

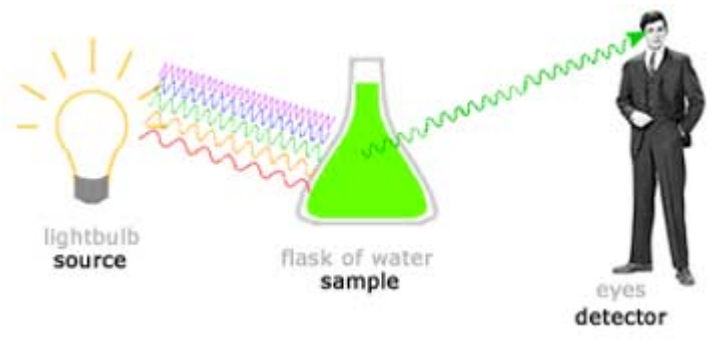
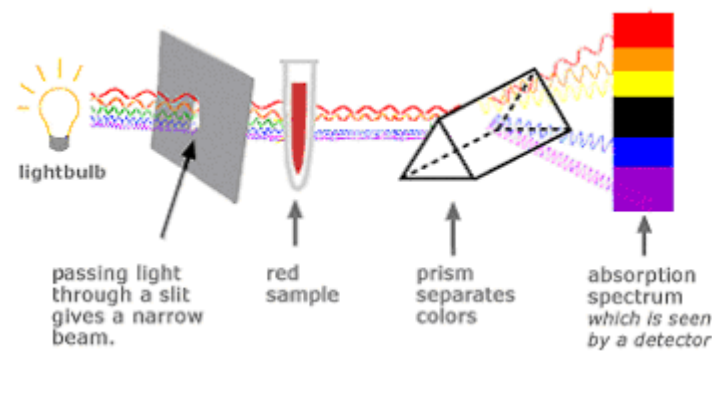
Unit: Modern Atomic Theory

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Absorption and Emission

key concepts:

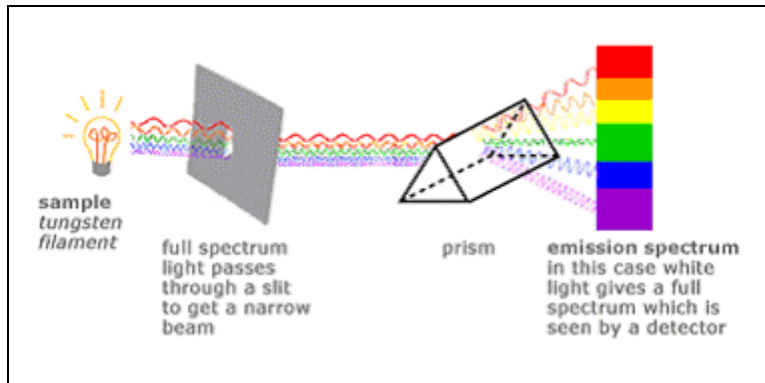
- The color of **light** depends on the **wavelengths** of which it is composed and the observed color of an object is due to the wavelengths that were not absorbed by the object.
- An **absorption spectrum** is a plot of the intensity of light absorbed by a sample versus wavelength.
- An **emission spectrum** is a plot of the intensity of light emitted by a source versus wavelength.
- Absorption and emission spectra are important tools for probing at the atomic level of a sample.

 <p>lightbulb source</p> <p>flask of water sample</p> <p>eyes detector</p>	<p>The color of light depends on the wavelengths of which it is composed and the observed color of an object is due to the wavelengths that were not absorbed by the object.</p> <p>White light is composed of light with all wavelengths present.</p>
 <p>lightbulb</p> <p>passing light through a slit gives a narrow beam.</p> <p>red sample</p> <p>prism separates colors</p> <p>absorption spectrum which is seen by a detector</p>	<p>An absorption spectrum is a plot of the intensity of light absorbed by a sample versus wavelength.</p> <p>The absorption spectrum of a substance is obtained by passing white light in a narrow beam through the substance. The light emerging from the substance is then passed through a prism. The prism separates the wavelengths (colors) of light present in the beam and allows a detector to measure the intensity of the emerging light by wavelength.</p> <p>In the example, the red sample absorbs the green portion of the spectrum, which is absent at the point of the detector.</p>

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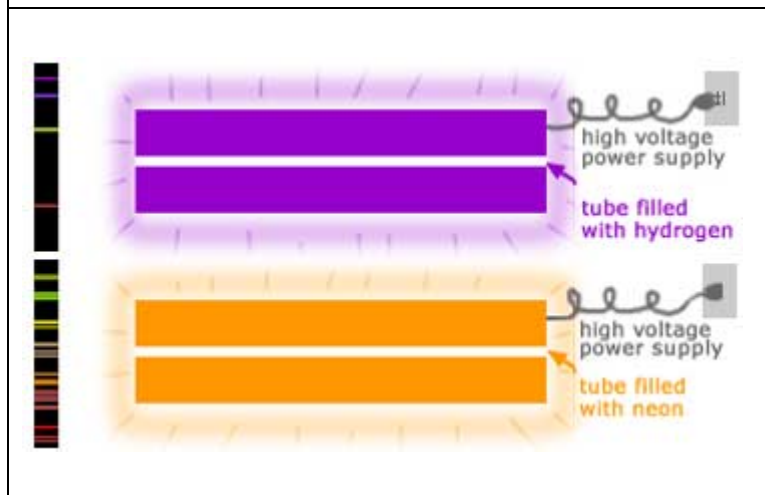
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Absorption and Emission



An emission spectrum is a plot of the intensity of light emitted by a source versus wavelength.

In an emission spectrum the source and the sample are the same. The emission spectrum is obtained by passing the light emitted by a substance in a narrow beam through a prism. The prism separates the wavelengths of the light present in the beam and allows a detector to measure the intensity of the light by wavelength.



Absorption and emission spectra are important tools for probing at the atomic level of a sample.

Different **elements** have different emission spectra. This can be used to identify the components of a sample.

In the example, the emission spectra produced by exciting the elements hydrogen and neon show characteristic bands. The absorption spectra of these two colorless **gases** are similar.

The discrete wavelengths emitted by the hydrogen and neon gas give information about **energy** levels in the **atoms**.