LIGHTING GENERALLY

Natural light is the basic stimulus for vision and life itself. The ability of the eye and the body to function is directly related to light.

Until recently light was considered as a general aid in "seeing" but during the last two decades researchers have discovered light has a profound effect on the human organism.

Natural sunlight stimulates the pineal and pituitary glands which in turn regulate the production and release of hormones controlling body chemicals.

It is assumed that lack of sunlight may have an adverse reaction on our bio-rhythms causing headaches, fatigue and stress which, over a prolonged period of time may ultimately develop into chronic illness.

Other destructive elements such as air conditioning, tinted windows, artificial light, gas and electrical heating, tinted eyeglasses, lack of ventilation, electronic display units, smog, plastics, artificial fibres, building products and even suntan lotions can play a major role in the destruction of a healthy living and working environment.

The result can be incomplete metabolic and biological functioning of the body.

PHYSIOLOGICAL EFFECTS OF LIGHT IN THE HOME

As our lives are consumed by computers and multi media we work and play indoors and study for lengthy periods surrounded by artificial light with little or no stimulation from natural day light.

Lengthy exposure to artificial light may induce eye fatigue and eye strain, resulting in physio-psychological problems such as physical and emotional stress and behavioral disorders.

It is assumed that man needs daily doses of sunlight to function and remain healthy but with the development of various types of artificial light used in the home and workplace and exposure to them, our bodies may be losing their natural ability to metabolize.

There is no doubt that physical and emotional stress may partially be attributed to over exposure to artificial light and under exposure to sunlight.

Ultimately, if ongoing, the physical regeneration process may start to break down having long term health consequences.

HEALTHY BUILDINGS

We must design our buildings to gain optimum benefit from natural light and prevailing breezes to be regarded as healthy homes.

Orientation is undoubtedly the most important criteria when designing homes for warmth, coolness, ventilation and light. Our homes must be cool in summer with adequate ventilation and warm in winter preferably without artificial heating and intolerable unwanted drafts.

HOT ENVIRONMENTS

If we live in an oppressively hot environment, we should attempt to reduce the amount of hot reflected sunlight to living spaces without eliminating natural light.

This is achieved by the deflection of reflected sun and heat from adjacent building surfaces using dark non-reflective foliage, materials and colours.

Sun shields such as verandahs, eaves, pergolas, trees and awnings provide protection from intense sunlight.

Contemporary buildings may be over illuminated and heated in summer because of large unprotected windows being exposed to hot aspects.

To eradicate problems associated with reflected light and heat, windows and doors are best located around the building so that natural light penetrates gently and indirectly into the space without radiating from surrounding buildings and exterior surfaces.

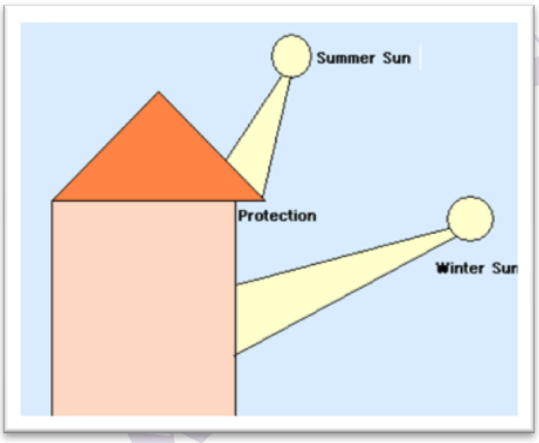
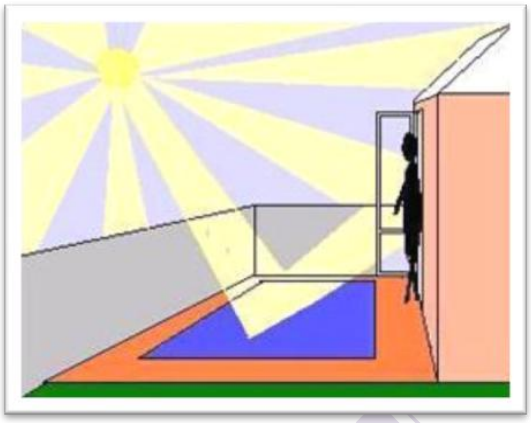


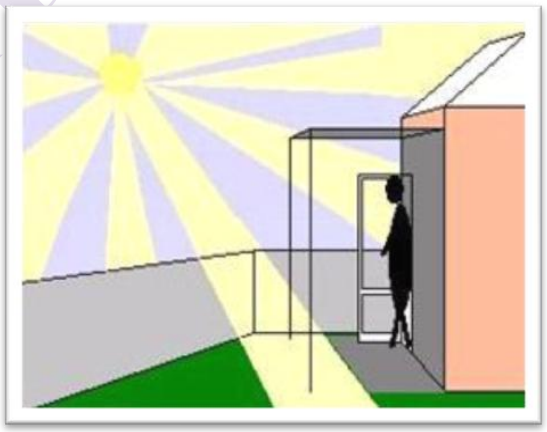
Illustration showing winter and summer sun angles

Rooms situated on the eastern side of a building exposed to direct early morning sunlight may need protection in the form of eaves, pergolas and/or deciduous vegetation, awnings, blinds and/or curtains resulting in an expensive solution to an initially obvious problem.



Reflected and radiated sun

Reflection of direct or indirect sun light and heat may be exacerbated by pools, heat absorbent and light reflective walls, ceilings and floor surfaces such as masonry walls and tiled floors.



Protection using sun shade

Selection of non reflective tonal colours and unpolished materials can assist in the deflection of aggressive unwanted sunlight and heat.

