analyzing its proper position from the early stage of planning.

Avoid having the front door open directly into the living room. This causes draughts eliminates privacy, and increases traffic wear. Use a room divider, a wall or a closet to create a vestibule effect.

**SUPERSTITION.** *“Beliefs which are puzzle to architects and engineers; but in deference to Filipino tradition – and Filipino homeowners – adhere to them”.* If your client believes and insist that his life success depends on luck brought about by his superstitious belief, then as a planner, you have no choice but to do what your client says, if you do not want to lose your bread and butter.

#### Some Folk Beliefs About House Construction

- **House Construction:** Don't start the construction of a house at the period when the moon is waning( entering its last quarter). Pick a time on or about a full moon. Also start construction on Monday ; never on a Friday.

Avoid starting construction when the year is about to end(“kawitang-palakol,” the old folks call such period). A better time is when the year has just begun- January to June.

Never have a house built when your wife is pregnant, and is expected to give birth at the very month.

Before giving the order to lay the foundation or put up the posts of your house, make peace with your enemies- especially those belonging to your own family or clan.

Before cement is poured to the foundation, one-peso coin should be dropped inside the forms. Again this brings good luck.

When the first post is about to be put up, or when cement is being poured to form the first wall, or when the first row of bricks or hollow blocks is being laid-in short, when any vertical part of the house is being erected- the father or the eldest member of the family should be present to witness. This contributes to the solidity of the house.

Do not build a house on a lot which is perpendicular to the street (“tumulumbok sa kalsada”). If space still allows it, locate the house such as it lies in position which is at an angle with the street. This way, the inhabitants keep out of the way of the disaster.

No part of your house should cover or overhang an anthill (“punso”- Magagalit daw ang mga nuno sa punso na nakatira dito).

No part of the house should cover or overhang a site of a recently-cut tree; neither should the house overlap any position of the old house.

- **Materials:** Never use materials that once belonged to a church, or those that are more often to build churches rather than ordinary houses. Also, as much as possible avoid using materials that came from owner’s old house. “Ang malas daw ng lumang bahay ay maililipat daw sa bagong bahay.”

All nails and screws that become bent in the process of building a house should be kept in a box and not left lying around. Leaving them scattered will bring misfortune to those who are involved in the construction.

It is taboo to use wood the sap of which is still fresh- what they call “weeping” wood (“lumuluha”)- especially the kind which they call *mayapis* or *palosapis*.

- **Posts:** The number of the main posts should always be even , not odd. Definitely, never 13!
- **Floors:** Flooring planks-whether of wood or of bamboo- must be laid parallel to the steps of any stairway. “Huwag patumbok o pahulog dahil di umano, ang biyaya ay laging mananaog sa bahay.”
- **Roof :** The longer length of the roof must lie parallel to the road instead of perpendicular to it.
- **Stairs:** The number of steps in every flight of stairs must fall to the count of either oro or plata in the sequence of oro- plata- mata ( gold, silver, death ) counting each step. This means prosperity and good luck to the dwellers. When the number of steps correspond to the count of mata, bad luck or poverty is to be expected – from Spanish belief. In the same manner, the Chinese also believe the sequence of good-good-bad-bad.
- The principal steps should face east, so the rising sun may shine on them. To the Muslims , the principal / prayer room and the stairway should face the direction of Mecca.
- **Doors:** Doorways should not face each other along a straight path. They should lie on a staggered path . Good fortune flows quickly out of the house in the first arrangement.
- Do not occupy a new house until it is completely built or blessed.

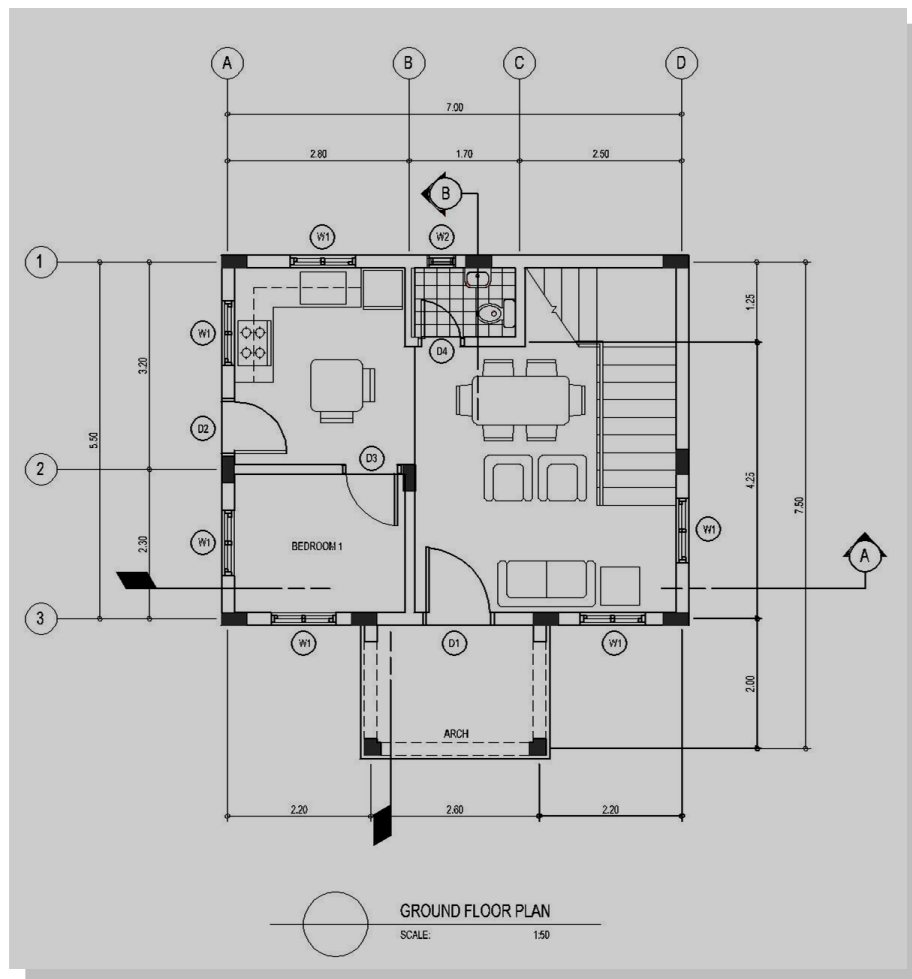


# Architectural Drafting

Working drawings are prepared by an architect for a construction project, e.g., plans, elevations, section, and details.

**Plan** – A two-dimensional graphic representation of the design, location and dimension of the project, or parts thereof, seen in a horizontal plane viewed from above.

***Floor Plan*** – a horizontal section taken above the floor to show diagrammatically the enclosing walls of building, its doors windows and the arrangement of its interior spaces.



## STEPS IN DRAWING FLOOR PLANS

1. Layout the position of exterior and interior walls.
2. Add the thickness of the walls with a hard pencil (don't darken the walls at this stage).
3. Locate the position of doors and windows by center line and by their widths.
4. Darken the object lines with an F pencil.
5. Add doors and window symbols with a 2H pencil.
6. Add symbols for stairwells.
7. Erase extraneous lines if they are too heavy. If they are extremely light, they can remain.
8. Draw the outlines of the furniture and fixtures.
9. Add the symbols and sections for any masonry work such as planters.
10. Dimension the drawing

## DOORS AND WINDOWS IN PLAN

1. Show normally swinging doors at 90° opening.
2. Doors swings are shown with light lines and quarter symbols.
3. Door type is not illustrated in plan, only in elevational views.
4. Window type cannot be explained in plan except for width and location : window type and height are shown in elevation views.
5. Show sill lines with a lighter line weight than walls, jambs and glass, since sills are not in fact cut through.

## RULES FOR DIMENSIONING FLOOR PLANS

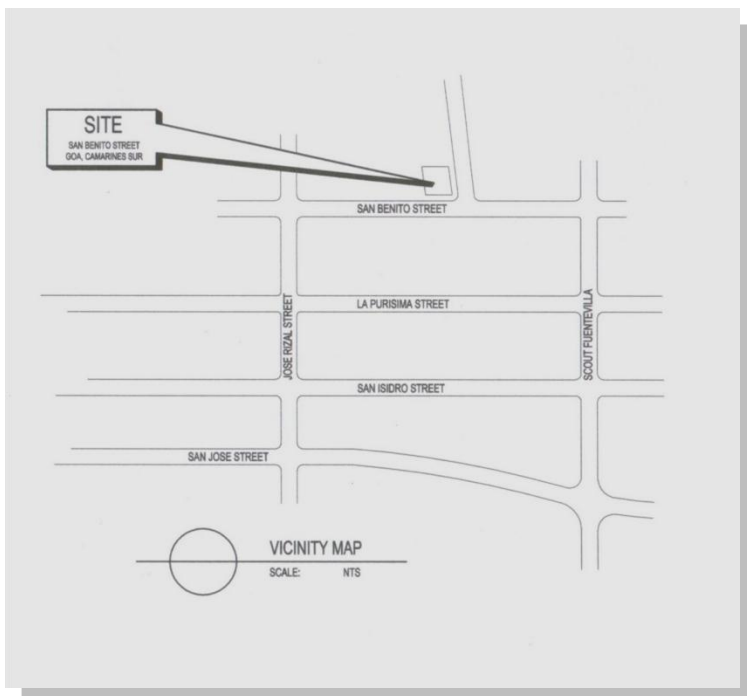
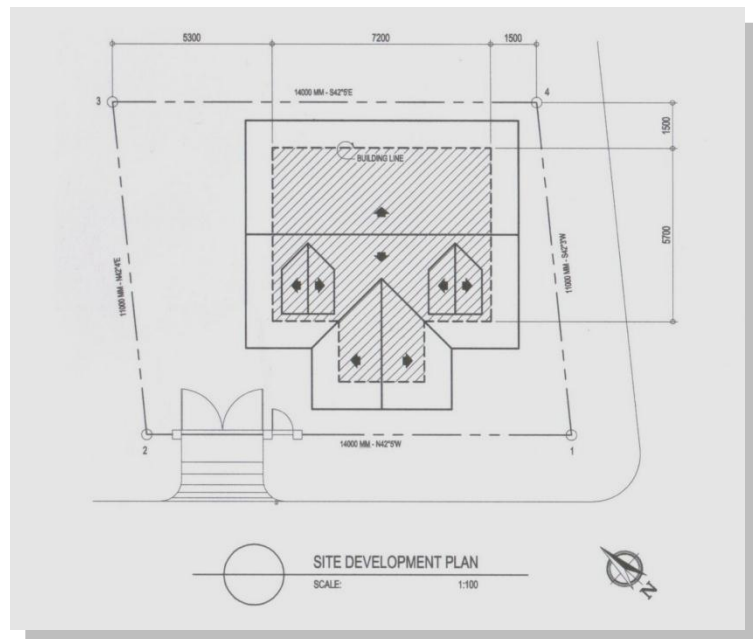
1. Architectural dimension lines are **unbroken** lines with dimensions placed **above** the lines. Arrowheads, dots, small circles and diagonal lines are used to denote the termination of the dimension line. **Dots** are used when the area to be dimensioned is too small for arrowheads. **Arrowheads** may also be placed outside the extension lines when the area is too small.
2. Dimensions should be placed to read **from the right or from the bottom** of the drawing. The numerals should always be written above the lines.
3. Dimension lines are placed about **10 mm** apart. To avoid crossing extension and dimension lines, place the longer dimensions farther away from the plan. Overall building dimensions are placed **outside** all other dimensions.
4. When the area to be dimensioned is too small for the numerals, they are placed outside the dimension lines. Do not try to “fancy up” dimensions with artistic numerals, **legibility** is the only concern.
5. Rooms are dimensioned from the **center line** of partitions. In some cases, they may be dimensioned from wall to wall, exclusive of wall thickness.
6. In dimensioning stairs, the number of risers is placed on a line with an arrow indicating the direction (up or down).
7. Architectural dimensions always refer to the **actual size** of the building regardless of the scale of the drawing.

- Never crowd dimensions. To free the plan of excessive dimensions, the sizes of doors and windows are given in the door and window schedule. All obvious dimensions are also omitted.

**Site Development Plan** – a plan of a construction site showing the position and dimensions of the building to be erected with its technical descriptions and contours of the lot.

