Lab 5: Simple Electrical Circuits

Introduction:

In this laboratory you will explore simple DC (direct current) electrical circuits. The primary goal of the lab will be to develop a *model* for electricity. A model is a clear mental picture that helps to explain how a physical system behaves and allows you to correctly predict what will happen in new situations. Note that a model is not a complete theory. A theory is a complete explanation in terms of known physical laws and mathematical equations. A model is the conceptual basis on which the complete theory is constructed.

The method we will use to help you develop your model is a three-step procedure: *predict/test/evaluate*. You probably already have some concept, some idea of what electricity is and how it behaves. It may be right or wrong. Whatever it is, it is your initial model. You will be asked to predict what you think will happen in a given electrical circuit, based on this model. You will then test your prediction by making measurements on a real circuit. This, essentially, is how all good science is done. We make predictions based on what we think is a correct explanation of a system, then experiment to verify or refute our prediction. If the prediction was correct, that says the model is at least partially right. If the prediction was wrong, that says the model is either wrong or incomplete, and must be revised. The goal, of course, is to develop a model that always results in correct predictions. When we have done that, we can then say with some justification that we understand the system. So don't worry if your predictions are wrong at first. You will not lose points for incorrect predictions. In fact, correcting an erroneous model often results in more effective learning than simply verifying a correct one. So use this opportunity to make some mistakes and to learn from them.