Attention to the aforementioned in preliminary design stages will save money ultimately as ongoing unnecessary cooling and/or heating may be continuous and expensive

COLD ENVIRONMENTS

When living in a cold dark environment, the opposite too the aforementioned applies.

During early concept design stages consider the advantages and disadvantages of direct and indirect reflection of natural light and heat from adjacent, external, light-reflective surfaces.

Older buildings with large overwhelming verandahs and foliage may be dark and cold in winter. Adjacent surfaces such as surrounding walls and fences may be used to indirectly reflect heat and light into rooms for warmth and additional light in winter months.

Light reflective fencing and foliage such as golden pines and white iceberg roses are excellent light reflectors.

Mirrors are ideal for dark passageways and rooms aiding natural illumination thus enhancing adjoining spaces. When placed directly opposite a window, mirrors reflect 100% of light thus creating the illusion of an additional window achieving a sense of equilibrium and balance.

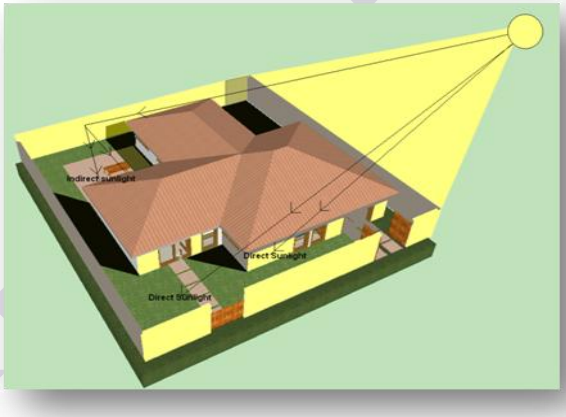
The positioning of window and door openings can be highly beneficial for additional warmth and light in cooler months when relating to winter sun. Selection of dark, textured floor materials will absorb heat providing warmth during the day and, by way of convection, release warmth at night.

The containment of heat may also be facilitated by the addition of double glazing, insulation and heat absorbent wall, ceiling and floor surfaces such as masonry walls and absorbent tiles.

Radiation and retention of natural light and heat into a space can help eliminate costly energy consumption by utilizing as much day light and heat as possible rather than relying on artificial illumination and warming systems.

BASICS OF ILLUMINATION

Illumination may be direct or indirect as shown in the following diagram.



Direct natural illumination is the radiation of sunlight from the sun without reflection or interference.

Direct artificial illumination is the projection of light from a man- made source or light fitting emphasizing the space or object but flattening the form and is most commonly used for working stations, security areas, pathways and general space illumination.

Direct artificial illumination for general lighting is best when used with a circular translucent fitting such as an oyster or hanging pendant. Unfortunately, oyster fittings are generally not considered as decorative or flattering fittings but are inexpensive, practical and efficient.

When intense, direct illumination can

cast crisp shadows onto workstations if the user's torso is above the workbench and directly under the light source. In this case install fittings above and in front of the user.

To minimize glare avoid using highly tinted reflective working surfaces such as polished stones, metals and light reflective colours. (*See Colour Chapter 3*)

Intense direct illumination such as spot lights above vanity basins in bathrooms can cast shadows making application of make up and shaving difficult should the user be sight impaired.

Softer indirect illumination reduces shadows and finer details such as wrinkles and blemishes instilling a sense of confidence and well-being on the user.

Consultation with a design specialist or lighting engineer and inspection of the types of lighting available would be advisable prior to purchasing.

Indirect natural illumination is sunlight reflected from surrounding houses or buildings, wall surfaces and reflective ground paving materials and boundary fences.

A living space adjacent a sparking pool may become unusable due to severe sun reflection during hot summer days or clear sunny winter days.

Highly reflective surfaces such as windows and water can negate the enjoyment of a perfect garden space on even the most enjoyable spring day.

The following illustration demonstrates the reflection of intense sunlight into an interior space from an adjacent water feature.

This problem can become a fire hazard or cause severe eye strain if constant.

The aforementioned problems could have been easily overcome by the relocation of the water feature or door to another suitable location on another aspect of the house.

Contrary to popular belief, the location of the site and orientation of the house is tantamount to that of visual appeal in terms of spatial enjoyment.

NATURAL LIGHTING DESIGN CONSIDERATIONS

Poorly designed homes may be so lacking in natural light that a continuous supply of artificial light is required.

Bathrooms and laundries window types and locations in particular are often ignored when it comes to the selection of appropriate windows enabling sufficient penetration of natural light and ventilation.

Many illumination problems are easily and inexpensively overcome by the

application of intelligent design principles being exercised in preliminary design stages.

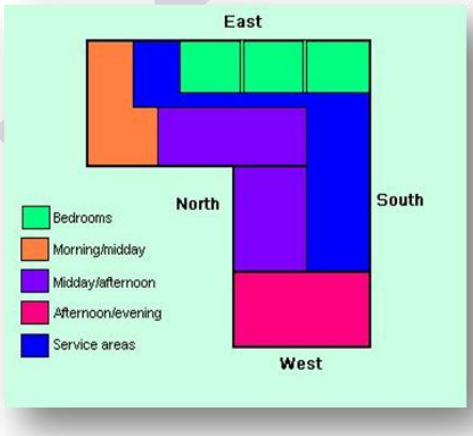
Utilizing the services of an interior designer or lighting consultant would be strongly recommended prior to the conclusion of final designs. Although a fee may be involved, a consultation may negate expensive illumination problems requiring change and additional costs in the future.

SITE ORITENTATION

Prior to selecting and purchasing a building block, consider the orientation of the site, the surrounding buildings, the lay of the land, the environment in which you will be living and the preferred aspect of living spaces to exterior recreational spaces.