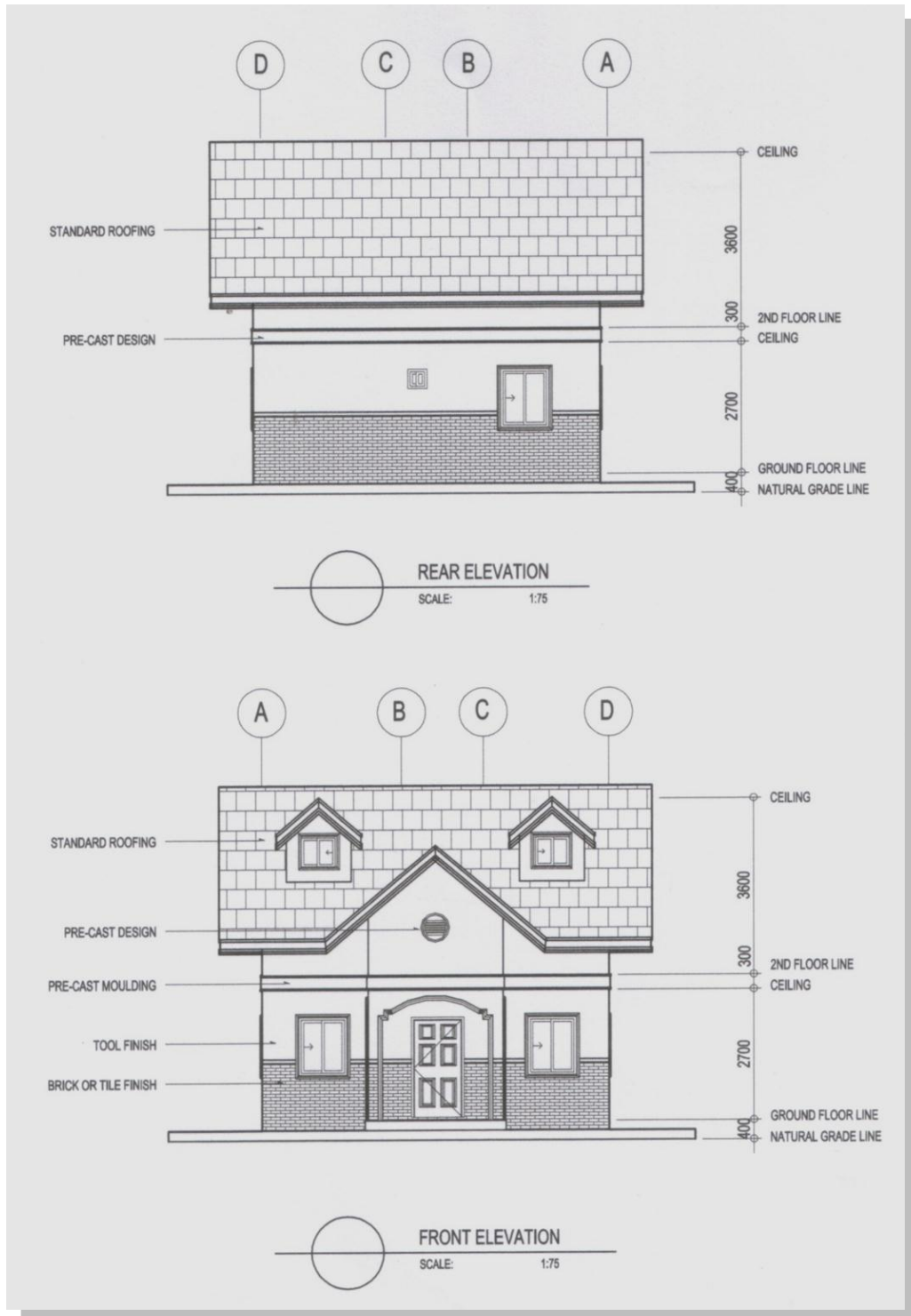
**Vicinity Map** – a map that shows where the project is in relation to major cross street, key landmark or geographic features *e.g. a map from city proper of San Jose Del Monte to Barangay Kaypian.*

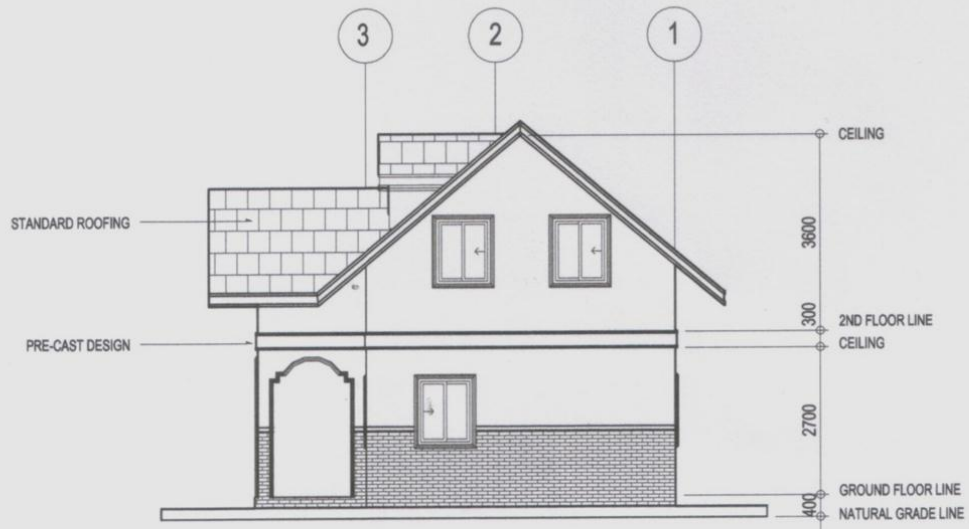
**Location Plan** – a map that shows corresponding divisions of lot in a particular area showing the exact site of the project *e.g. a particular subdivision or area in Barangay Kaypian.*






**ELEVATION** – a drawing showing the vertical elements of a building, either exterior or interior, as a direct projection to a vertical plan.






**LEFT SIDE ELEVATION**  
 SCALE: 1/75




**RIGHT SIDE ELEVATION**  
 SCALE: 1/75

## STEPS IN PROJECTING ELEVATIONS

The major lines of an elevation are derived by projecting vertical lines from the floor plan, and measuring the position of the horizontal lines from the ground line

### **Vertical line projection**

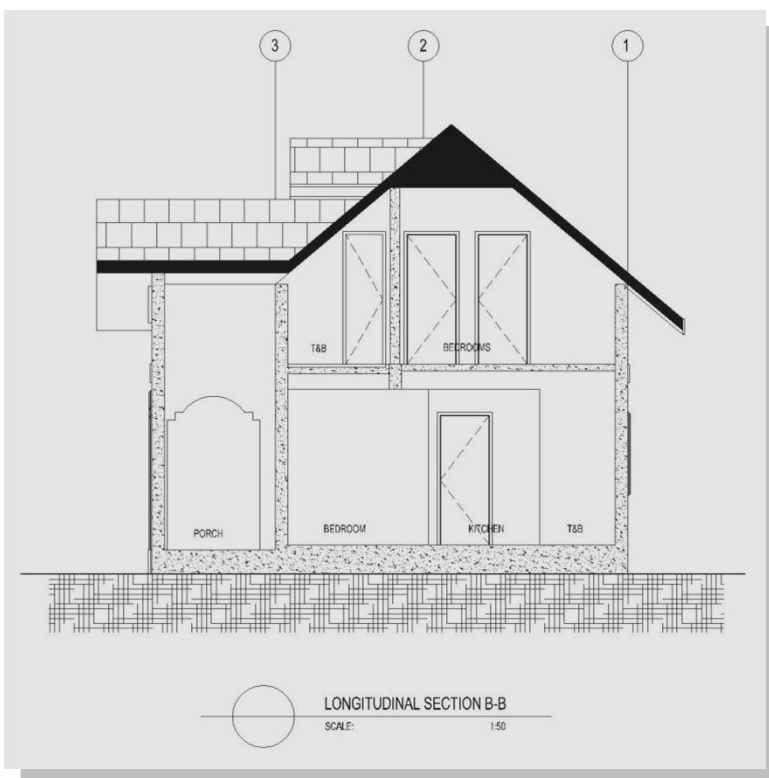
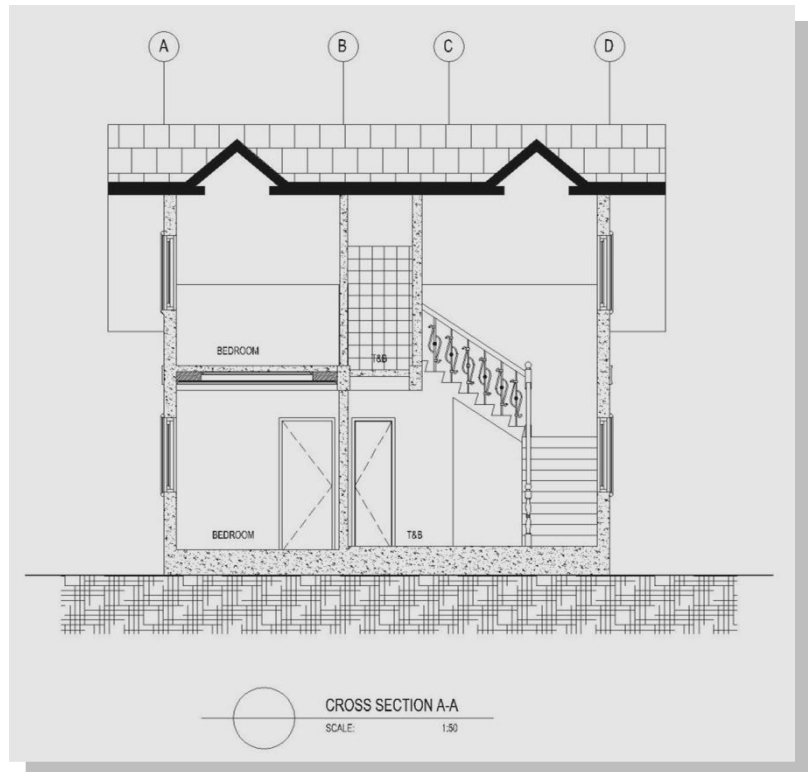
Vertical lines represents the main lines of a building should first be projected. These

lines show the overall length or width of the building. They also show the major parts or offsets of the building. The position of the doors and windows are also projected from the floor plan

### **Horizontal line projection**

Horizontal lines that represents the height of the eave line and ridge line above the ground are measured, then drawn to intersect with the vertical lines drawn from the floor plan. The intersection of these lines provide the overall outline for the elevation

**SECTION** – representation of a building, or a portion thereof, drawn as if it were cut vertically to show the interior.



## KINDS OF SECTIONS

### FULL SECTION

A section cut through the entire building or component

- a. **Cross Section** – a section showing a crosswise cut through the building.
- b. **Longitudinal Section** – a section showing a transverse or lengthwise cut through building.

### OFFSET SECTION

A section with a cutting plane line offset to permit it to cut through necessary features.

### HALF SECTION

A cut to remove only one quarter of a symmetrical component. Thus both exterior and interior can be shown in one view.

## POINTS TO REMEMBER IN DRAWING SECTIONS

1. A building material is only sectioned when the cutting plane line passes through it. The outline of all other materials visible behind the plane of projection must also be drawn in their proper position and scale.
2. As with floor plans, whatever is cut through in taking a section (floor, walls, roof structure, etc.) is profiled with a heavy line (cutting plane line).
3. **Show the main areas like staircase, toilet, dining, and bedroom.** Cut sections through major elements in a building (major window openings, doorways, changes in roof and floor levels, roof opening, etc.). never cut through columns.
4. It is good practice to include people in building design section to give a scale to the spaces.
5. The physical context of the building should always be shown by indicating the earth upon which it sits, which is also cut through
6. Construction details and foundations need not be indicated in design sections.

## RULES FOR DIMENSIONING SECTIONS

1. Vertical dimensions should be read from the right of the drawing
2. Levels to be dimensions should be labeled with a note, term or abbreviation
3. Room heights are shown by dimensioning from the floor line to the ceiling line
4. The height of windows and doors are dimensioned from the floor line to the top of Windows and doors. Windows and doors may be indexed to a door and window schedule, or the style of the windows and doors may be shown on the sectional drawing.
5. Sectional dimensions show **only vertical** distances. horizontal distances are shown in the floor plan

6. Dimensions for small, complex, or obscure areas should be indicated to a separate detail overall height dimensions are placed on the outside of sub-dimensions.

**PERSPECTIVE**- a graphic representation of a project or part thereof as it would appear three-dimensionally, naturally and lifelike.

### **EXTERIOR PERSPECTIVE**



### **INTERIOR PERSPECTIVE**



## Importance of understanding Basic Architectural Design Theories for Drafting Application

### Basic Architectural Design Principles

It is very important that a draftsman knows' what he is doing. He should practice drafting not just to provide impressive drawings but an accurate and precise illustration of work.

It is very hard to draw something that you can not visualize. Chances of guessing might take place. And this action might result for inefficiency; a waste of time and materials that added unwanted cost for the firm. For this reason, it is very necessary for draftsmen to be equipped with knowledge in basic theories and principles of design.

There were three design principles in architectural design practice. Namely **Aesthetic** which refers to beauty, **Function** which refers to its use, and **Strength** which refers to durability. These principles make the difference between architecture and engineering practice. For in engineering, the focus of design is centered on functionality and durability.

