Sunglasses lab

Sun Eyeware Sunglasses

Excessive exposure to ultraviolet radiation (radiation with a wavelength below 400 nm) can cause short-term and long-term ocular problems such as photokeratitis, cataracts and various eye cancers. Medical experts stress the importance of wearing sunglasses to protect the eyes from UV light. More recently, high energy visible light (HEV) in the range of 400 to 515 nm has been shown to cause age-related macular degeneration.

Our sunglasses are the latest in technology, blocking virtually 100% of harmful UV and HEV light while transmitting a large fraction of most other, not harmful light.

We at Sun Eyeware are dedicated to innovation and function and lead the way in technological fashion. We have a huge selection of superb styles and colours available so you are sure to find something that suits you.

You are a physicist working for a rival firm producing sunglasses. You are aiming to check Sun Eyeware's advert claims. Design and carry out an experiment to do this.

Write a report for your firm showing your results. Your report should include an explanation of the aim of the experiment, a definition of the physical quantities you are measuring, a detailed account of the experimental setup, tables with measured quantities, and a detailed analysis showing what formulas you use.

Additional information:
At the beginning of the session, students were given the scenario and the sunglasses. In groups of 3 to 4, students designed their own experiment and created a list of required apparatus. They then received the apparatus that they had requested and set up, carried out and analyzed their experiment. In order to account for variations in the experimental setup, we had a variety of equipment on wagons outside of the lab. At the end of the session, students visited a research lab and were shown how such a measurement is carried out with a spectrophotometer in a research enviroment.

Equipment per group:
flipchart
sunglasses
dual wavelength ultraviolet lamp
mercury lamp
prism spectrometer
white light source with slit aperture
set of colour filters
diffraction grating
photodiode detector

Marking Scheme:
Quality of group work (demonstrator, peer and self-assessment): 25%
Lab report: 75%