The sun rises in the east and sets in the west therefore the time of use and location of interior spaces are best when they relate to the sun.

Bedrooms may be best looking east (morning sun), family rooms north (midday sun) and afternoon or early evening living rooms west (setting sun).



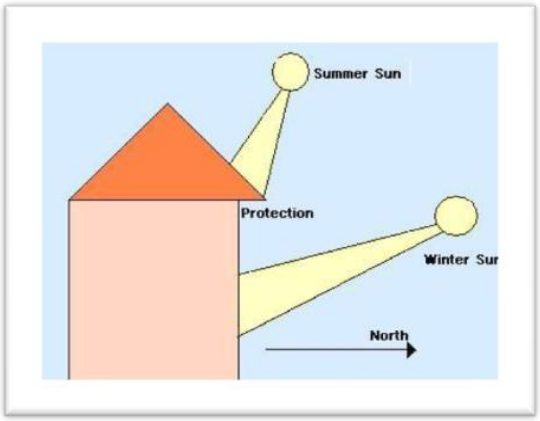
The location of rooms may also be influenced by views to the ocean or a lovely garden.

WINTER AND SUMMER CONSIDERATIONS

As the earth tilts on its axis, the sun in summer is at a higher angle with longer days to that of the winter sun at a lower angle with shorter days.

Rooms without eaves or window protection can be uninhabitable in summer in a hot climate, however warm in winter in a cool climate.

During winter months, the sun being at a lower angle penetrates windows and openings providing warmth and light but all care must taken to ensure that adjoining exterior and interior recreational spaces are protected from surrounding highly reflective surfaces as previously mentioned in indirect natural illumination.



Poorly illuminated interior and exterior spaces may need the assistance of indirect radiated light from external and internal walls, floors and ceilings.

Finishing colours containing 80 - 95% white (tint) are ideal reflectors as they are less light absorbent than darker colours. Black absorbs

approximately 90% of all sunlight and artificial light.

Colour used as an aid in the illumination of the home is discussed in Colour Chapter 3.

Mirrors reflecting 100% of light are excellent light reflectors and space enhancers.

When placed opposite a window, mirrors create the visual effect of an additional window adding to the equilibrium of the space.

Whilst inspecting an existing building for purchase, one should establish whether all habitable and non habitable rooms have been artificially illuminated to enhance the home for selling purposes. During inspection, ask that all artificial interior illumination sources be turned off giving a true indication of interior light efficacy during the day and on for night time inspections.

It is now recognised that too much or too little natural and artificial illumination may be responsible for many physio-psychological problems such as depression, fatigue and headaches.

Home illumination design systems are not considered as much as they should be during early design stages. A badly designed lighting system may be an expensive problem to overcome in the future.

LIGHTING DESIGN CONSULTANTS

Research into the types of lighting available and their application is well advised prior to final plans being concluded. There are many specialized lighting retailers offering consulting services for a small fee.

Fees for lighting design may vary from $100.00 to $2,000.00 depending on the complexity of the building design and extent of lighting required.

The fee however, may be deducted from the final lighting supply contract.

LIGHTING BENEFITS

Much of a room's atmosphere is established by the type and quality of illumination. We can change the atmosphere of a room by the flick of a switch.

More so than colour, with the addition of balanced ambient illumination, rooms can appear bigger or smaller and warmer or cooler.

Light is encouraging and assists with visual and physical guidance through interior and exterior spaces providing a sense of emotional security and safety.

Positive psychological responses can occur with the addition or reduction of light and following are examples.

- Small brilliant "fairy" lights create an atmosphere of gaiety at weddings and parties.
- Children are spellbound by tree lights. At Christmas time, one of the most important and enjoyable events can be turning on the Christmas lights.
- A small lamp provides children

and adults with emotional security at night;

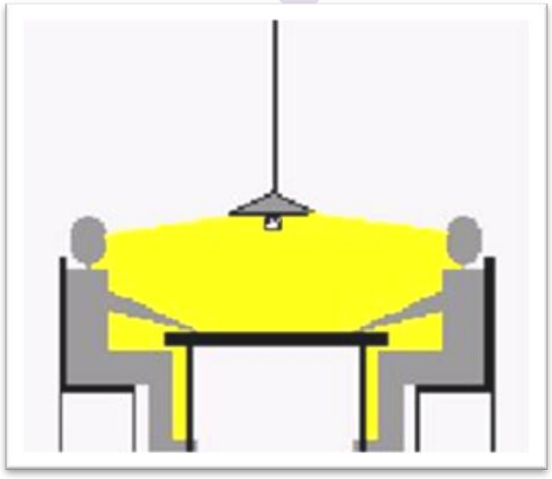
- Lighting suspended over tables will prompt intimacy and conversation.
- Artworks and accessories are easily emphasized;
- design weaknesses can be de-emphasized with a little help from additional artificial light.

It is my belief that lighting and colour are the most important elements in creating a physically and emotionally well balanced interior or exterior space.

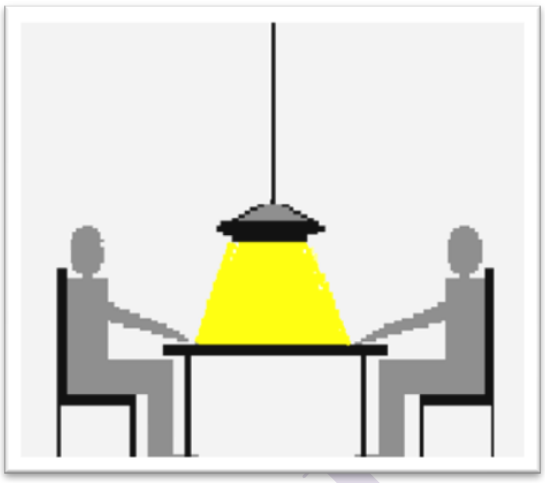
PROBLEMS TO AVOID

Illumination can often be over utilized creating disharmony, discomfort and stress and the result can be disturbing and expensive to rectify.

