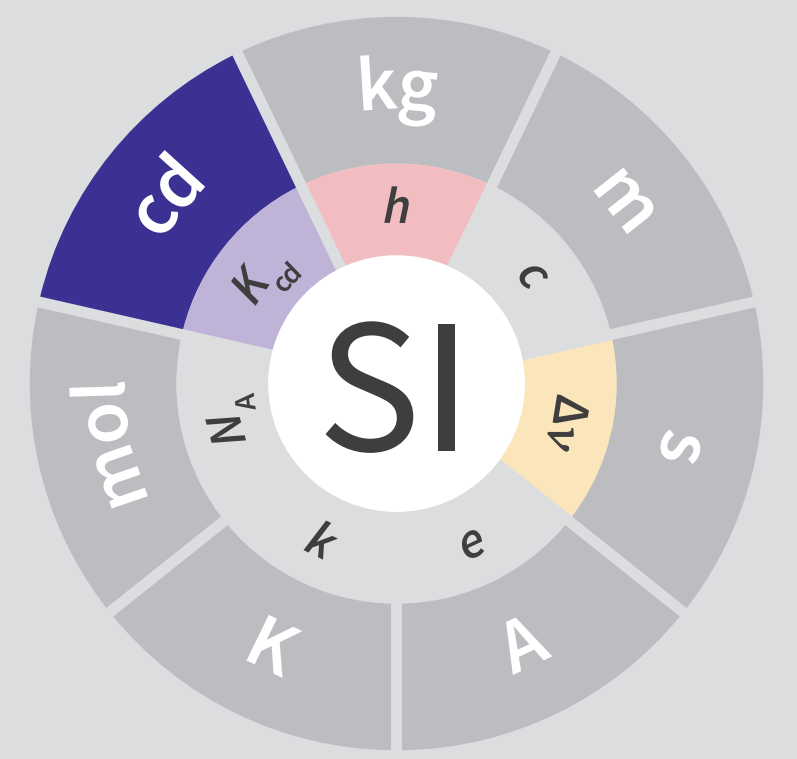


# luminosity measurements cd candela



## Luminosity matters

Light is important to human beings, and the luminous intensity of a light source tells us how bright that light appears to people.

Not all frequencies of light appear equally bright to people, so it can be wasteful to emit lots of light energy at a frequency to which people are insensitive.

This is important for creating energy efficient environments that allow people to work comfortably.

It is important for safety critical lights such as traffic lights, car lights and safety critical warnings.

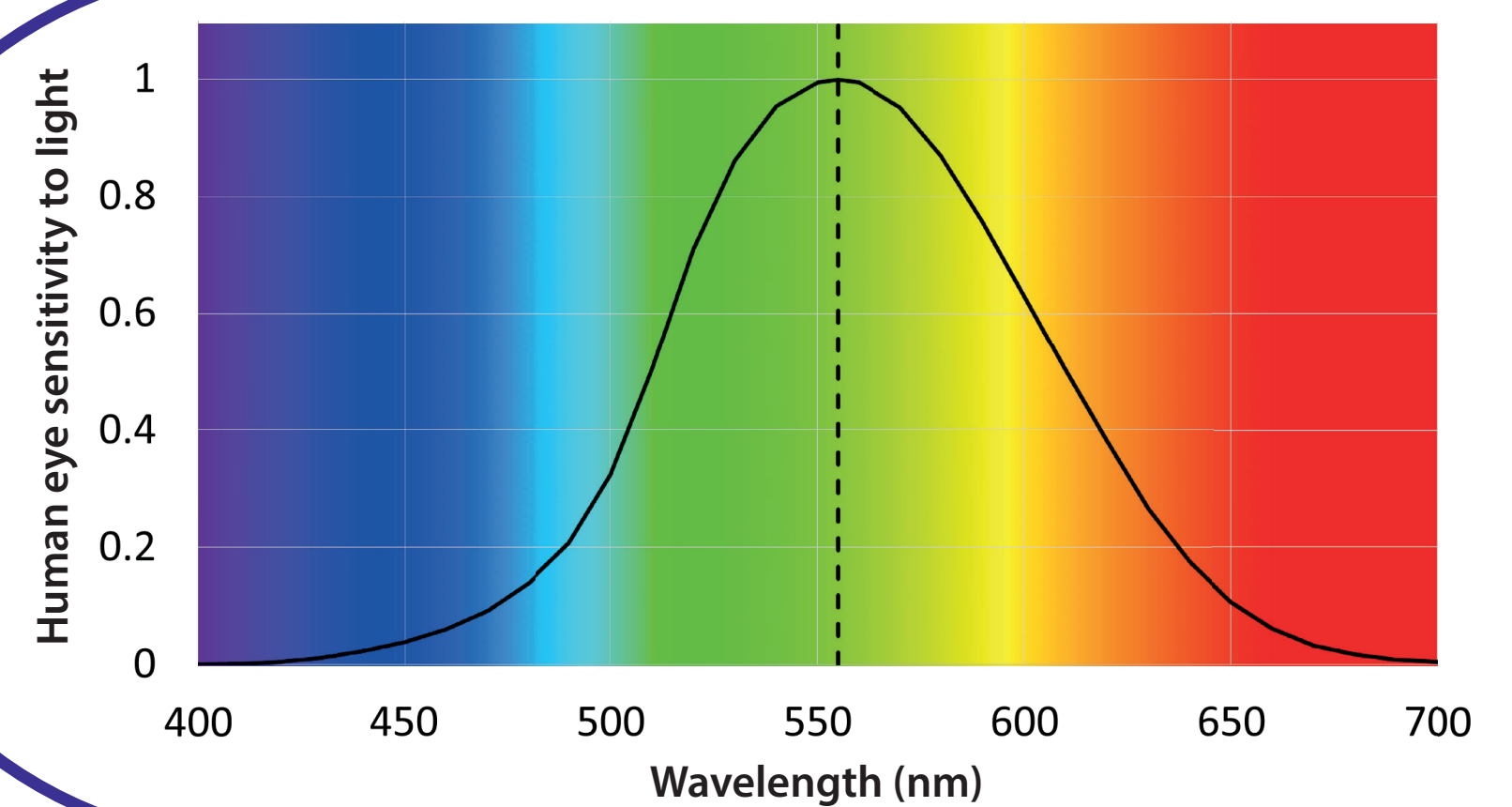
We are not only interested in the brightness of light emitted into our eyes, but also the total amount of useful light emitted.



## Luminosity measurements

We measure the brightness of illumination using instruments that work like digital cameras. They convert the light power to electrical signals.

But cameras do not see in the same way that people do. So in order to work out how bright a light will appear to people, we need to factor in the relative sensitivity of the human eye to different colours.



## Definition

The base unit for luminous intensity, the candela (cd), is defined in terms of three fundamental constants

- $K_{cd}$
- $\Delta\nu$
- $h$

One candela defines the apparent brightness of light with a frequency of  $540 \times 10^{12}$  Hz. This light elicits a greenish-yellow sensation in most humans.

To work out the apparent brightness of other colours, we need to factor in the relative sensitivity of the human eye to different frequencies of light.

The definition of the candela is closely related to the definition of the lumen – which tells us the total amount of ‘useful’ light emitted by a lamp.

## Did you know?

Our eyes are more sensitive to green light than red and blue light.