

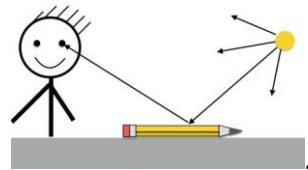
Light Sources and Traveling Light

Light Energy and Its Sources

Light: a form of energy that can be detected by the human eye

How does light allow us to see objects?

Light energy from electric sources must spread throughout the room. Some of it **bounces** off objects and then **travels** to your **eyes** enabling you to see objects and people in the room



Sources:

Sun- the most important natural source of light

Artificial sources of light are created by people i.e. Lightbulb

Luminous objects- emit energy in the form of light (sun, candles)
- input energy such as **chemicals, electrical, nuclear** or **thermal** energy transform into light

Nonluminous objects- do not emit light, but only **reflect** if from other sources e.g. the Moon

Getting in Light's Way:

Transparency- measure of how much light can pass through a material.

Transparency	Description	Example
Transparent	-allows all light to pass through	- window - glasses - glass of water
Translucent	-allows some light to pass through	-skin - sunglasses - paper
Opaque	- allows no light to pass through	- brick wall - lunch box - spoon

*note: Large amounts of transparent material may become translucent or opaque and you cut an opaque material into very thin slices, they will be translucent rather than opaque.

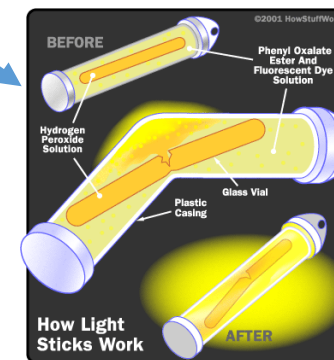
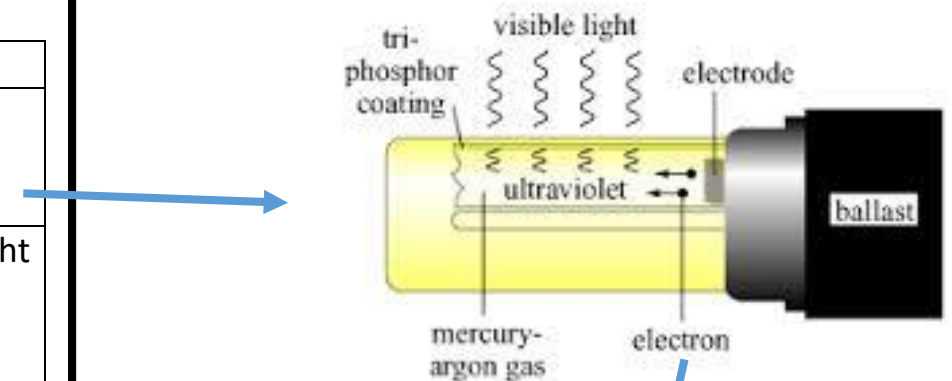
Absorbing and Reflection Light:

Less Absorbent Materials	More Absorbent Materials
White and light-coloured Shiny and smooth – plaster	Asphalt Black and dark- coloured Dull and rough- stucco

These factors can play an important role in design choices for homes, posters, magazines and clothing to provide appropriate temperature and contrast.

Luminous sources:

Light from:	Description	Examples
Fluorescence	- emitting light while receiving energy from other sources	- Fluorescent tubes
Phosphorescence	- give off light for a short time after you shine light on them - store energy and release it gradually	- glow in the dark light switches - luminous dials on some watches - glow in the dark stickers
Electric Discharge	- when electricity passes through a gas , the gas particles can emit light	- lightning - neon lights
Incandescence	- Emit light due to high temperatures - not efficient	- kerosene lamp - incandescent light bulb
Chemiluminescence	- process of changing chemical energy into light energy with little or no change in temperature	- safety lights - glow sticks
Bioluminescence	- living things that make themselves luminous using chemical reactions	- fire-flies - glow worms - some fish, squid, bacteria and fungi



