

Introductory Laboratory Inquiry Skills

(From "Teaching Introductory Physics" by Arnold B. Arons, John Wiley and Sons, 1997)

- 1 Observing phenomena qualitatively and interpreting observations.**
- 2 Forming concepts as a result of observations.**
- 3 Building and testing abstract models in the light of observation and concept formation.**
- 4 By subjecting a piece of equipment to close examination in context, figuring out how it works and how it might be used (rather than simply being told how it works and what it is supposed to do.)**
- 5 Deciding what to do with a piece of equipment as well as deciding how many measurements to make and how to handle and present the data.**
- 6 Asking or pursuing "How do we know . . . ? Why do we believe . . . ? What is the evidence for . . . ?" questions inherently associated with a given experiment.**
- 7 Explicitly discriminating between observation and inference in interpreting the results of experiments and observations.**
- 8 Doing hypothetico-deductive reasoning (i.e., asking and addressing "What will happen if . . .?" questions) in connection with the laboratory situations. This includes visualizing, in the abstract, the effect of changing relevant variables or boundary conditions, visualizing outcomes in extreme or limiting conditions, and , where possible, forming an a priori hypothesis and then testing it by performing an appropriately designed experiment.**