### Basic Theories of Architectural Design

#### **What is design?**

Design in this matter is any visual concept of a man made object, as a work of art. The architectural concept of a building as presented by plans, elevations, renderings, and other drawings.

What are the basic aspects to be considered in Architectural Design?

- Influences on Architectural Design
- Anthropometrics (Human Dimension)
- Space planning
- Forms and Balance



# Influences on Architectural Design

## General Influences

### Needs of Man

#### 1. Physical Needs

##### A) Self preservation

*food, shelter, clothing – basic*

Add to these Basic Needs: Power, water, transportation ecological balance, education, sports, medical, and livelihood.

##### B) **Reproduction** – for population to increase and continue existence.

**Shelter** – is something that covers, protects, or defends as roof that shields one from the elements and changes.

#### **The Modern man's shelter shall have:**

- 1) **Necessities** – warm, dry house with glazed doors, windows, sanitation and permanency.
- 2) **Convenience** – rooms shall be arranged economically. Circulation are studied according to functions, such as the kitchen for food preparation, bedroom for sleep and bathroom for cleanliness.
- 3) **Comforts** – this must contain the labor-saving devices which provide heat, ventilation, and instant communication. The furnishings are designed for comforts.





*Houses of Parliament, London*

**2. Emotional Needs**

The emotional reactions of man have to do with the instincts stirred by the forces of religion and art with the desire to indulge in recreation. Art in its broadest interpretation, assumes the various familiar forms, painting, sculpture music and literature.

Sample:



Holy Rosary Catholic Church  
*Pine Ridge, South Dakota.*



Sports Complex: Olympic games Tent, Munich Germany  
*By: Arch. Gunter Behnisch*

### 3. Intellectual Needs

Education, science and government demand a proper architectural setting. Intellect or reason alone may erect a utilitarian building; emotion will endow it with beauty and interest.

Samples:



Nagoya University





# Influences of Nature

Climate and geography influence the life and habits of a nation. They decide what foods shall be grown and what occupations shall be followed. They determine what regions will develop farmers, sailors, or merchants. Climate aids in giving to races their own particular traits. These races in turn create architecture with local or national characteristics.

## A. Climate

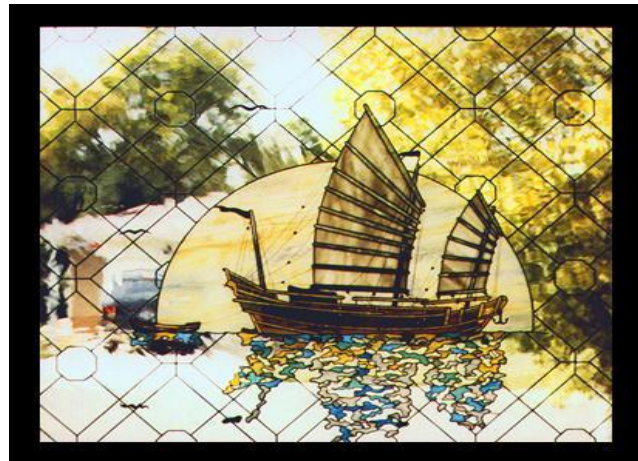
This affects the habits and temperaments of the people. Those near the sea are quiet, taciturn and bold people. They are easy going and carefree and produce an architecture different from people in the cold and forested areas, whose people plan in advance. This requires initiative, patience and energy.



*Eskimo*



*Igloo*



B. Topography

Topography, in its broadest sense, may mean the general terrain or contour of the surface of the entire country. If the country is small and the topography is uniform, this tends to be a similarity of character in the architecture. It maybe nationalistic and may assume traits common to the entire area.



*Mt. Apo*



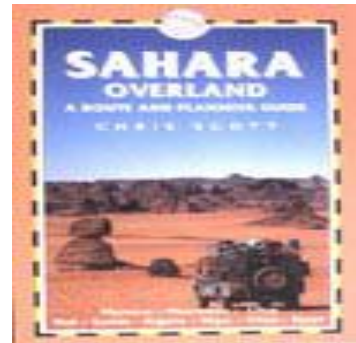
*Overlooking Bohol's chocolate Hills*



*Baguio: Banawe Rice Terraces*



*Alaska*



*Sahara Desert*



Japan



## Influences of Man

### 1. SOCIAL CONDITION

Architecture, because it is the most permanent and cumulative-reflects the social structure of the period in which it is developed. The interests of the people dictate the type and appearance of its buildings.

Stable government and improved social condition eliminate the necessity of many protective features such as high fences, shutters, wrought iron or steel railings for doors and windows, broken glass and barbed wire on top of fences. Comfort and convenience now control architecture.

### Periods

The different architectural characters in different periods of architecture is shown in their buildings.

In this new millennium, our social structure has become so complex that confusion rather than simplicity is its chief characteristic.



*Stone Age Habitat*

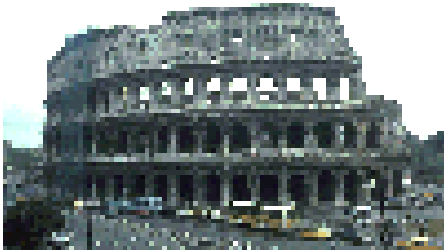


*The Great Pyramid of Khufu*

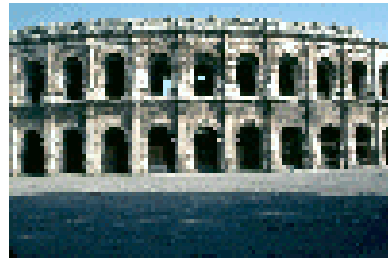


Greek: Parthenon





*Colosseum; Italy, Rome 72 AD*



*Amphitheater; Nîmes, France 1<sup>st</sup> or early 2<sup>nd</sup> century*



*Amiens, West facade*



*Cologne Cathedral*

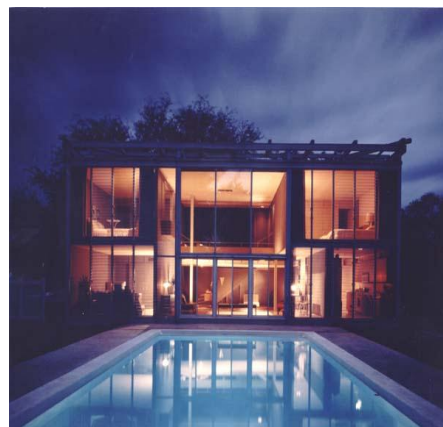


*St. Chapelle, Paris*

*Medieval Age: Gothic Architecture*



*Contemporary Architecture: St. Louis, Missouri*



*Post Modern Architecture*

## 2. Man's Personality

By his appearance, something is known of his interests from the type of house in which he/she lives. In a similar manner, it is possible to trace a comparison between the personality of a nation as reflected in its clothing and its attitude toward architecture as seen in its buildings. Clothes give an indication of its simplicity or complexity of the existence of its inhabitants which in turn controls its architecture.

## 3. Man's Interests

It has been pointed out that the activities and interests of man are directly responsible for the type, which he develops.

This is shown in the typical structures like the:

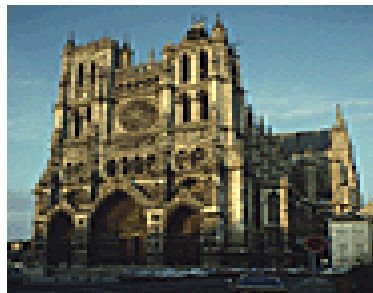
*house* – which provides shelter for man during his hours rest.



*factory*- offers a place in which to work and to produce a commodity of exchange.



*Church and Mosque* – affords spiritual relaxation and opportunity for worship.





# CONTEMPORARY ARCHITECTURE

Contemporary architecture breaks away from cookie-cutter design and traditional aesthetics. It strives to create home designs that go beyond “standard” ideas and instead pursue projects inspired by layout, location, and function. Frank Lloyd Wright’s mentor, Louis Sullivan famously stated that, “Form follows function”. This idea is expressed by contemporary principle to have land or the function of a project dictate much of the design ideas. For example, Wright was famous for building with the land - his



residential homes almost always relied on the lot to determine how the building was to be laid out. Wright believed that a building should be “one with the land” and not simply plopped down on top of it. Modernist architecture takes inspiration from the project itself - if the project is meant to showcase something, house something particular, or be occupied by a particular person, Contemporary architecture’s aim is to design for each unique situation and to be inspired by its purpose.

**Modernism Architecture** is a set of building styles with similar characteristics, primarily the simplification of form and the elimination of ornament. The first variants were conceived early in the 20th century. Japanese (Zen) inspired architecture can be classified as modern architectural design.



**Postmodernism Architecture** was an international style whose first examples are generally cited as being from the 1950s, and which continues to influence present-day architecture. Post-modernity in architecture is generally thought to be heralded by the return of "wit, ornament and reference" to architecture in response to the formalism of the International Style of modernism.

MODERN ARCHITECTURE



**Deconstructivism Architecture** also called deconstruction - is a development of postmodern architecture that began in the late 1980s. It is characterized by ideas of fragmentation, an interest in manipulating ideas of a structure's surface or skin, non-rectilinear shapes which serve to distort and dislocate some of the elements of architecture, such as structure and building envelope.

**Expressionism Architecture** - was an architectural movement that developed in Europe during the first decades of the 20th century in parallel with the visual manifestation of the concept and performing arts.

**Neoclassicism Architecture** - is the name given to quite distinct movements in the decorative and visual arts, literature, theatre, music, and architecture that draw upon Western classical art and culture (usually that of Ancient Greece or Ancient Rome).



### **Mediterranean Inspired House Designs**

This style is inspired by architecture from Spain, Italy, France, Greece and Morocco. Sunny states like California and Florida are the perfect environment for Mediterranean style homes. Although the style is named after the sea this style of house can also fit in well in the countryside of Texas or the mid-western states.

Characteristics:

- Low pitched tiled roof often using red tiles
- One to two stories
- Designed with cornice and moldings
- Stucco exterior walls painted in colors which complement the surroundings
- Arched windows
- Use of columns to hold up porticos and balconies
- Open plan living
- Courtyards in larger houses



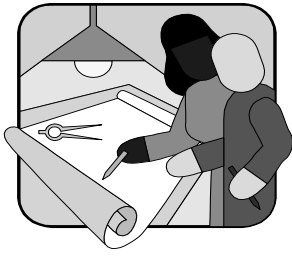
## Zen Inspired House Designs

As these erratic and stressful times make it increasingly difficult to find tranquility and relaxation in our lives, one of the few options left is to create a peace haven in the comfort of our own home. This is the reason why Zen principles applied in interior design have increased in popularity and become a trend of modern days. But what does Zen actually mean? In Japanese, Zen refers to meditation. In interior design, it reflects balance, harmony and relaxation.

Although Zen is not a proper design style and does not come with a book of strict rules, it is often associated with minimalism, simplicity and purity of lines. It is rather a way of arranging your home and creating an atmosphere that offsets the stress and hassle of your daily routine.

Minimalistic design is always associated with Zen design concept which has been highly influenced by Japanese traditional design and architecture. Minimalism describes movements in various forms of art and design, especially visual art and music, where the work is set out to expose the essence or identity of a subject through eliminating all non-essential forms, features or concepts. Minimalism is any design or style in which the simplest and fewest elements are used to create the maximum effect.

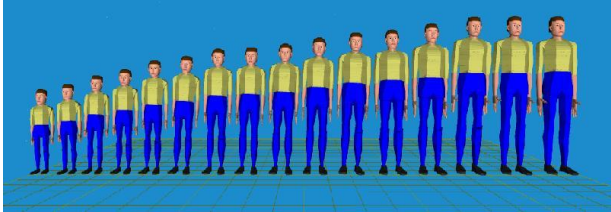




## How can we start Design?

It is very important for you to always remember that you are creating the design for human. Therefore, as a designer you must design so to satisfy their needs.