- **Energy travel:**
- Electricity → tube → particles of mercury → vapor emits ultraviolet (UV) energy → UV energy absorbed by phosphor coating → coating emits light that can be seen

- thin wall separates two chemicals → when wall is broken the chemicals **mix** and react to **produce** light



Name: _____

Div: _____

Date: _____

Check your understanding 10.1

- Which of the following are luminous?
 - A campfire
 - The moon
 - A hot toaster filament
- Make a flow chart to illustrate the process that each luminous object uses to emit light and the type of energy that is transformed into light energy.
 - The light in your home
 - A lit match
 - Glow sticks
 - Glow – in the dark paints and fabrics
- What is the difference between a phosphorescent light source and a fluorescent light source?
- Describe how a flashlight can be luminous. Describe how it can also be non-luminous.
- While cycling, your body's efficiency is about 20%. This means that your body uses about 20% of its available energy for cycling. The remaining 80% becomes heat. Incandescent bulbs have an efficiency of about 5%, fluorescent bulbs about 20%.
 - Why does a bright incandescent bulb get much hotter than a bright fluorescent tube?
- What kind of light source would be safest to use in buildings or bins that might be filled with explosive gas?

Check your understanding 10.3

- Classify the following materials as transparent, translucent, or opaque:
Milk, apple juice, wax paper, aluminum foil, plastic wrap, mirror, helium, ice cube, smoky air, writing paper, newspaper, cardboard, clear plexiglass, coloured plexiglass, silk, rubber, copper plate
- | Transparent | Translucent | Opaque |
|-------------|-------------|--------|
| | | |
- Explain how climate is an important factor in deciding what type of building materials to use when constructing a house.
 - Why does fall and winter clothing usually come in darker colours, while spring and summer clothing usually comes in lighter colours?

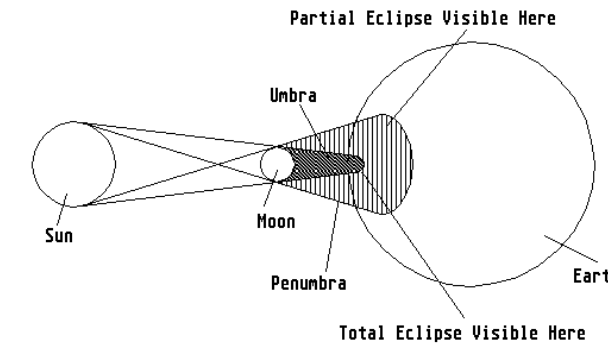
Traveling Light and Shadows:

Shadows: area where light has been blocked by a solid object (eg, shade of a building or tree on a hot day)

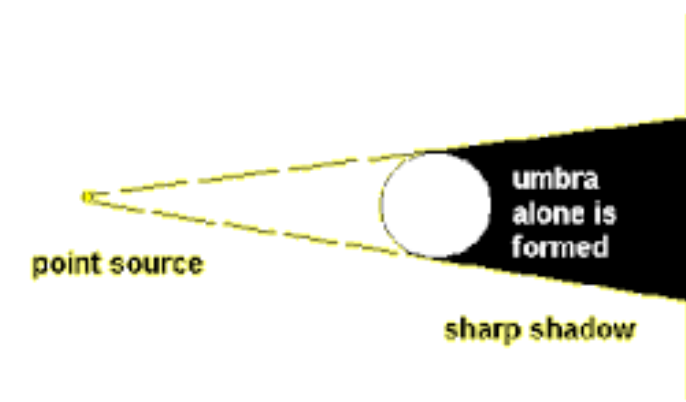
Umbra: portion of shadow that no light reaches

Penumbra: the lighter part of the shadow where no light reaches

In an eclipse, the light source is **larger** than the object in front of it; therefore, there will be both types of shadows. This would also happen with two light sources



When the light source is **smaller** than the object, only an **umbra** is formed.



Teacher notes:

On Board:- classifying objects