Pendant fittings with exposed globes suspended at incorrect heights over tables create glare as will candles flickering at eye level.



PROBLEM

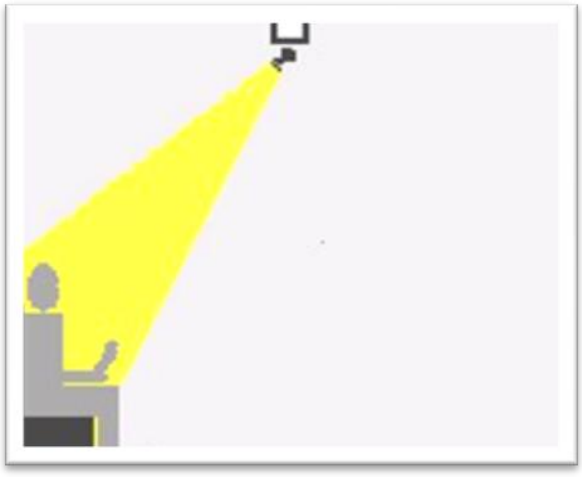


SOLUTION

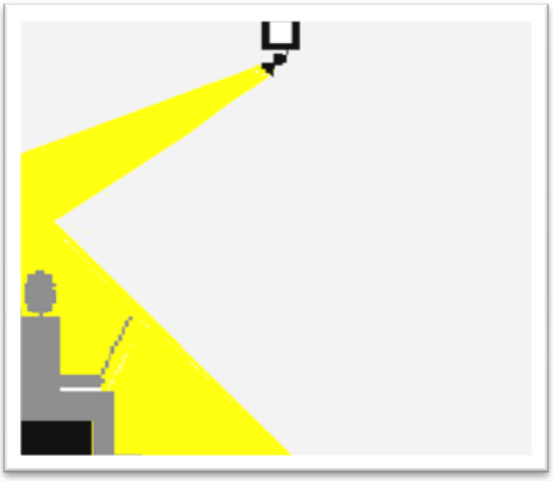
To soften glare from an exposed globe, use either pearl or reflector globes and/or fittings casting a 60 – 90 degree beam of light over the area being illuminated as demonstrated above.

It is not recommended to locate intense directional multi spot fittings suspended from the centre of the ceiling as a general light source. This creates eye fatigue resulting in eye strain.

Illumination for reading is best positioned behind the reader or reflected from a wall surface.



PROBLEM



SOLUTION

Illumination projected onto walls or ceilings is gently reflected rather than directly in the line of vision.

Select your light fittings wisely for various tasks and locations as follows:-

ARTIFICIAL LIGHTING TYPES

Artificial light sources are varied and numerous and must be appropriately selected for the function of the interior or exterior space.

The selection of an artificial light source must never be for cost alone as long term results may have substantial physio-psychological consequences on the well-being of long term inhabitants.

Following are the most widely used light sources for domestic housing, some advantages and disadvantages.

Fluorescent illumination is a harsh, colour distortive, flickering light used for general even illumination of task areas such as laundries, storage rooms and garages in conjunction with white walls and ceilings for optimum efficiency.

Fluorescent lamps are seldom, if ever, used for atmospheric illumination. Long term exposure to fluorescent lighting is known to cause eye fatigue, tiredness and lack of concentration.

As fittings are inexpensive and long lasting, fluorescent light is used extensively in government, private and public buildings, commercial applications, work shops and other long term cost-effective situations.

Colour rendition is poor therefore fluorescent illumination is not recommended for romantic situations, kitchens, bathrooms, dressing rooms, make-up stations, art studios and décor emphasis unless lamps are colour enhanced.

Should fluorescent illumination be preferred because of long term running cost considerations, it is recommended that another type of lighting be used in conjunction with fluorescent lighting such as halogen in order to achieve the desired atmosphere when required.

The advantages and disadvantages of fluorescent lamps are as follows:-

- Fixtures and tubes are inexpensive;
- Tube life is up to ten times longer than incandescent or quartz halogen;
- Easy to install;
- Efficiency is approximately four times greater than incandescent for energy consumed;
- Almost no heat is produced;
- Fittings are generally larger and less aesthetic, although tubes are

now available in curves and spirals;
- With age lamps can flicker and hum causing fatigue and irritation;
- Light is cold and unappealing;
- Colour rendition is poor but colour corrected tubes are available for colour enhancement, and
- Tube contains mercury therefore disposal is difficult.

Compact fluorescent lamps "CFL's" have been designed to replace the outgoing incandescent lamp. CFL's are curved tubes to fit into the space of an incandescent lamp. Improvements to CFL's are to be expected in the future.

Incandescent illumination is a heat generated soft yellow appealing light and is considered more atmospheric and flattering than fluorescent and halogen light.

Because of minimum energy performance standards for lighting products being imposed by the Australian Government in 2007, incandescent light will eventually be banned from sale and replaced by CFL's and LED's.

The disadvantages and advantages of incandescent lamps are as follows:-

- Bulbs cost less with no flicker or hum;
- Colours are enhanced;
- Lamp is warmer and more atmospheric than others but bulb life span is shorter;
- Dimmers can be installed for added atmosphere for various tasks such as television viewing;
- Forms and spaces have softer shadows and outlines;
- Light is warm, romantic and elegant;
- Energy consumption is more than fluorescent and halogen therefore running costs can be high;
- A heat generated light therefore not ideal as a source of illumination in hot environments;
- Dimming can shorten the life of the lamp, and
- Lamps are hot to touch and may burn.