### First thing First



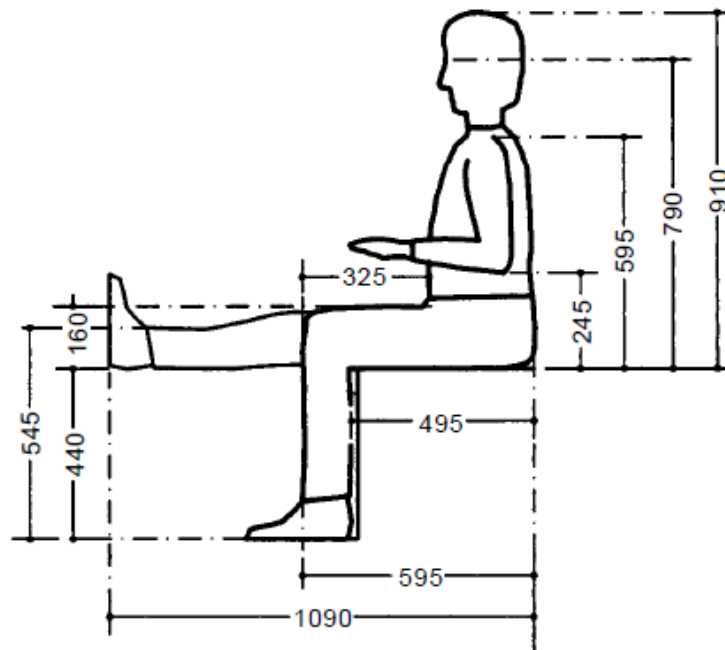
## Knowing Anthropometrics (Human Dimension)

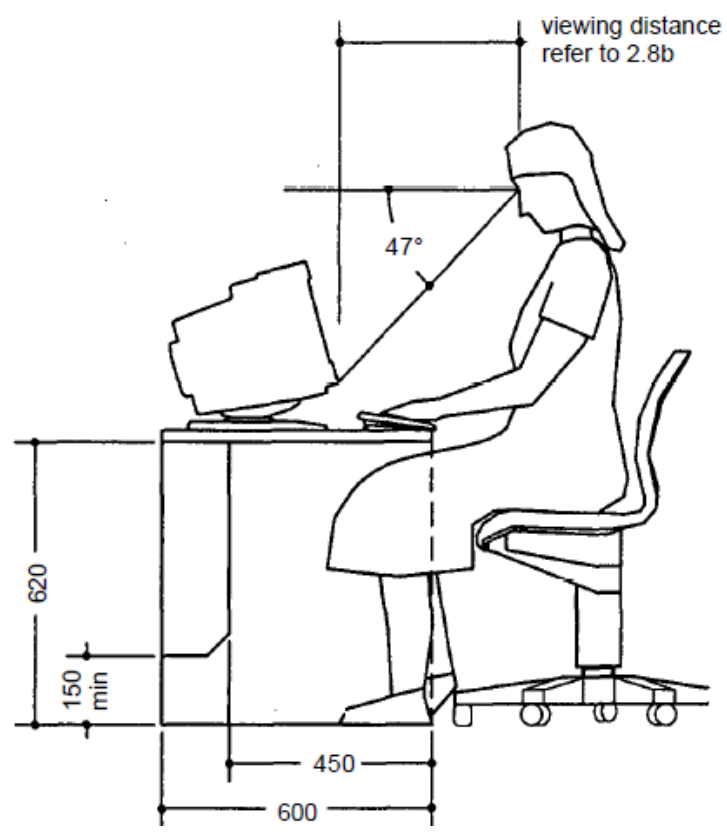
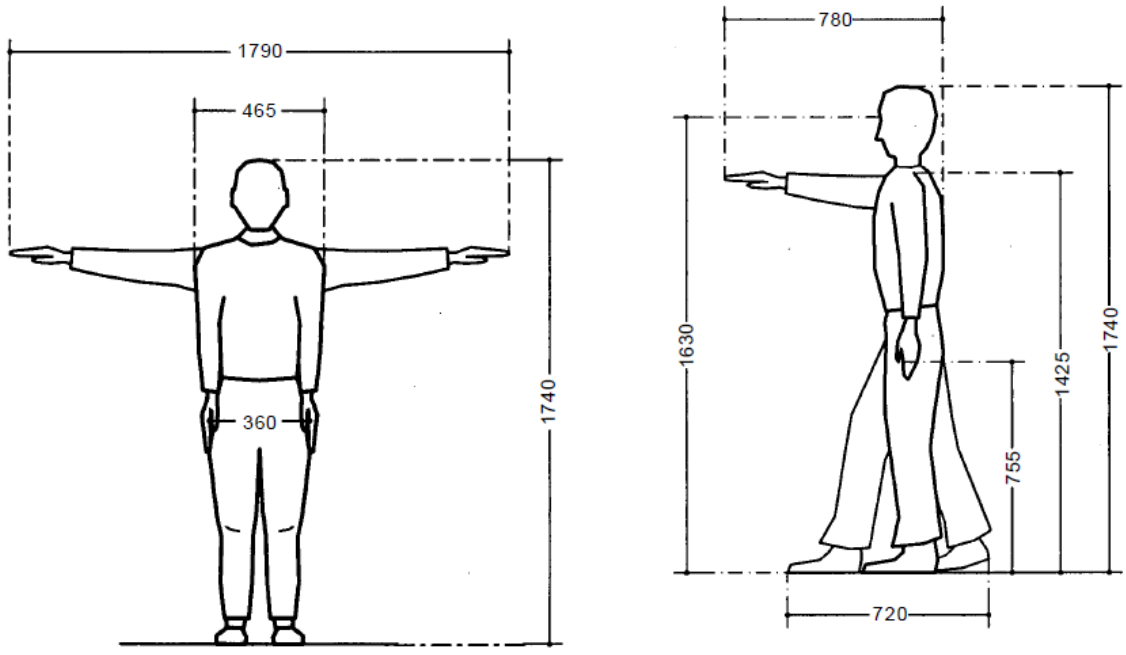
### What is Anthropometry?

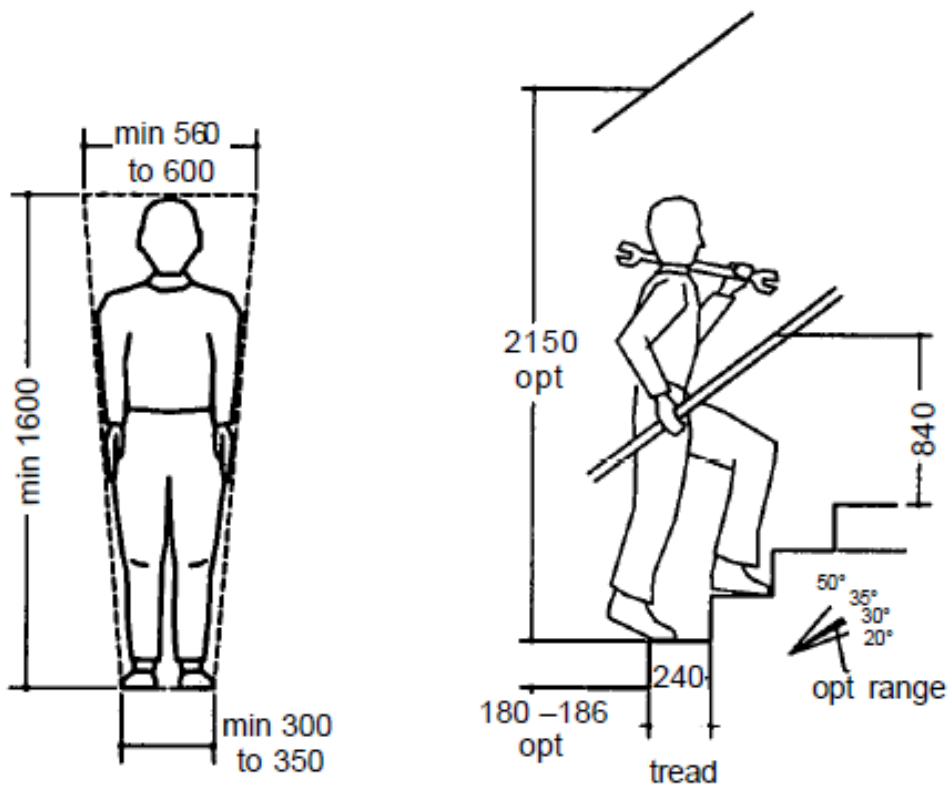
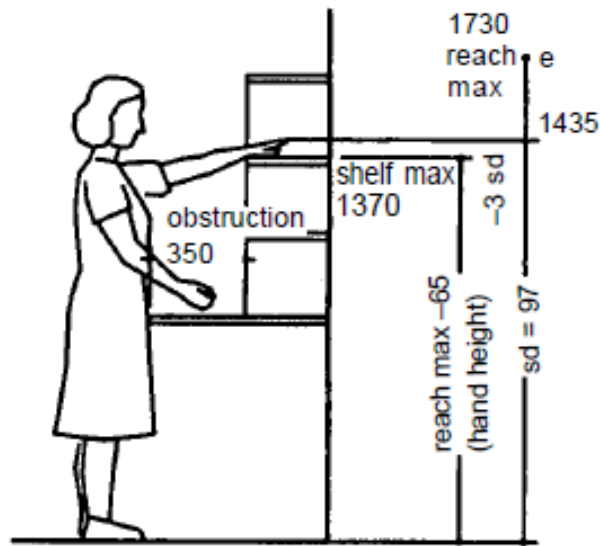
Anthropometrics are used to describe the "user" or "target" population for a product. Answers are given in terms of the range of body dimensions, which exist in that population.

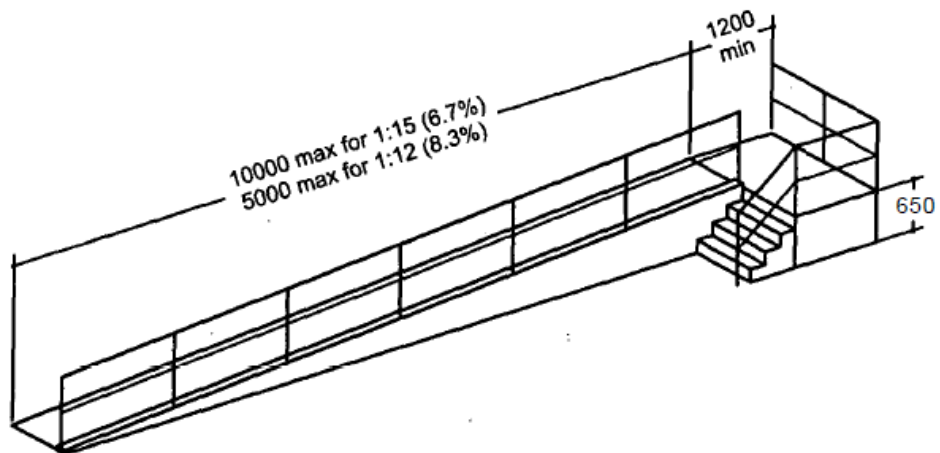
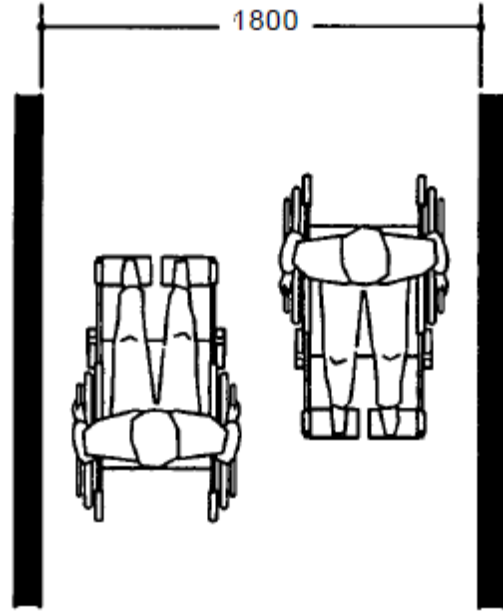
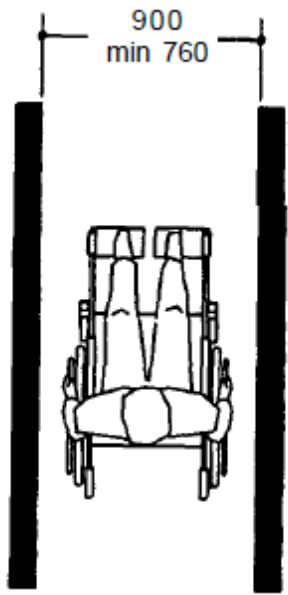
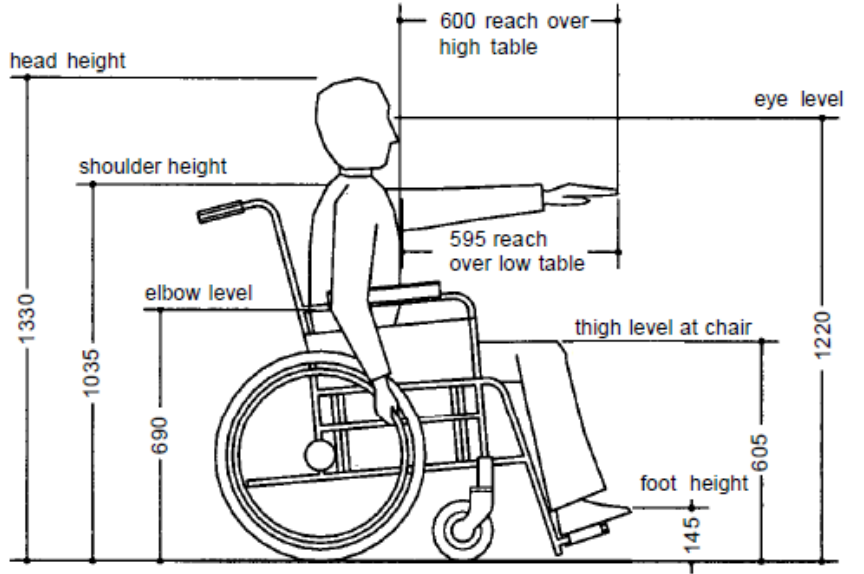
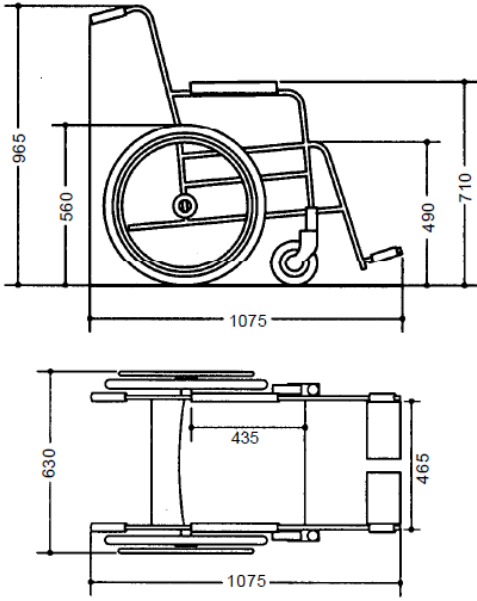
Anthropometric variations between different nationalities

It is important to use the appropriate anthropometric information for the population who will be using the eventual design. As you might expect, there are some differences between nationalities for most body dimensions.

