



Learning Lists for Science 4

Practical Work

Contents Updated: Wednesday, 03 December 2003

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A. Theory and Experiment

1. Science is both theoretical and practical
 - Theory and practice are intimately linked
 - theory arises out of practice
 - theory points to new practices
 - Experimental work, tackled with thought and a spirit of enquiry, will give you a deeper understanding of any scientific subject.
2. You might be tempted to treat practical work light-heartedly—Don't:
 - you must pass the practical examination
 - otherwise you will fail fully to appreciate theory
 - practical situations are increasingly a feature of the theoretical papers.
 - if you have learned nothing from a practical period you have been just wasting your time!
3. Nevertheless your practical handouts will not always include detailed theory.
 - Part of your scientific training is to refer to relevant sources of information
 - It is up to you to look up background information before an experiment and to seek explanations afterwards:
 - in textbooks
 - in references provided
 - in journals.

B. Stages of a Practical

1. Pre-laboratory—previous night:
 - read the experimental handout/reference
 - make sure you understand the purpose of the experiment
 - consider the experimental details:
 - note the possible hazards
 - analyse into separate steps
 - make a flow chart
 - know the reason for each step
 - do you need to select or devise any procedures in addition to those given?
 - check what data are required
 - do any preliminary or control experiments need to be done
 - what are the limitations and sources of error? how can they be minimised?
 - do any problems remain?—note them.
 - prepare your lab notebook
 - fresh page—date title

- write down the object of the experiment
- draw the flow chart
- make notes of details/problems
- prepare tables for results.

2. In the laboratory:

- Before starting the experiment:
 - put on your lab-coat
 - ask the tutor about any difficulties
 - check that the apparatus/materials are available—if not, see the technician
 - check that no changes in procedure have been made
 - assemble the apparatus—is it correctly functioning?
 - if in doubt—ask the tutor.
- During the experiment:
 - BE SAFETY CONSCIOUS
 - work individually for all qualitative/volumetric analysis and observation experiments—if necessary work in pairs for more complicated preparations and physical chemistry experiments
 - take care when handling:
 - materials—hazards and economy, don't use too much
 - apparatus—often fragile—look after it
 - time—speed but not haste
 - make observations accurately—record them precisely
 - note any snags and how you overcome them
 - don't change the procedure without informing the tutor—record all such changes
 - keep thinking!
 - Never act the fool, especially where there are dangerous chemicals or apparatus
- After the experiment:
 - clear your bench
 - make sure it is free from spillages, clean and dry
 - check the contents of your cupboard.

3. Post-laboratory:

- analyse the data
 - classify and/or tabulate results
 - plot graphs
 - do calculations
 - derive desired results—are they sensible?
- interpret the results and draw conclusions
- assess validity and reliability
- suggest improvements
- write up:
 - use your original notes—lab notebook
 - refer to further handouts on practical work.

You should develop a pride in doing precise work and recording it objectively. Always therefore record work as you do it in a notebook and be aware of possible sources of error, and possible hazards to yourself and to others.

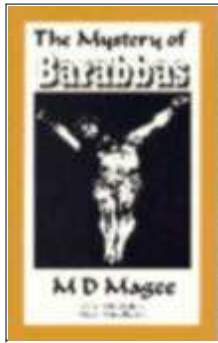
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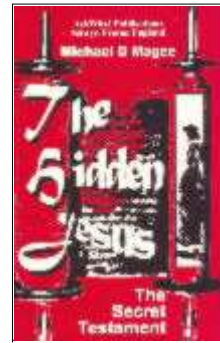
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