Halogen illumination is a crisp intense light reminiscent of sunlight having excellent colour rendition qualities.

Halogen lamps can run on 12v and 240v mains voltage.

The 12v halogens lamp requires transformers to reduce the circuit from 240v to 12v.

Transformers can be integral or separate to the fitting. Separate transformers may need to be housed in areas of the home where they are not seen such as the tops of wardrobes, bulkheads and ceiling spaces or can be integral to the lamp.

Fixtures and globes can be expensive initially but as less energy is

consumed, mains voltage halogen over long periods can be inexpensive.

The advantages and disadvantages of halogen lamps are as follows:-

- Fixtures and lamps may be expensive or inexpensive depending on the type of fitting and its origin;
- Excellent colour rendition properties;
- Fixtures may be small and easy to install;
- Less heat to that of incandescent is generated by the lamp which may also be dimmed;
- Light beam volumes are available in a variety of beam diameters making the halogen lamp far more versatile than other lamps;
- More fixtures may be required for general even illumination and atmosphere thus counteracting lower running costs;
- A high number of 12v halogens cast many strong shadows and outlines;
- Fixed too far apart, hot and cold spots occur on walls and benchtops creating problems for the sight impaired;
- There may be problems in changing lamps if installed in difficult spaces such as high ceilings and above stairs;
- Small fittings and lamps give a twinkling effect creating a sense of festivity;
- Used with dimmers, bulbs may have a short life span, and
- Small halogen lamps produce a star like quality creating a sense of gaiety, spontaneity and freshness.

Halogen illumination being more versatile and adaptable to most situations is considered the most popular and can provide dramatic effects throughout the home, guide travelers through spaces without general illumination and provide additional lighting to work stations, areas of significance and accessories.

Light emitting diodes - LED'S are used as indicator lamps in particular but are being developed and used for other lighting. Although not readily available for homes they may be the lighting of the future. The lamps may be expensive but consume much less energy to incandescent and halogen lamps.

LIGHTING CRITERIA

General illumination is without emphasis. Rooms are viewed as a whole with softer shadows minimizing harsh outlines.

Objects are flattened and appear less interesting therefore general illumination is regarded as less flattering but essential for general cleaning.

General illumination may be insufficient for reading and close handy work and can be monotonous and uninteresting and not generally recommended for atmospheric situations.

Fluorescent tubes and halogen lamps within opaque spheres and semi-spheres, commonly referred to as oysters, are best used for general lighting in task areas such as kitchens, workshops and laundries.

Fluorescent illumination should be avoided in bathrooms and formal residential and garden areas because of poor colour rendition properties and dullness.

Local or task illumination is intense directional and localized for areas such as worktops, storage areas, objects, paths and passageways.

Local illumination can be halogen spot lights and lamps for tasks such as reading, studying, sewing, concentration, meditation, cooking, creating dramatic effects and highlights.

A variety of light fittings are available in ceiling, wall, work top mounted or portable such as table lamps and standard floor lamps.

Local lighting can be directional or reflected using spotlights with a high level of illumination creating dramatic effects. Spotlights are available in 12v halogen and mains voltage halogen with a variety of beam widths to suit various applications.

Spot illumination is intense and used for emphasis of artworks, garden features, entrances, objet d'art or areas requiring a high level of illumination for a specific task such as mending.

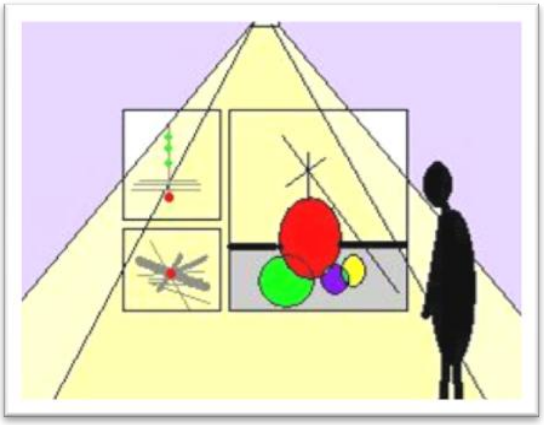
Dramatic illumination for gardens is achieved by carefully and safely locating the fitting behind the object being emphasized. This is commonly referred to as back lighting.

Spot back illumination outlines the object shape but flattens and de-emphasis the front of the form.

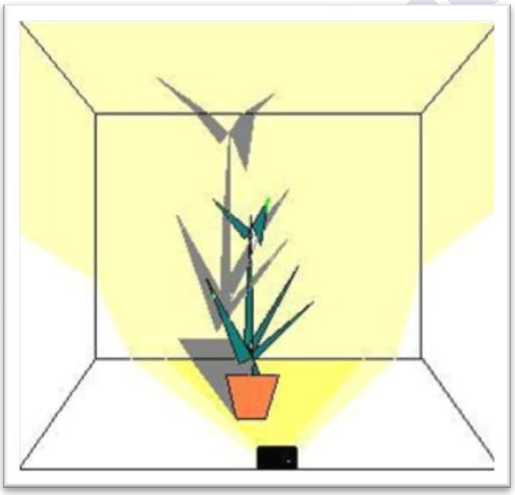
Well shaped trees and shrubs can be stunning when back illuminated for evening garden parties.

Spot illumination is ideal when used as general illumination for small dark corners and service areas.

Illuminating wall surfaces around the home and in the garden emphasizing passage ways and entrances will reassure the traveler giving a sense of security as well as creating dramatic effects for gardens and architecture.



