

# Quick guide to light bulbs

Standard tungsten or GLS bulbs (no longer sold in the UK):



Warm yellow-white light

Watts as a measure of brightness

Compact fluorescent lamps or CFL bulbs:



CFLs most common on the market

Many disliked blue-white light and slow start up

Modern colour and 'fast start' options

Good life and energy-saving

Not always dimmable

May not be suitable for high risk or cold areas

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Halogen bulbs:



Halogen bulbs cheapest but least long-lived on the market

Significantly less energy-saving

Similar colour light to old GLS bulbs

Dimmable with no start up lag

Light emitting diode or LED bulbs:



LED bulbs most expensive but most energy efficient and long-lived on the market

Light in a range of colours

No start up lag

Require specialist dimmer switch

New and evolving technology

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Since 2012 lumens is the standard measurement for luminance:



Since 2012 lumens standard unit for luminance

Advise patients to look for this instead of watts

General lighting must be optimised to avoid eye strain

Use the Thomas Pocklington Trust guide for lumen ratings by room size

The inverse square law, which is applied to lighting, states that illuminance is inversely proportional to the square of the distance between the object and light source:



A 60-year-old may require three times the level of light as a 20-year-old

Inverse square law:

$$E = I/d^2$$

(illuminance = luminous flux/distance<sup>2</sup>)

E.g. task light within 60cm will provide 25 times the light of a ceiling light 3 metres away

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The cosine law - which states that the illuminance starts to reduce where a surface moves away from the optimum 90 degree incidence to a light source - applies to task lighting:



**Cosine law:**

$$E = I \times \cos\theta$$

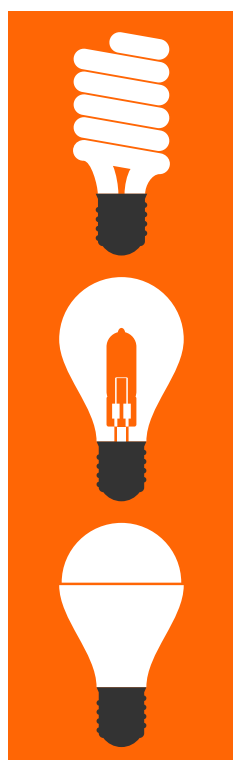
(illuminance = luminous flux  $\times$  cosine  $\theta$ )

An angle may be advisable if the patient prefers to read glossy material

Task lights may be adjustable and portable

A flexible solution

Task light bulbs may be CFL, halogen or LED:



CFL bulbs don't get too hot and can provide either warm yellow white or a cool blue "daylight" white. CFL bulbs without an outer glass envelope emit small amounts of UV light so patients should be advised not be closer than 30 centimetres for extended periods.

Halogen bulbs get hot so may not be comfortable to use for close up tasks.

LEDs don't get hot and are energy efficient, but they don't give off as much light as halogen or CFL bulbs.