Name:

18.2 Interference, Diffraction, and Polarization

Question: What are some ways light behaves like a wave?

1 How a diffraction grating works

There are no questions to answer in Part 1.

2 Measuring the wavelength of laser light

a. Use the value for the spacing of the grooves on the diffraction grating from your instructor for *d*. Use the grating formula ($\lambda = dw \quad L$) to calculate the wavelength of the laser light (λ).

b. Does the value of wavelength of the laser fall within with the range of wavelengths that appear red to the human eye?

3 The spectrometer

Table 1: Spectrometer observations

Apparent color	Observed range of wavelengths	Appearance of lines

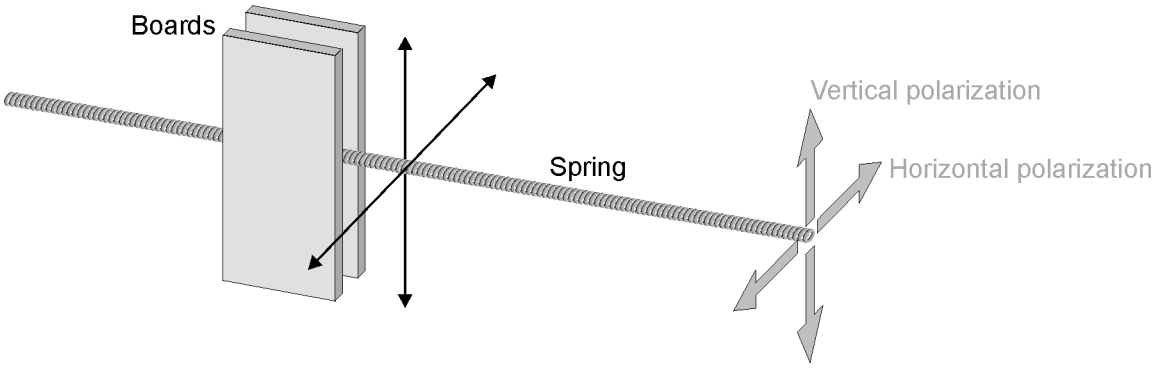
4 Polarization of a transverse spring wave

There are no questions to answer in Part 4.

5 Describing and applying what you see

a. Describe the motion of the spring using the terms *horizontal polarization* and *vertical polarization*. Your description can be in words, diagrams, or both.

b. Suppose you try to sandwich your spring wave between two boards. What happens to the waves if you make them pass through the narrow space between the boards? If the boards were oriented like the picture below, discuss how the two different polarizations of waves would behave. Which would get through the slot and which would be blocked?



c. Describe the polarization of water waves. Are there two polarizations (like the spring) or only one? What is it about a water surface that makes it different from a spring?

6 The polarization of light

There are no questions to answer in Part 6.

7 How do you explain what you see?

a. The light from the sun (or a lamp) is not polarized, meaning it is a mixture of light that is polarized equally in all directions. Explain why the light is reduced passing through one polarizer.

b. When the light passes through the first polarizer, it becomes polarized. We say light is polarized when it consists of only one polarization. Explain why rotating the second polarizer changes the amount of light you see coming through.

c. The glare from low-angle sunlight reflecting from water and roads is polarized in the horizontal direction. Ordinary sunlight is not polarized. Explain how polarizing sunglasses can stop most of the glare but still allow half the regular (unpolarized) light to come through.