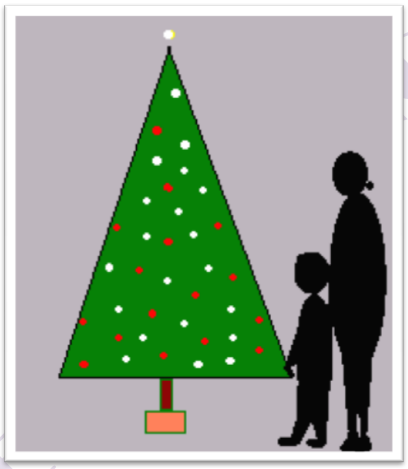
Lighting and interior design consultants can assist with advice on the positioning of fixed spotlights to maximize the exhibition of paintings, two and three dimensional objet d'art eliminating glare and unwanted shadows.



Front Illumination for Objet D'art

Generally fittings are best located centrally at 300mm to 600mm out from the wall in front of the object being emphasized or exhibited.

Brilliant illumination is an abundance of small sparkling lights located in formal areas, gardens, entrances and home theatres and is often used on special occasions such as dinner and garden parties imparting a sense of festivity and magic.



Brilliant Illumination - Christmas Lights

Brilliant light is seldom, if at all, used for general illumination as each light source is small and ineffectual.

Lighting can be halogen, LED and candlelight. The most commonly used but especially dangerous around the young and elderly is candle light.

To watch children at Christmas time when the tree is finally decorated and illuminated with fairy lights is a joy to behold. Brilliant illumination changes our emotional well-being with the flick of switch.

Security illumination is best when directional, even and soft eliminating shadows wherever possible.

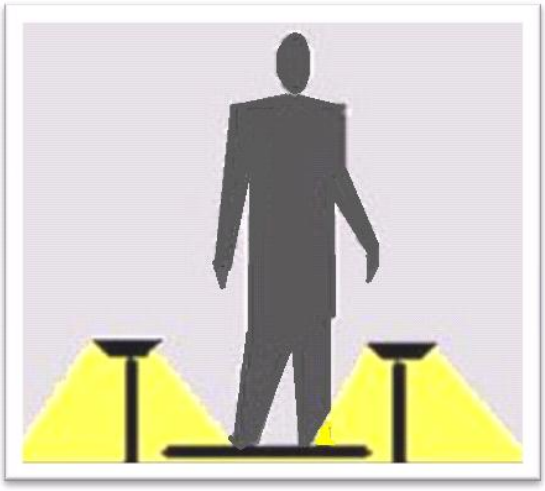
Most home occupiers are careful to protect their family and property with the inclusion of movement and heat activated sensors generally in the front garden and on the garage of the home but fail to address the importance of

security illumination around the perimeter of the property and dark corners.

The importance of external security illumination is paramount to all other forms of security. Once in the property, intruders can hide under bushes and in dark spots unbeknown to the residents especially if the residents are tucked up in the home with all curtains drawn at night.

The intruder can be at the back door without your knowledge before you know it. So it may be best to illuminate along boundaries and entrances firstly, as light discourages the unwanted intruder more so than any other form of security in the garden.

The gentle illumination of entrances, passageways, paths and boundaries in and around the home and garden is possibly the best and least expensive form of emotional security.



Direct Illumination – Paths

Emotional insecurity in this case is reluctance to enter a dark space at night, or walking up stairs and along paths. The elderly and young are especially vulnerable to emotional insecurity.

If in doubt, it would be wise to consult a specialist security lighting company offering all aspects of security other than a front and back door armed security system with the addition of a heat sensor suspended from the garage or verandah blinding the visitor but welcoming the intruder.

Self affixed systems are short term solutions but not adequate in the long term.

Neon lighting used extensively in the past for commercial applications is more commonly used for formal rooms and home theatres as a highlight to walls and ceilings, around entertaining areas and water features, highlighting architectural focuses, pools and gardens.

Neon lighting is expensive to purchase and used mainly for commercial signs and seldom used for general illumination. However, dramatic special effects are created using neon lights and water features. These can be demonstrated by your local lighting supplier or retailer.

DESIGNING A LIGHTING SYSTEM

Although best when left to lighting design experts, following are some helpful hints should the contracting of a lighting designer be out of the question.

NATURAL ILLUMINATION

Illumination throughout the home and garden should be well balanced and

natural for daily tasks and activities without the addition of artificial illumination where possible.

Carefully consider and analyse the natural illumination of your home interior and exterior spaces at the time of day the spaces will be most frequently inhabited.

If your home plans are in the preliminary design stage, consult the services of an interior designer, passive solar architect or both. They have the necessary expertise to evaluate the environmental quality of you home and will provide assistance with the natural illumination of spaces to the orientation of the sun.

If concluded that your new home is devoid of natural balanced illumination, then back to the drawing board please! Responsible home design is paramount to all other building issues as inefficient natural illumination and heating can lead to long term dissatisfaction and unnecessary ongoing additional expense not to mention the ongoing effects on the environment.

ARTIFICIAL ILLUMINATION

On plan, or if the house exists, begin at the entrance and work your way through the home applying the following criteria:-

Security illumination –

- **Generally** for obscure and public areas to include car parks and gardens;

- **Localized** for paths, stairs and passageways, and

- **Spots** for entrances, passages and door emphasis.

Paths and stairs illuminated at ground level are encouraging to the visitor and give a sense of stability, especially to the elderly or vision impaired. Incandescent, quartz halogen and tungsten lighting can provide special effects throughout the garden whilst providing safe passage.

