**Diffraction Lab**

Instructions:

1. For each station write a procedure that describes (in step by step format) how you gathered the data at each step.
2. Record all your observations (using data tables where necessary).
3. Analyze your data using proper scientific techniques (proper graphical and averaging techniques where appropriate)
4. Summarize your results with a conclusion that addresses the problem given at each station.

**Station 1: Refraction and Diffraction**

Use the diffraction grating on the aquarium, the laser and the ruler to determine the index of refraction of water.

**Station 2: White Light Refraction**

Use the ray box and the diffraction grating the determine the wavelength of red and blue light.

**Station 3: CD Interference**

Use the Laser and CD setup to determine the pit spacing on the CD.



**Station 4: Spectroscopic Analysis**

Use the spectroscope to determine the wavelength of one of the Emission Lines.

Diffraction Conceptual Problems

1. The diffraction pattern below is formed when a blue laser is shown on a diffraction grating.



Explain how, if at all, the diffraction pattern would change if a student made the following adjustments:

1. A red laser was used instead.
2. The diffraction pattern was placed further from the laser.
3. The screen was placed further from the diffraction grating.
4. The diffraction grating was ruled with more lines per millimeter.
5. The diffraction grating was placed in methanol (index of refraction of methanol 1.32)
6. Explain the difference between reflection and transmission diffraction grating.
7. Referring to path length difference, explain how bright and dark fringes are produced by a diffraction grating.
8. When shining light on a CD explain why white light will produce a rainbow of colours but a laser will not.
9. Draw a diagram of the spectra produced by a prism and a diffraction grating. Point out the similarities and differences between the two.