Waves and Interference

I. Testing Experiment: Double-slit Interference

All bullets must be addressed in your lab write-up, and a random subset will be graded.

The goal of this activity is to test whether the relationship between the separation of two slits, their distance to the screen and the interference pattern on the screen is applicable to a given system of slits. You have a laser, various types of double-slits (ask your TA if you need help sorting these out), and a ruler. You don't need to follow the full testing rubric for the following experiment; simply give careful responses to each of the bullet points below.

IMPORTANT NOTES:
(1) Do not look directly into the laser beam! It could damage your eyes! Be content to observe the beam striking a wall or other object.
(2) Be careful when handling or working near the laser, as it is delicate.
(3) Do not aim it at anyone, and even when simply swiveling it around, place your had in front of it to ensure that it doesn't shine in anyone else's eyes. Don't play with the laser!

Include the following in your report:

a. Choose one double-slit and set up the laser such that you obtain an interference pattern on the wall or board. Think what observations you should record in order to make predictions in parts b and c. Record this information in an appropriate format.
b. Use your knowledge about double slit interference to predict qualitatively what will happen to the pattern if the separation between the slits and wall/board is increased (or decreased). Choose a separation that is farther (closer), and record your prediction. Then perform the experiment and record your observations. Discuss whether the experimental outcome supported your prediction.
c. Use your knowledge about double slit interference to predict qualitatively what will happen to the pattern if the separation between the slits is different. Choose a system of slits with a different separation, and record your prediction. Then perform the experiment and record your observations. Compare your prediction and the experimental outcome.
d. For part c, what aspect of the pattern changed when you changed the slit separation? What aspect of the pattern stayed the same? Explain.