External entrance lights may be activated manually or by heat and movement detectors using smart wiring systems to help deter unwanted intruders. Avoid high and low level mounted spotlights subjecting guests to exposed globes and glare.

- **Local halogen** ceiling mounted recessed lighting casts welcoming warm light emphasizing the entrance without glare and intimidation.

Main Interior Entry should feel welcoming and secure with emphasis on paths, steps and doors bells.

- **General fluorescent** light is seldom used for formal entrances but is adequate for entrances of less importance;

  12v spot halogens are regarded as more elegant creating a 'Hollywood lights' impact. These may be used with decorative pendants and chandeliers for added formality and pizzazz;

- **12v Spot or tungsten halogen** wall mounted up-lighters will emphasize architectural details creating dynamism to even the most conservative entrance; and

Finally the inclusion of an **attractive warm halogen** table lamp opposite the entrance doorway or window is always perceived as a welcoming gesture.

Normally, two types of lighting in any room would be sufficient however, it is possible to incorporate all the above lighting types in one space if the budget permits.

This degree of lighting may be regarded as an unnecessary indulgence and somewhat irresponsible considering our current environmental climate.

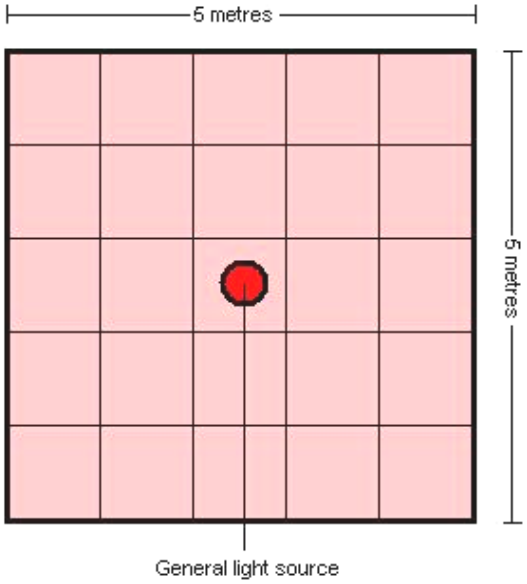
Public and Private Areas

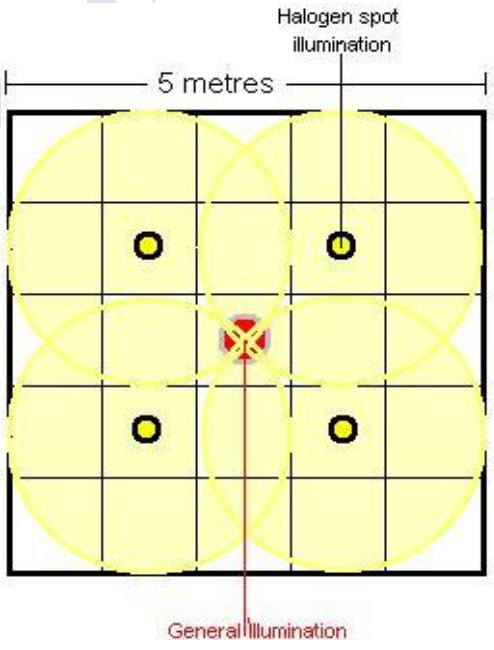
Most interior spaces of the home require a variety of lighting types providing additional atmosphere as the moods or tasks arise.

- **General halogen** or fluorescent illumination of approximately 200 – 400 watts is essential for cleaning a room approximately 3.6m - 5 metres square;

  The position for one general fitting is best centrally located in the ceiling as demonstrated in the following diagram:-

  Should directional halogen illumination be preferred in the form of recessed spots as demonstrated in the above Illustration using two or four fittings, the fittings are best installed not less than 1.2 metres and not more than 2 metres apart ensuring even illumination.





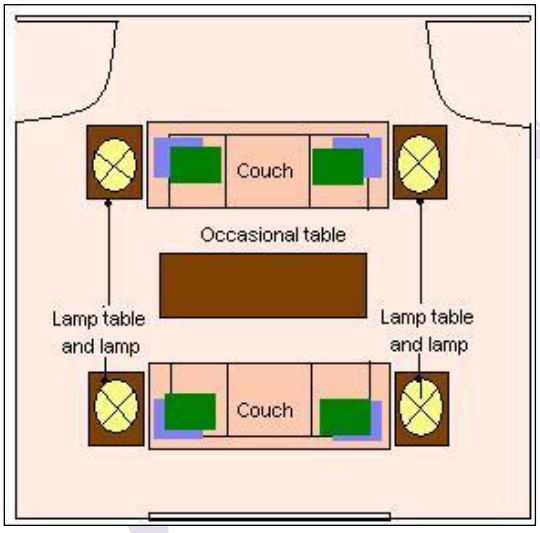
- **Atmospheric illumination** for television viewing, a romantic dinner or just quiet relaxation is best when the colour (or temperature) is warm and intensity low.

  Incorrectly selected fittings and lamps may have a negative visual impact on the desired ambiance of the room.

- **Local illumination** such as table lamps and recessed spot lights for objet d'art, artworks, architectural and furniture emphasis can dramatically improve the integrity and visual impact of any room.

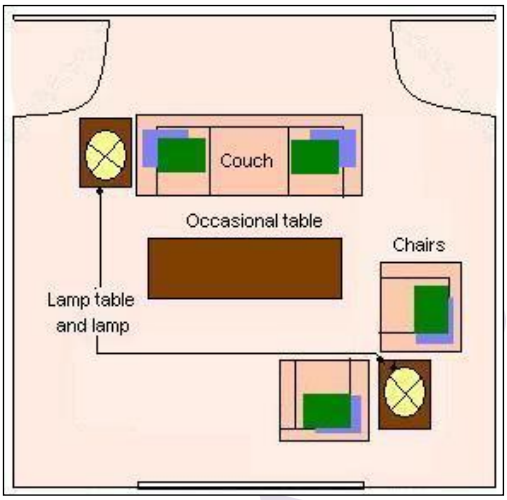
  Local illumination provides warm pools of light giving a sense of coziness and emotional security and is best when conforming to the balance of the room.