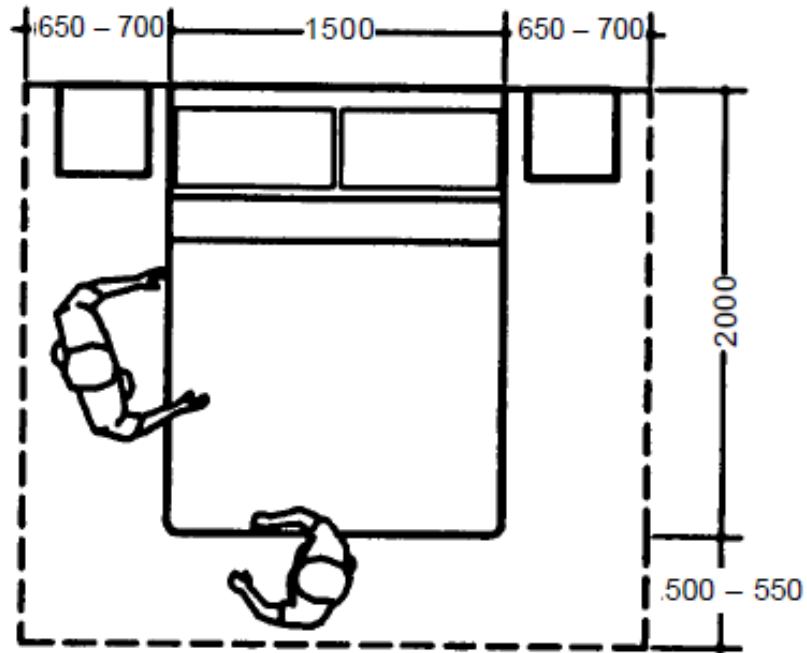




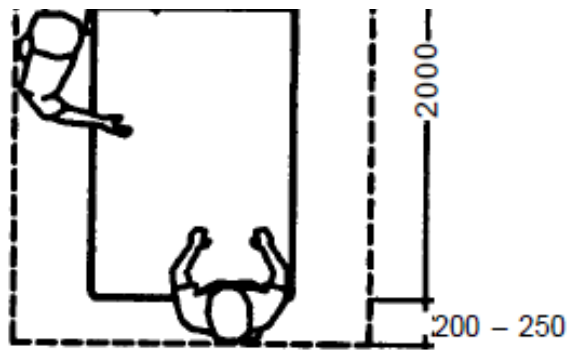








*Making double bed*



*Making single bed*

# AREA PLANNING

In creating any architectural design, the designer must progress as logically step by step through the design process. One key step in this process is to divide the functions of building into specific areas.

## Three Major Functional Areas of a House for Planning purposes

1. The Living Area
2. The Sleeping Area
3. The Service Area

### Living Area



The only area of the home that most strangers observe. The living area is what the name states, the area where most of the living occurs. It is here the family entertains, relaxes, dines, listens to music, watches the television, enjoys hobbies, and participates in other recreational activities.

The total living area is divided into smaller areas (rooms) which are designed to perform specific living functions. The subdivisions of most living areas may include the living room, dining room, recreational or game room, family room, patio, entrance, foyer, den or study room, and guest room. Other specialized rooms, such as library, music room, sewing room are often included as part of the living area of large houses that have space to devote to such specialized functions. In smaller homes, many of the standard rooms combine two or more functions.

## Sleeping Area



One third of our lifetime is spent in sleeping. Because of its importance, the sleeping area should be planned to provide facilities for maximum comfort and relaxation. The sleeping area is usually located in a quiet part of the house and contains bedrooms, toilet and bathroom, dressing areas and nursery room.

### **BEDROOMS**

Houses are usually classified by size according to the number of bedrooms; for example, a three- bedroom home, or a four-bedroom home. In a home there are bedrooms, master bedrooms, nursery rooms according to size of the family.

### **Function**

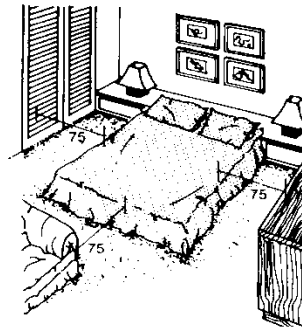
The primary function of a bedroom is to provide facilities for sleeping. Some bedrooms may also provide facilities for writing, reading, sewing, listening to music, or relaxing.

### **Noise Control**

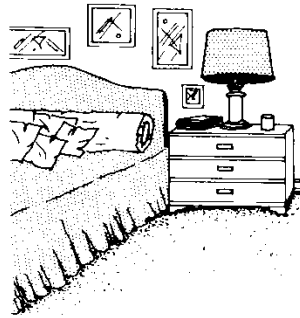
Since noise contributes to fatigue, it is very important to plan for the elimination of as much noise as possible from bedroom area. The following guides for noise control will help you design bedrooms that are quiet and restful.

1. The bedroom should be in the quiet part of the house, away from major street noises.
2. Carpeting or porous wall and ceiling panels help absorb many noises.
3. Rooms above a bedroom should be carpeted.
4. Floor to ceiling draperies help to reduce noise.
5. Acoustical tile in the ceiling is effective in reducing noise.
6. Trees and shrubbery outside the bedroom help muffle sounds.
7. The use of double-glazed insulating glasses in windows and sliding doors help to reduce outside noise.
8. The windows of an air-conditioned room should be kept closed during hot weather. This eliminates noise and aids in keeping the bedroom free from dust and pollen.
9. Air is a good insulator; therefore, closets provide buffers, which eliminate noise coming from other rooms.

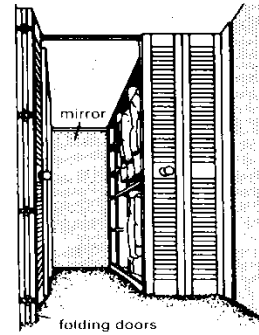
# BEDROOMS



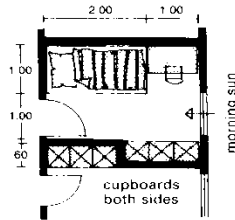
1 Allow 750 mm around beds



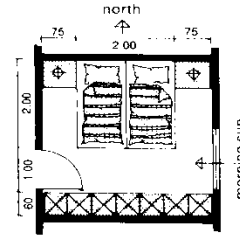
2 Storage: bedside table



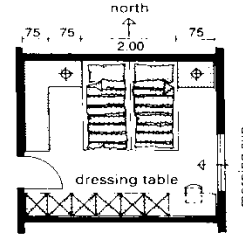
3 Walk-in cupboard with folding doors



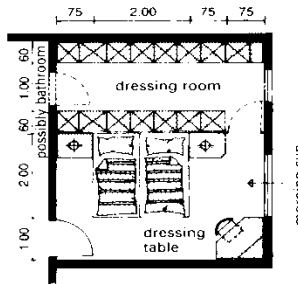
4 Small bedroom for a child



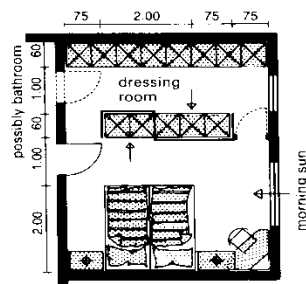
5 Standard bedroom layout



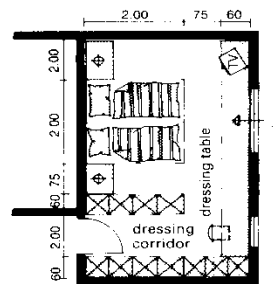
6 Bedroom with space for dressing table and side cupboard



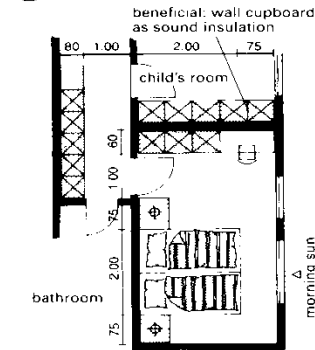
7 Bedroom with dressing room



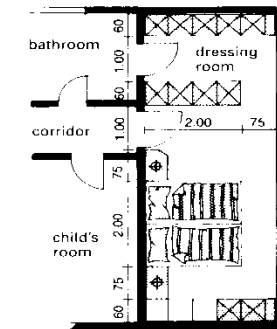
8 Bedroom with dressing room



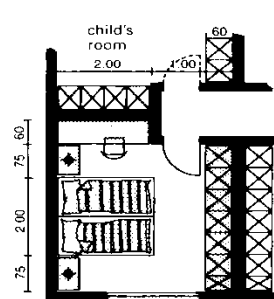
9 Large bedroom with dressing corridor



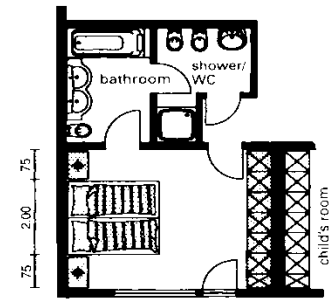
10 Bedroom with adjacent cupboard corridor



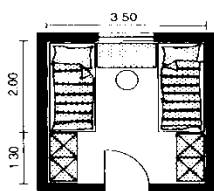
11 Bedroom with dressing room and access to bathroom



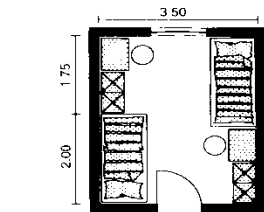
12 Bedroom with adjacent child's room



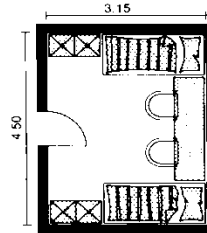
13 Bedroom with shower/bathroom



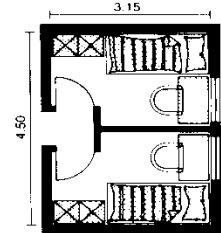
14 Two-bed room for children/guests



15 > 14



16 Two-bed room



13 Dividable → 16

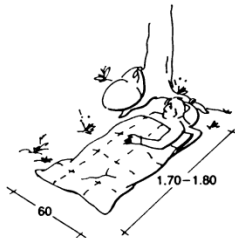
To ensure comfort while sleeping, the bed length should be 250mm longer than the individual's height. Based on average heights, beds are produced in a range of standard sizes: 900 × 1900 mm, 1000 × 1900 mm, 1000 × 2000 mm, 1600 × 2000 mm and 2000 × 2000 mm. The bedroom layout should give at least 600mm, preferably 750mm, around the bed → ①. This is important to allow the bed to be made easily and also, if there is a cupboard standing parallel to the bed, to give enough space for movement even if the cupboard doors are open.

There should always be a bedside cabinet to the left and right of double beds and a headboard, onto which one can fix clip lights for reading, is also useful → ②. Bedside lamps should be provided in addition to general lighting.

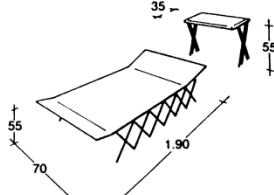
About 1m of cupboard length should be planned per person. If there is not enough room in the bedroom, then space can be found in the corridor → ⑩. At least one mirror, in which one can see oneself from head to toe, should be fitted in a bedroom: mirrored cupboards are even better.

