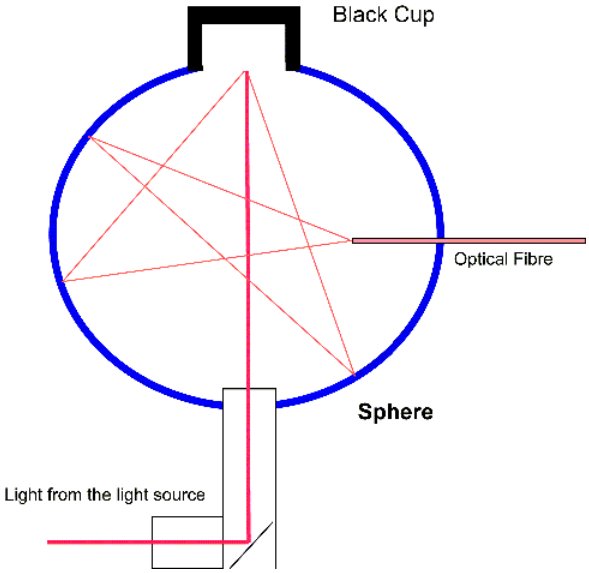
EXPERIMENT #3 REFLECTANCE SPECTROSCOPY

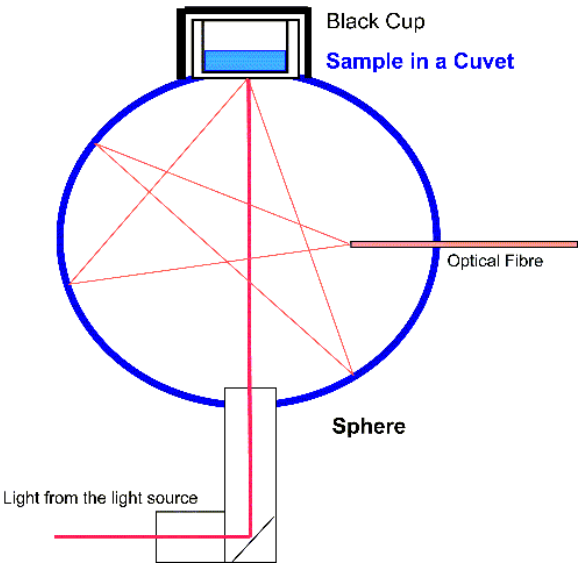
We will use the reflectance attachment and fiber optics OceanOptics spectrophotometer to measure the reflectance spectrum of several paint samples and a powdered solid.

A**. Calibration of Spectrophotometer in Reflectance mode.**
Turn on the computer and the power supply for the reflectance attachment. Set the measurement time of 3.000 s. The lamp you are using is good enough for spectral area from 450 to 800 nm. Remember it will take up to 10 s to take each measurement!

Use the "black body" cap as your "dark" standard.



Then install your "white" sample and use it as your reference (the reflectance of the Kodak standard we use is close to 100% in visible area).



Change the mode of the measurements to Transmission. Actually, the spectrum you will obtain is a reflectance spectrum.

B. **Reflectance of Powdered Solid Sample**
Place a sample of the assigned powdered solid in the special optically flat-bottomed cell so that the bottom is completely covered. Scan the reflectance spectrum. In addition, obtain reflectance measurements in the vicinity of reflectance maxima and minima so you can pinpoint these features of the spectrum when you plot the points. When doing this, use interpolated values of reflectance from the white porcelain lid to set the standard absorbance at each wavelength. When using the optically flat- bottomed cell, the black body must be placed over the cell before opening the shutter to make R% measurements.
If you prefer, instead of running the assigned powdered solid in section C, you may run a reflectance spectrum of a carrot slice, radish, turnip, squash, orange juice, tomato juice, V-8

juice, etc. See the instructor before doing this.

C. Fiber Optic Reflection Probes couple to spectrometers and light sources to create small-footprint optical-sensing systems for measuring reflection and fluorescence from solid surfaces, or backscattering and fluorescence in liquids and powders.
Measure **White** and **Black** standards similar to what you did for powder samples.
Measure several colored objects at the same surface. Observe different colors and compare what you see with what the instrument “sees”.

REPORT: Copy the images of spectra you measured in a WordPad file and then edit it with Microsoft Word. Discuss the features of spectra of different color pigments.