  A formally furnished and accessorized room requires lamps placed around the room retaining the balance as demonstrated below.



Symmetrical room arrangement

If the room is asymmetrically or informally designed as demonstrated in the following illustration, the lamps may be asymmetrically positioned retaining the informal balance of the room.



Assymmetrical room arrangement

Even the dreariest interiors can be instantly, easily and inexpensively converted into a visually exciting space for entertainment simply by the addition of well placed fixed or freestanding decorative or concealed spot lamps.

It is essential that all illumination be balanced either formally or informally within the room achieving a sense of equilibrium and well-being.

DINING ROOMS can be formal or informal, elegant or casual with a variety of lighting for short or long term dining for more formal occasions. The illumination should focus around the function of the room and cleaning when required.

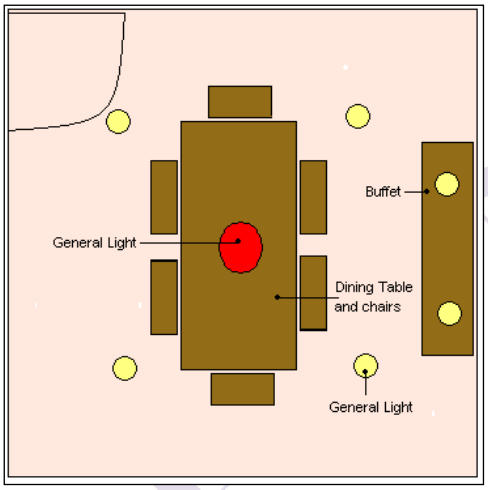
- **Local halogen** centrally located above the dining table for eating and conversation;

- **General halogen** for cleaning in the form of two or four spots equally spaced in the ceiling as demonstrated in "Public and Private Areas".

- **Dimmers** provide an option for intense illumination for general tasks and soft illumination for atmospheric dining;

- **Local halogen** recessed down lights or table lamps atop servers or buffets emphasize a beautiful arrangement of flowers, fresh colourful fruit or those sumptuous puddings and cakes so lovingly prepared; and

- **Brilliant illumination** in the form of chandeliers, candles or your favorite sparkling pendant at approximately 600mm adorning the table will add gaiety to the occasion and ambiance to the room.



Dining Room with General and Spot Illumination

KITCHENS being a major task area used throughout the day and night require the following lighting:-

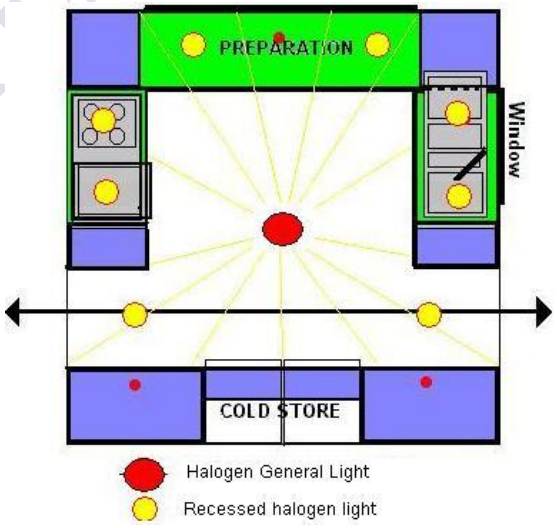
- **General halogen** or colour corrected fluorescent for general cleaning. The selected lighting must eliminate shadows and hard lines where possible;

- **Local directional halogen** over benchtops for task illumination at 1.2 – 2.0 metres apart; and

- **Spot halogen** for difficult to illuminate areas such as cabinet interiors and architectural niches.

A combination of 200 – 400 watt diffused general halogen or fluorescent lighting for cleaning and 35 – 50 watt recessed directional halogens at 1.2 – 2.0 metres apart above benchtops is adequate for the average kitchen.

Additional halogen spots may also enhance a kitchen focus such as a cabinet interior, building details and objet d'art but are not recommended for general illumination if possible.



BATHROOM ILLUMINATION is consistent with kitchen illumination providing for general cleaning and daily personal ablutions as follows:-

- **General halogen** lighting installed in the ceiling for cleaning and surveillance of cupboard interiors.

- **Local halogen down lights** over vanity basins for the application of

make-up and shaving. The light used should be warm and soft eliminating shadows and hard lines especially if the occupant is sight impaired.

- **Brilliant small halogen** or "Hollywood" lights either above or surrounding the face may be preferable for makeup application. Once again the light must be warm and soft without shadows.

- **Natural illumination** either above or flanking the occupier's face is essential for day use.

Unfortunately many bathrooms have no or little natural illumination requiring the addition of artificial illumination for everyday personal tasks.

If building a new home, pay particular attention to windows provided for bathrooms and en-suites to ensure adequate balanced natural illumination either side or above the vanity mirror.

The introduction of 12v halogen recessed down lights with glass covers now provides lighting to dark showers and bath recesses.

When selecting colour schemes for service areas such as kitchens, laundries and bathrooms, ensure that colour tints on walls and ceilings are used so that light is evenly reflected throughout the space enhancing general illumination.

Safety regulations must be strictly complied with at all times. Consult a retailer, electrician or lighting designer for information regarding safety issues for all lighting installations.