# BEDROOMS

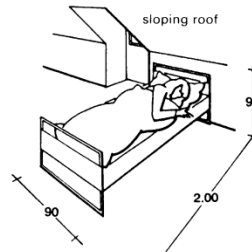
## Types of Bed



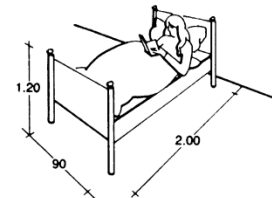
① Sleeping bag



② Canvas bed; folds to give a stool

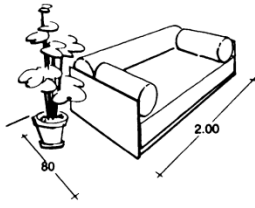


③ Low steel tubular bed

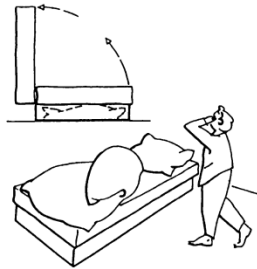


④ Grandmother's feather bed

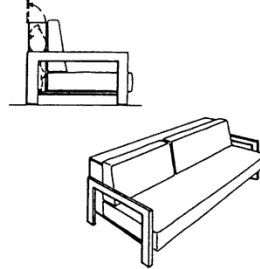
### Couch/bed conversions



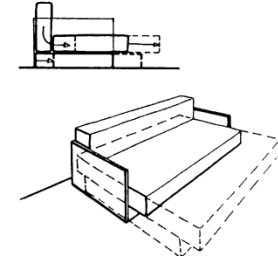
⑤ Sofa-bed: bedding rolls up in zipped covers



⑥ Sofa-bed: bedding stored in drawers under the mattress

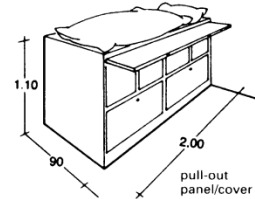


⑦ Sofa-bed: bedding stored behind backrests

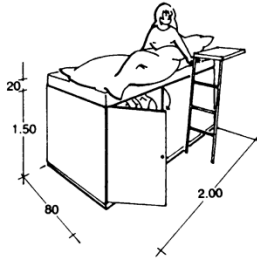


⑧ Sofa-bed: pull-out mattress

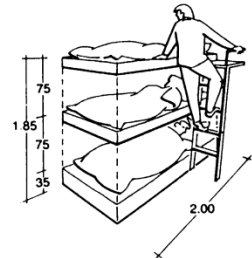
### Bunk beds and units



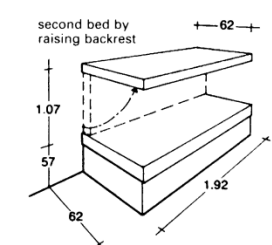
⑨ Bed on cupboard unit



⑩ Bed on cupboard for small rooms, ships' cabins etc.

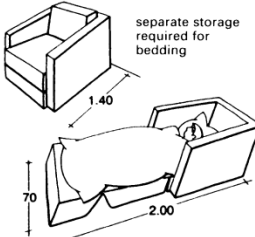


⑪ Bunk for railway sleeping cars, holiday homes etc.

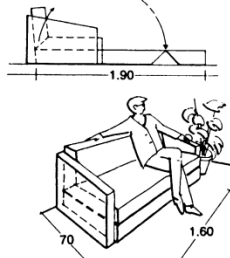


⑫ Pullman bed for caravans and railway sleeping cars

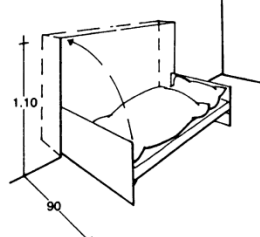
### Fold-up beds



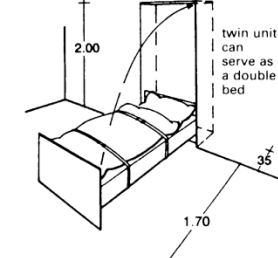
⑬ Bed/chair (fold-out)



⑭ Sofa-bed (fold-out)

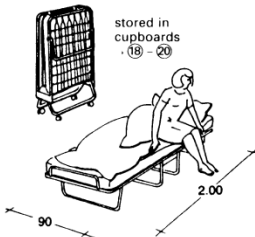


⑮ Side-hinged folding bed

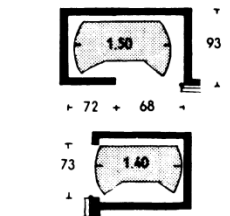


⑯ Top-hinged folding bed

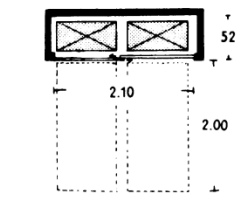
### Castor-mounted folding and wall beds



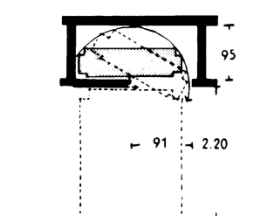
⑰ Folding bed on castors



⑱ Wall cupboards for folding beds



⑲ Beds unfolded in front of cupboard doors



⑳ Hinged/swinging folding beds

## **Service Area**



The service area includes the kitchen, laundry, garage workshops, storage centers, and utility room. Since a great number of different activities take place in the service area, it should include facilities for the maintenance and serving of the other areas of home. The functioning of the living and sleeping areas is greatly dependent upon the efficiency of the service area.

### **KITCHEN**

A well-planned kitchen is efficient, attractive, and easy to maintain. To design an efficient kitchen the designer must consider the basic shape, décor, size and location of equipment.

### **Function**

The preparation of food is the basic function of the kitchen. However, the kitchen may also be used as dining and as laundry.

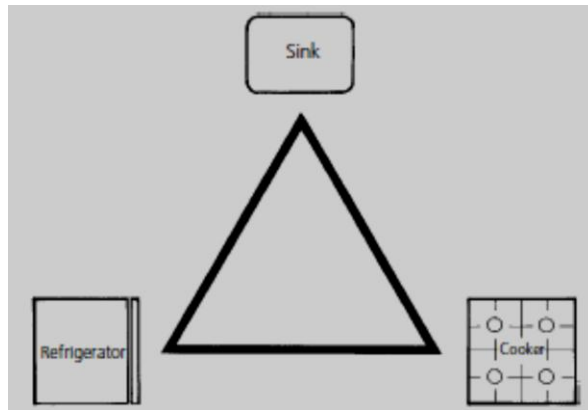
The proper placement of appliances, storage cabinets and furniture is important in planning efficient pattern eliminates wasted motion. An efficient kitchen is divided into three areas; the storage and mixing center, the preparation and cleaning center, and the cooking center.

### **Location**

Since the kitchen is the core of the service area, it should be located near the service entrance and near the waste-disposal area. The children's play area should be visible from the kitchen must be adjacent to the dining area and outdoor eating areas.

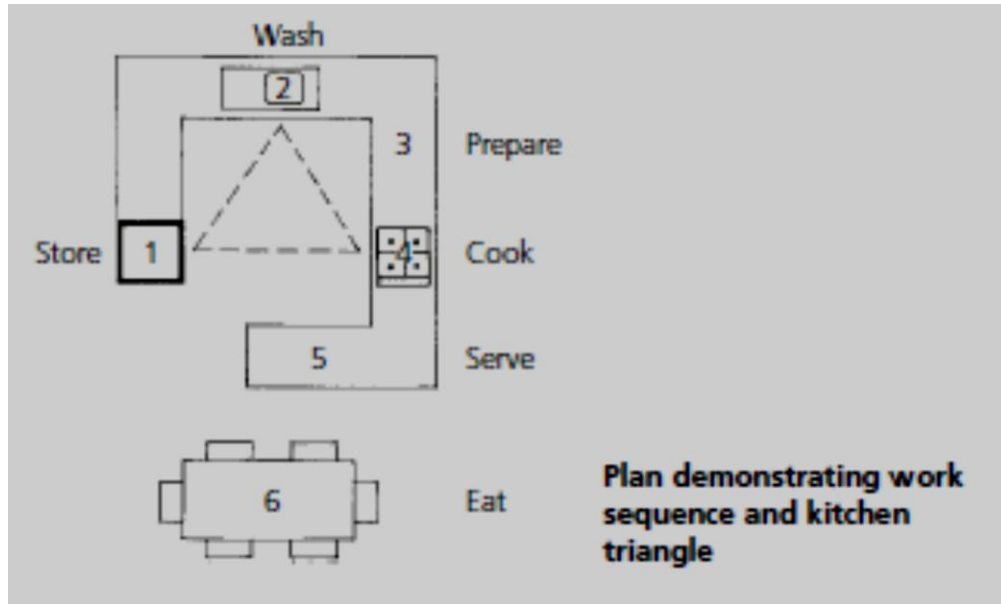
## THE WORK TRIANGLE

From the work sequences described above, it will be seen that there are three activities which relate to three main appliances – the refrigerator, the sink and the cooker. The relationship of these three fittings is commonly referred to as the *work triangle*.



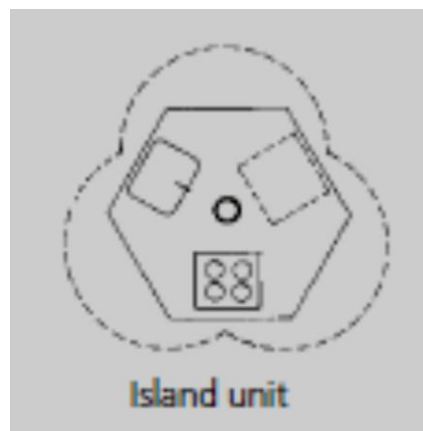
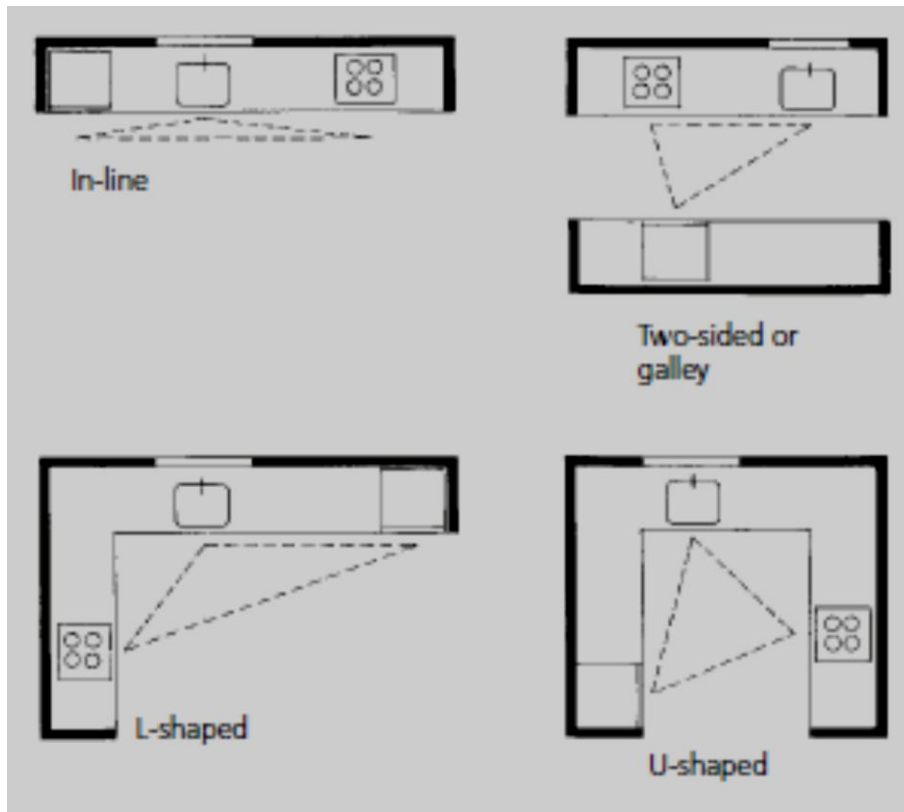
### **Kitchen triangle**

Optimum length between 3.6m and 6.6 m. Less than 3.6 m means worktop length too short. More than 6.6 m is time consuming and hard on the feet.



## Kitchen layout

These diagrams show different layouts with the kitchen *triangle* in a dotted line. This links the three most used appliances: sink, cooker and refrigerator. The *U-shaped* kitchen is the easiest to use as the appliances surround the cook and are set in worktops unbroken by circulation. Conversely the *island unit* generates too much walking while having totally inadequate amount of worktop space.





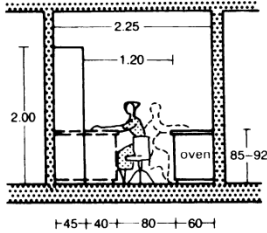
## **LOCATION OF THE KITCHEN**

The kitchen must be located near the service entrance and near the waste disposal area. If possible, the children's play area should also be visible from the kitchen. The kitchen must always be adjacent to the dining area or when provided, outdoor dining areas.

