

A DEDICATION

This manual is dedicated to the late Professor Max L. McGlashan, a graduate of Canterbury College of the University of New Zealand, and Professor of Chemistry first at the University of Exeter, UK, and then as Head of Department at University College, London. His belief in, and writings on, the importance of absolute rigour and logic in the presentation of chemistry, especially in all areas involving measurement were far reaching, and of great importance to the proper teaching of chemistry. Unfortunately much teaching on measurement and of chemical calculation at the elementary level is still woefully inaccurate and illogical leading to unnecessary difficulties for students. Sections 7, 8 and 10 of this manual, which are an attempt to rectify this situation, owe much to his inspiration.

INTRODUCTION TO LET'S TALK CHEMISTRY

WHAT IS CHEMISTRY? Chemistry may be defined as the study of matter, its composition and properties, and the changes it undergoes.

WHAT IS MEANT BY THE LANGUAGE AND VOCABULARY OF CHEMISTRY? Over time as chemists have developed basic ideas and concepts a distinctive chemical language has evolved. Chemists often use common words in a very special context (e.g. amount of substance). They use symbols for the elements and combine these with numbers to write formulae to represent different substances. They represent chemical reactions (the interaction of substances to give new substances) by writing chemical equations. To show the structure of various species they expand basic formulae to show the necessary detail. In short, chemists have developed a distinct vocabulary and language. As with other languages it has evolved and grown as new needs arise, and consequently is not always logical, or unambiguous.

WHAT IS THIS MANUAL ABOUT? This manual is an introduction to the basic concepts, vocabulary and language of chemistry. As in studying a foreign language a sound grasp of this vocabulary and language is essential to the understanding of the subject. Many student problems arise from not knowing the basic language, or from non-rigorous use of by teachers. It takes time and practice to acquire a good appreciation and command of it.

WHO IS IT FOR? It is written for all students who need or wish to study chemistry for its own sake or need it as the basis of another discipline (biology, medicine, physics, engineering) at first year university level. It is of special importance for those who have not had the opportunity to study chemistry over their formative years, or who have not been fortunate enough to have experienced good teaching. However, it is also useful to those who have successfully studied chemistry over several years at school to reinforce their basic knowledge and understanding of its all important language. It is also for teachers with limited background of chemistry but who are called on to teach the subject. In teaching it is so important that basic terms and definitions are precise and accurate.

HOW IS IT USED?

There are several ways this manual could be used.

If you are a complete beginner and are having to work on your own, the sequence of sections listed in the Contents is a logical one and you could work your way through the whole manual. However, it is more likely that you will be using this in conjunction with a course. In this case if you wish to review a traditional topic select from the contents the section which seems to be appropriate.

However, it is envisaged that this manual will be most commonly used to look up definitions of words or concepts of concern. To do this find the word in the INDEX and then go to the section indicated. There you will find the definition or explanation you are seeking. But instead of finding just a definition, as in a normal alphabetical glossary, you will see the definition or explanation in a broader context. By reading material both before and after the entry your knowledge will be enhanced. It is this aspect of this manual which makes it different from other publications.

At the end of each section there are a small number of EXERCISES on the most basic topics. Answers to these are given immediately before the index.

WHAT DOES THIS MANUAL COVER?

In general students who have completed the most senior level of their school's chemistry curriculum should have covered most of the material in this manual. Notable exceptions to this are likely to be quantum numbers of *section 3*, spectroscopic analysis of *section 12* and most of *section 16* on rates of reaction and reaction mechanisms. All these topics are met early in tertiary chemistry courses, and the difficulties many students have with reaction mechanism appear to stem from a lack of understanding of the language used to express the concepts. A knowledge of elementary algebra is assumed, this being essential for quantitative work.

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To SI Chemical Data by Gordon Aylward and Tristan Findlay, 3rd edition, Wiley, Brisbane, from which the basic layout of the periodic table was taken.

To General Chemistry by P.W. Atkins and J.A. Beran, 2nd edition, Scientific American Books, New York, for their excellent *glossary* from which many of the definitions were taken.

CDROM - LET'S TALK CHEMISTRY

A CDrom - Let's Talk Chemistry is also available. It contains this manual on the basic language and vocabulary of chemistry that may be printed out in full or in individual sections (chapters). As this manual is of necessity brief, this CD-ROM also contains a very much more friendly and helpful tutorial type electronic form in HTML, with fuller explanations, many figures and diagrams, and more examples and exercises all with detailed answers. The price is \$25 (Australian and NZ) + \$7 postage and packaging. It may be ordered by mail sending an Australian or NZ cheque to: A and B Scott, 62 Orchard Grove, Blackburn South, 3130 Vic., Australia.

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