EXERCISE 1

Food dye analysis

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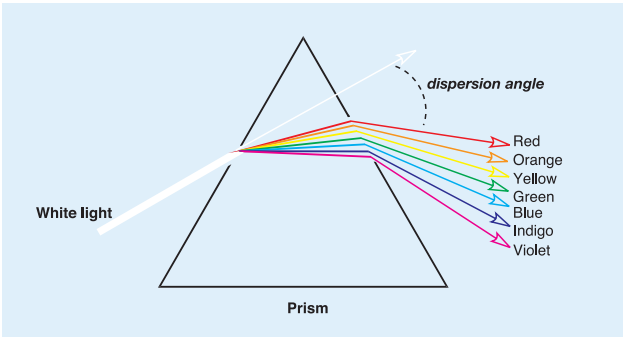
INTRODUCTION

The electromagnetic spectrum ranges from radio waves with wavelengths the size of buildings down to gamma rays, the size of atomic nuclei. White light forms a small part of this spectrum and is composed of a range of different wavelengths which can be dispersed using a prism into its component colours. The colour an object, or a solution, appears will depend on which light is transmitted or reflected in the visible spectrum and which light is absorbed. Using a UV-visible spectrometer and a range of food dyes you will test how the absorbance wavelength value relates to the colour of the solution.



UV-Visible Spectrometer

UV-visible spectrometers can be used to measure the absorbance of ultra violet or visible light by a sample. The spectrum produced is a plot of absorbance versus wavelength (nm) in the UV and visible section of the electromagnetic spectrum. Instruments can be used to measure at a single wavelength or perform a scan over a range in the spectrum. The UV region ranges from 190 to 400 nm and the visible region from 400 to 800 nm. The technique can be used both quantitatively and qualitatively.

METHOD

1. Prepare a dilute sample for each colour to be tested using a cuvette and distilled water (approximately 1 drop food colouring to 100 ml distilled water).
2. For each colour sample fill a plastic cuvette and stopper with a lid.
3. Prepare a blank sample cuvette containing distilled water only and stopper with a lid.
4. Use the colour wheel to predict absorbance values for each solution and record your predictions in the table provided.
5. Set up the spectrometer to scan the visible region from 350-800 nm and run each sample. Print out the spectrum and note the wavelength for each of the absorbance peaks. Compare these with your predictions.

Red	620-750 nm
Orange	590-620 nm
Yellow	570-590 nm
Green	496-570 nm
Blue	450-495 nm
Violet	380-450 nm