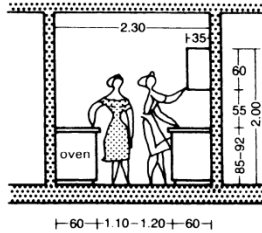
## **GUIDES IN PLANNING A KITCHEN**

1. The traffic lane is clear of the work triangle.
2. The work areas include all necessary appliances and facilities. Electrical outlets must be provided for the appliances. There must be adequate storage centers for all work areas.
3. The kitchen is located adjacent to the dining area and near the children's area.
4. The work triangle measures less than 22' or 6.7m.
5. Shadow less and glare less light is provided and is concentrated on each work center.
6. Adequate counter space is provided for meal preparation.
7. Ventilation **MUST** be adequate.
8. The oven/range/stove is separated from the refrigerator by at least one cabinet.
9. Working height for counter is 36" or 0.90m.
10. The combination of base cabinets, wall cabinets, and appliances provides a consistent standard unit without gaps or awkward extension or depressions.

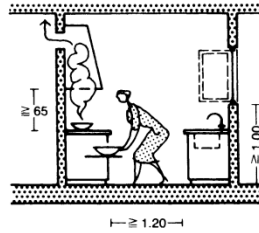
# KITCHENS



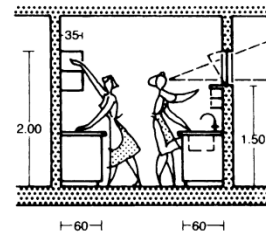
1 Section through kitchen with two worktops



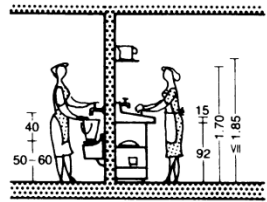
2 Section through kitchen; space for two people



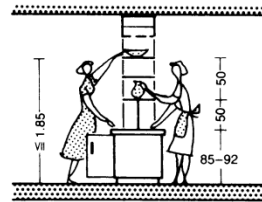
3 Low-level oven requires adequate space in front; extractor hood above cooker



4 Worktops and storage 60cm deep

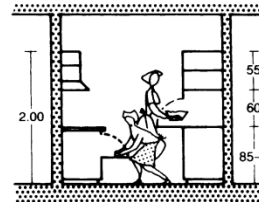


5 Household sink heights and high shelving

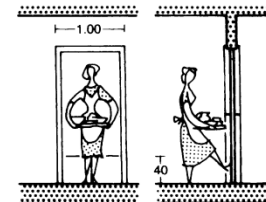


crockery storage cupboards, accessible from both sides

6 Hatch between kitchen and dining room



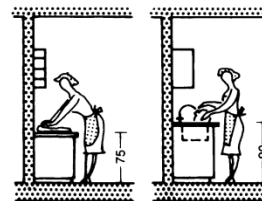
7 Side-by-side working



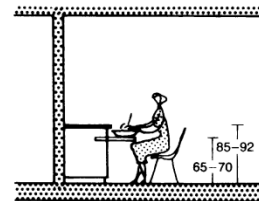
8 Self-closing doors with kick-plate between pantry and dining room



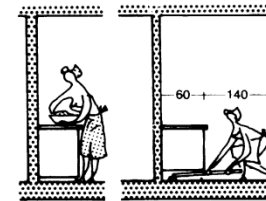
9 Correct/incorrect kitchen lighting



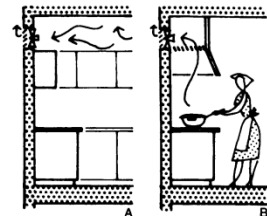
10 Normal table height of 85 cm lies between the best heights for baking and dish-washing



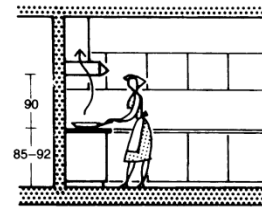
11 Pull-out worktop for use when seated



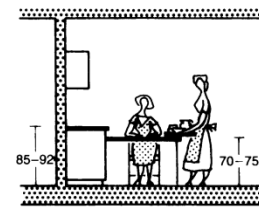
12 Correct design of cabinet bases for convenient cleaning and working (>8 cm)



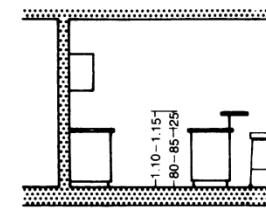
13 Extractor fan on outer wall (A), better if directly above cooker (B)



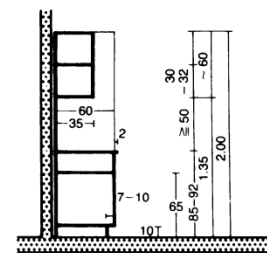
14 Extractor hood: better than just a fan



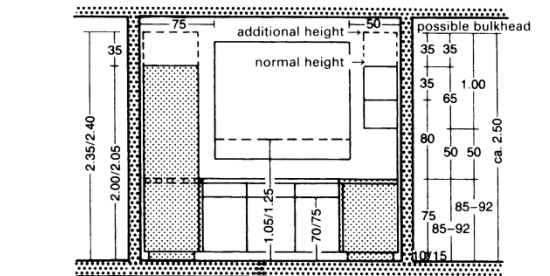
15 Pull-out/swivelling table



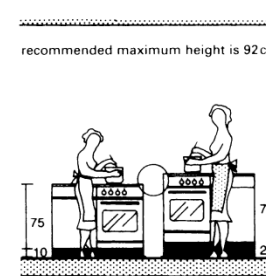
16 A breakfast bar arrangement



17 Section through kitchen units: preferred measurements



18 Kitchen fittings and standing areas required



19 Plinth depth varies height of work surface

# KITCHENS

## Built-in and Fitted Units

Despite increasing standardisation, the dimensions and manufacturing ranges of kitchen fittings still vary considerably. Built-in units are generally available from 20–120cm (in 5cm steps), usually with a height of 85cm.

In an architect-designed kitchen, the various elements are assembled in a way that cannot be altered, with worktops and storage surfaces, possibly including an electric oven (with cut-outs for hotplates) and a continuous cover plate.

The materials used in kitchen units include, wood, plywood, chipboard and plastic. Exposed wood surfaces are varnished or laminated with plastic. Shelves are of wood or plastic-coated chipboard; metal shelves are best for pots and pans. Sliding or folding doors are useful if space is restricted because they require no additional space when opened.

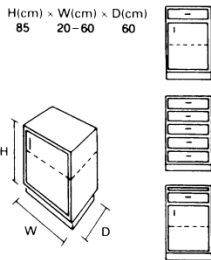
Floor units → ① + ② are for storing large, heavy or seldom-used kitchen equipment. Wall-mounted cabinets → ③ + ④ have a small depth so that the worktops beneath them can be used without hindrance. They allow crockery to be reached without bending.

Full-height cupboards → ⑤ can be used for storing cleaning materials, brooms etc. but are also suitable for housing refrigerators, ovens, or microwaves at a convenient height.

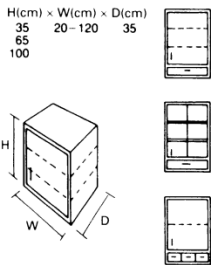
Sinks and draining boards should be fitted into floor units, which may also include a waste bin, dishwasher and disposal units (and, if necessary, an electric water heater).

Special equipment, such as retractable breadbins with universal cutting board, equipment cupboards with special pull-out or hinged compartments, retractable kitchen scales, spice drawers, pull-out towel rails etc., save time and effort.

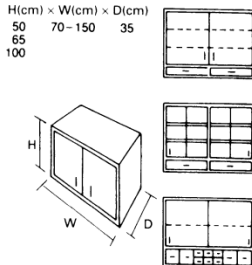
An extractor above the cooker is recommended → ⑫ and extractor hoods are most suitable for this task. There is a differentiation to be made between air extraction and recirculation systems. Extractor systems require a vent to the outside but are more effective than recirculation systems and so are the preferred type.



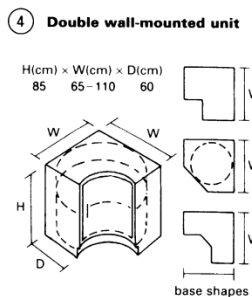
① Single floor unit



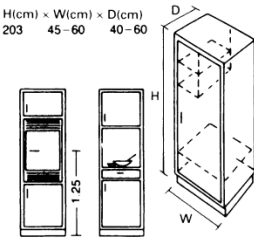
② Double floor unit



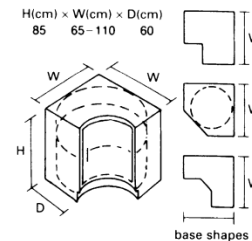
③ Single wall-mounted unit



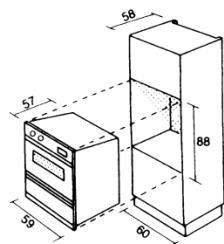
④ Double wall-mounted unit



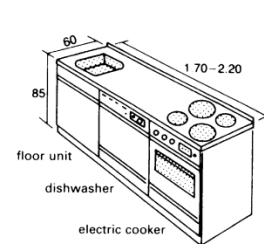
⑤ Full-height cupboards



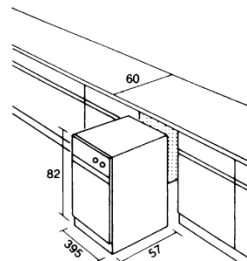
⑥ Corner units



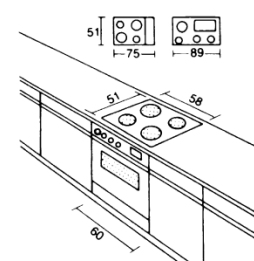
⑦ Built-in cooker



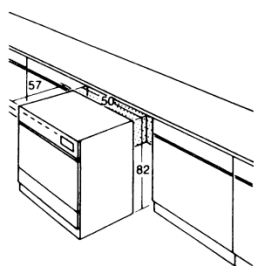
⑧ Kitchen centre



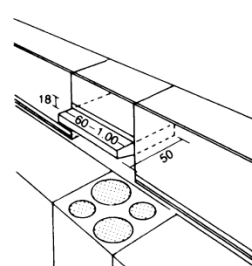
⑨ Electrical waste compaction unit



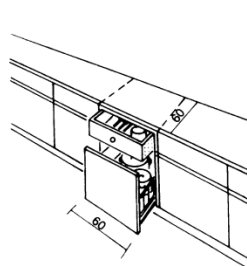
⑩ Cooker space



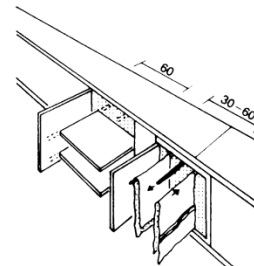
⑪ Dishwasher



⑫ Extractor hood

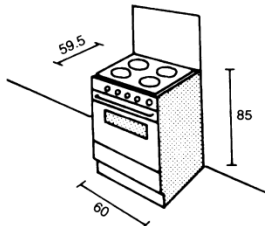


⑬ Saucepan cupboard with drawers

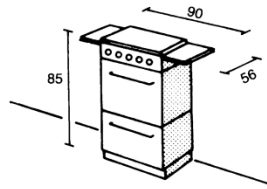


⑭ Equipment cupboard and towel cupboard

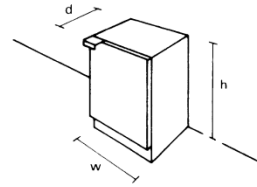
# KITCHENS



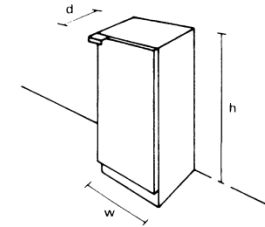
① Electric cooker



② Large gas cooker



③ Refrigerator



④ Upright freezer

size (l)	w (cm)	d (cm)	h (cm)
50	55	55-60	80-85
75	55	60-65	85
100	55-60	60-65	85
125	55-60	65-70	90-100
150	60-65	65-70	120-130
200	65-70	70-75	130-140
250	70-80	70-75	140-150

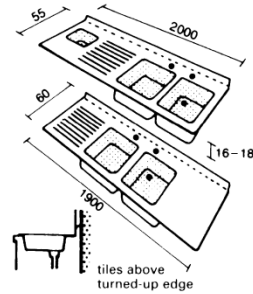
⑤ Dimensions: refrigerators and freezers → ③ + ④

size (l)	w (cm)	d (cm)	h (cm)
50	55	55-60	80-85
75	55	60-65	85-90
100	55	60-65	90

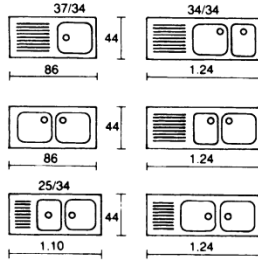
⑥ Dimensions: built-in refrigerators

The dimensions of built-in units and equipment must be taken into consideration when designing the layout and storage areas of a space-efficient kitchen. Modern electrical and gas units as well as kitchen furniture are made such that they can usually be fitted together and built in, giving combinations that ensure a smooth flow of work. Provide sufficient shock-proof sockets: a minimum of one double socket for each working and preparation area.

