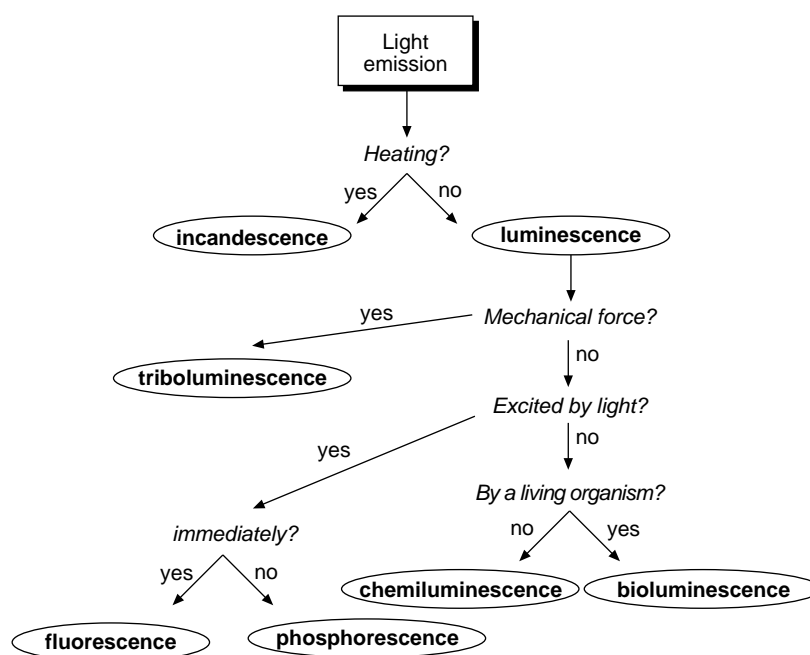

Cold light

Cold light is also known as luminescence. It is light that is emitted when things are cold. Light emitted when things get hot is called incandescence – for example, the light from a Bunsen burner, a standard light bulb or an electric cooker when hot.

There are many types of cold light, given different names depending on the conditions under which the light is emitted. The flow chart below shows how you can decide which type of light an object is emitting.



You are going to examine a number of different items under white and UV light and observe what happens. From your observations it will be possible to decide which type of light emission you have observed.

You will need

- White light – lamp or torch
- UV light
- A few spinach leaves
- Knife
- Tile or plate
- Ethanol (**Flammable**)
- Beaker
- Boiling tube and bung
- Glass rod
- Clear boiled sweet in wrapping
- Plastic bag
- Pliers
- White paper
- Washing machine powder

- Fluorescent pens
- Brown paper
- Glow-in-the-dark sheet
- Tonic water
- Gypsum, calcite or fluorite (minerals)
- Eye protection.



Health and safety

Do not look at the UV light, always have it pointing away from your eyes and shine it only on the items you are observing.

Ethanol is flammable – do not use it near flames.

When using the pliers take care not to crush your fingers.

Do not eat anything in a laboratory.

Wear eye protection,

What to do

- Set up a table like the one below for your observations.

| Item | White light on | White light off | UV light on | UV light off | Luminescent | Type of luminescence |
|------|-------------------|--------------------|----------------|-----------------|-------------|-------------------------|
| | | | | | | |

- Cut up the spinach into very small pieces. Wearing eye protection, scrape these into the beaker and just cover them with ethanol. With the beaker on the bench, gently press on the spinach leaves with the glass rod. When the leaves are looking pale and the ethanol is very green, carefully decant the ethanol into the boiling tube and put a bung into it.
- Using the fluorescent pens, write or colour on the brown paper.
- In a darkened room, shine a white light on each of the items in turn. Look carefully at the items and note the colour and intensity (bright, dim etc) of any light given off by them. Make sure you observe the spinach extract in the boiling tube from several angles and note any differences.
- Turn off the light and make the same observations.
- Repeat the above using UV light.
- Leave the boiled sweet in its wrapper and place it inside the plastic bag. Make sure that the area where you are working is dark and then crush the sweet using the pliers. Watch the sweet carefully as you crush it.
- Decide if each item is luminescent and what type of luminescence it shows.