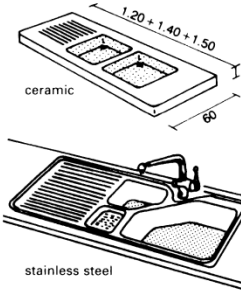
A double sink unit is usually required → ⑦ - ⑨, ideally with a draining surface on one side and a standing surface on the other. Dishwashers should be fitted to the right or left of the sink. Where the kitchen is very small, compact kitchens → ⑩ offer a solution. They require little space and can be fitted with many useful features.



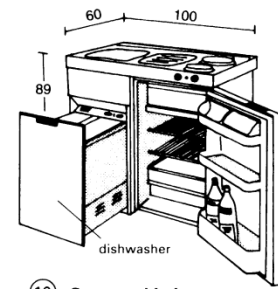
⑦ Dimensions: built-in sinks



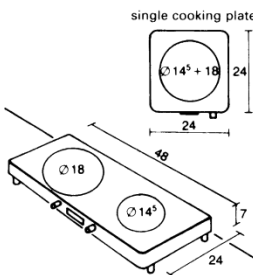
⑧ Types of built-in sinks



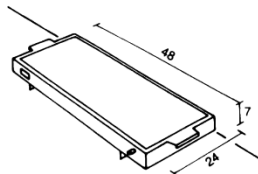
⑨ Sink units



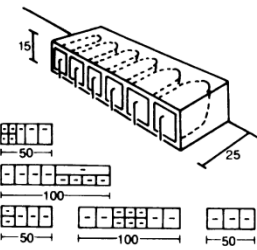
⑩ Compact kitchen



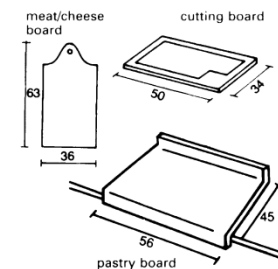
⑪ Cooking plates



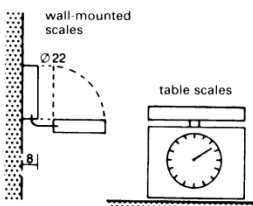
⑫ Hotplate



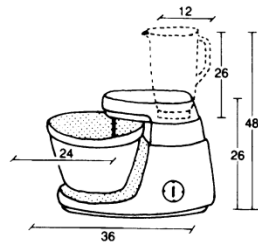
⑬ Glass or plastic storage canisters



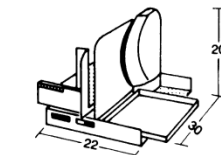
⑭ Kitchen boards



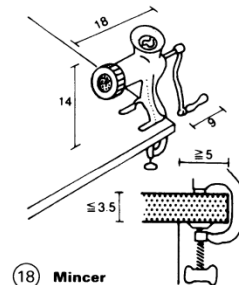
⑮ Kitchen scales



⑯ Food processor



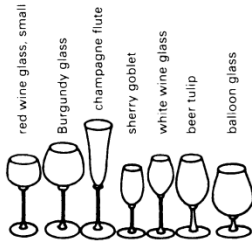
⑰ Multipurpose slicer



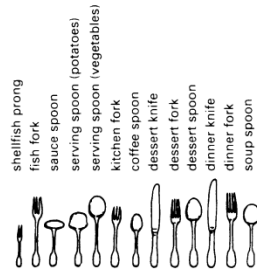
⑱ Mincer

# DINING ROOMS

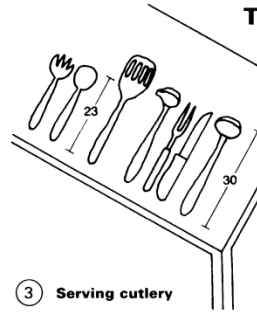
## Tableware and Furniture



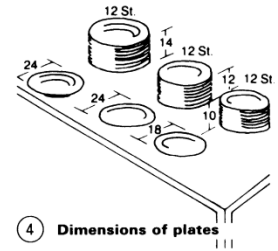
1 Glasses



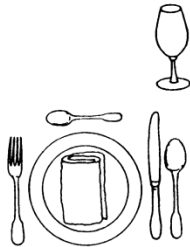
2 Dining cutlery



3 Serving cutlery



4 Dimensions of plates



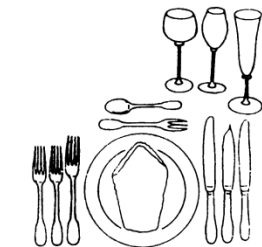
5 Menu: soup, meat course, dessert, drink



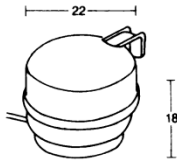
6 Menu: soup, fish and meat course, dessert, white and red wine



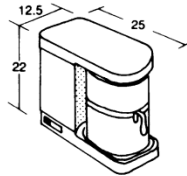
7 Menu: soup, fish and meat course, ice cream, white, red and sparkling wine



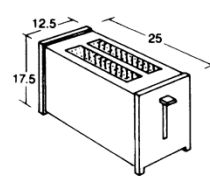
8 Menu: starter, fish and meat course, dessert, white, red and sparkling wine



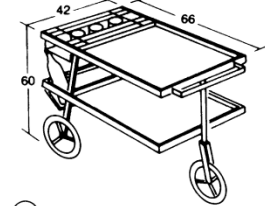
9 Egg boiler



10 Coffee machine



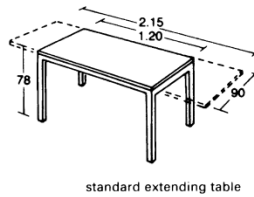
11 Toaster



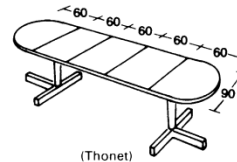
12 Tea-trolley



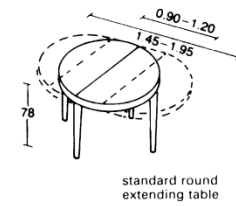
13 Serving table



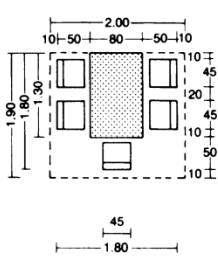
14 Dining table



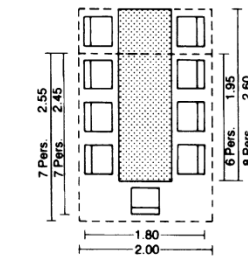
15 Large extending table



16 Dining table



17 Minimum area requirements



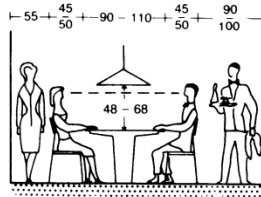
18 Minimum area requirements

number of diners	width (cm)	depth (cm)	space required (m <sup>2</sup> )
four people		≥ 130	2.6
five people		≥ 180	3.8
six people	≥ 180	≥ 195	3.9
seven people		≥ 245	5.1
eight people		≥ 260	5.2

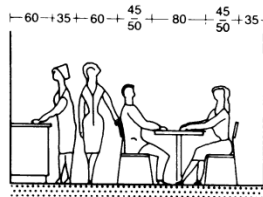
$$\text{round table} = \frac{(\text{seat width (m)} \times \text{number of people})}{3.142}$$
 e.g. for 0.60m seat width and six people =  $\frac{(0.60 \times 6)}{3.142} = 1.15\text{m}^2$

19 Minimum area requirements → 17 + 18

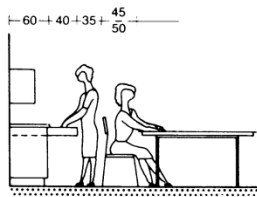
## DINING AREAS



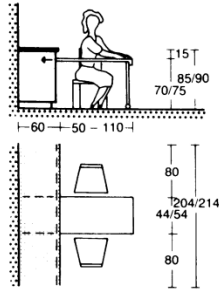
1 Minimum table-to-wall distance depends on how food will be served



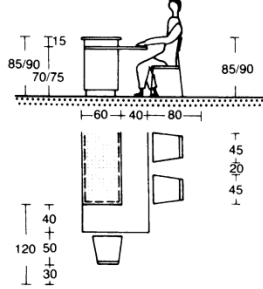
2 Allow space between sideboard and table for walkway



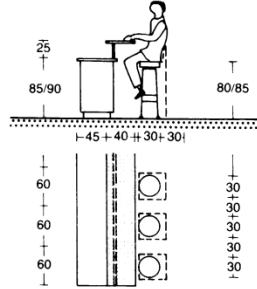
3 Allow for drawers and doors



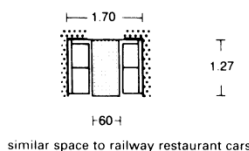
4 Retractable table



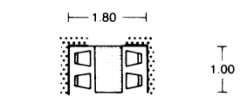
5 Fitted table



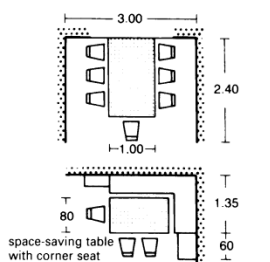
6 Breakfast bar



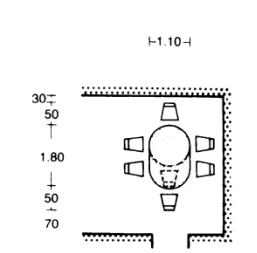
similar space to railway restaurant cars



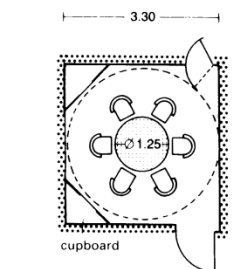
7 Smallest space for dining table and recess



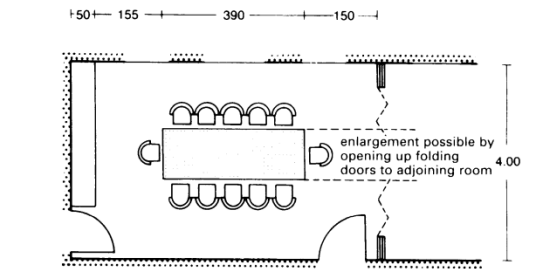
8 Ensure clear access to rear seats with more than five diners



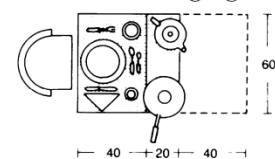
9 Round table, four to six people



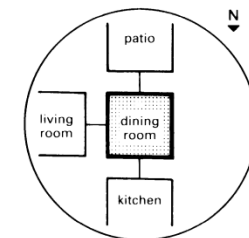
10 Minimum size for six diners with round table



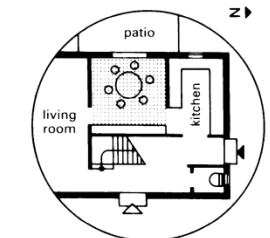
11 Most comfortable seating arrangement in dining room for 12 people (with sideboard)



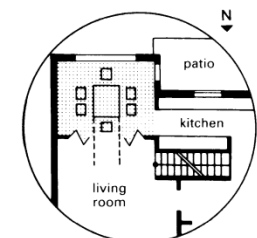
12 Typical table cover



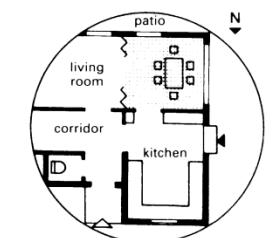
13 Dining room layout scheme



14 Self-contained dining room between kitchen and living room (undisturbed dining area)



15 Dining room between patio and living room: folding doors allow combination with the living room



16 Dining room and living room, as 15, on common patio giving good natural lighting

It is often desirable to have space in the kitchen for eating snacks, breakfast etc. and use the dining room for main meals only. This can be provided by including a retractable table, with a height of 70–75cm, which is pulled out of a base unit → ④. A movement area of at least 80cm is needed to the left and right of the table. If sufficient space is available a fixed table against a free-standing unit can be used → ⑤. Another alternative is the breakfast bar arrangement → ⑥. This requires less depth than the fixed table, even though the surface is also 40cm deep, because of its elevation but this also means that special stools are required. Depending on their design, full dining areas require far more space but they can obviate the need for an additional dining room → ⑦ + ⑧. A corner seat and dining table take up the least amount of space → ⑧.

It is useful to be able to extend the dining room through wide doors or a folding wall for special occasions → ⑪ + ⑮. To eat comfortably an individual needs a table area of 60 × 40cm. A strip of 20cm is needed in the centre of the table for dishes, pots and bowls → ①. Lighting should not be dazzling: the ideal distance from lower edge of the light to the table top is around 60 cm → ①.

Suitable locations for dining rooms are shown in ⑭–⑯.