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DEPARTMENT OF PHYSICAL SCIENCES
FACULTY OF SCIENCE
PENINSULA TECHNIKON



An integrated course

COMMUNICATION SKILLS AND ANALYTICAL CHEMISTRY



Jenny Wright

PIV-ACM-254

An Integrated Course: Communication Skills and Analytical Chemistry

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Author: Jenny Wright
Project coordinator: Cecilia Jacobs
Content editors: Abdullah Solomon and Udi Narsing
General editor: Chris Winberg
Proofreading: Neale Peffer
Illustrations: Carole Howes, Chip Snaddon
Cover illustration: Evan Oberholzer
Design and layout: Lori Lake, OpenBook Educational Media

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Contents

Unit 1: Introduction	I
Goals	1
Assessment	2
Topics	4
Assessment criteria	5
Presentation of written assignments	9
Editing symbols	11
Unit 2: Written Assignments	15
The writing process	15
Analyse the topic	17
Use prior knowledge	18
Search for information	23
Plan an outline	30
Draft	33
Revise	43
Edit	44
The final version	45
Unit 3: Reading And Vocabulary	47
Scanning	49
Previewing	51
Skimming	57
Developing your vocabulary	59
Using a dictionary efficiently	61
Textual features 1	66
Textual features 2	69
Reading a text for meaning	71
Reading for meaning 2	74
Summarising	80
Unit 4: Oral Presentations	83
The secrets of successful presentations	85
Using visual support	88
Oral presentation assessment	93

Contents

Unit 5: Workplace Communication	95
Self-awareness and responsibility	96
The communication process	99
Barriers to communication	106
Listening	109
Communication in organisations	111
Conflict management	112
Communication case study 1	115
Communication case study 2	118
Letters	120
Memoranda	123
Applying for employment	124
The Curriculum Vitae	125
Meetings	127
Report writing	137

Unit 1: Introduction

Welcome

We would like to welcome you to Peninsula Technikon's Science Faculty and to this integrated English and Analytical Chemistry course. We wish you success in your studies and we hope that you find yourself enriched when you have completed them.

The purpose of this introductory unit is to help you to understand the requirements of this subject. Please take time to understand it. In order for you to gain maximum benefit from this course, you need to read through all the sections in this unit. Afterwards you will participate in an activity that will test your understanding of all aspects of the course and your role in it.

Your goals

In this subject you are going to learn to develop your ability to communicate effectively as well as the skills that you will need to cope with the demands of your academic studies.

There will be many skills you are going to develop during your studies. In this subject, you are going to do the following:

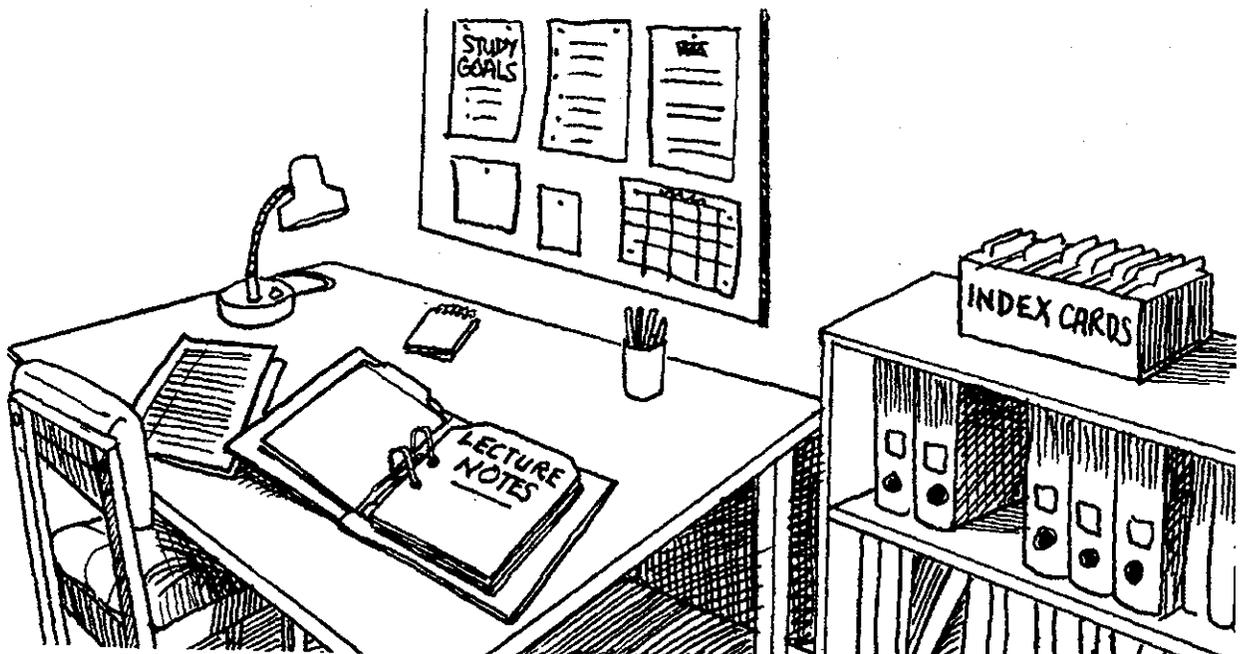
- develop your ability to become receptive listeners
- develop your speaking skills
- improve your reading skills
- develop your ability to communicate clearly, concisely and correctly in written forms of communication required in your academic courses
- develop your communication competence in formal and informal group activities within the academic environment (e.g. meetings, working groups)
- develop your ability to access, use and acknowledge sources of information



What you need to do

In order for you to achieve all of the above skills, it is essential that you work hard at your studies. These are some of the things that you will have to do:

- attend class regularly
- keep a file of work that you do in the course of the semester
- and in original work (i.e. not plagiarised)
- prepare for classes when required to do so
- meet deadlines given



What about assessment?



In this course we have a system known as continuous assessment. This means that all the assignments and practicals that you do will count towards your final mark. There is no final examination at the end of the semester. All your marks will come from a combination of written and oral tasks and tests. The total of these assessments will equal 100%. The pass mark is 50%.

Please examine the Assessment Criteria provided further on in this unit. These criteria are used to assess all written and oral tasks and tests.

You will be provided with a full Student Guide which carries information about the weighting (i.e. the percentages gained) from the various tasks you will do in relation to the total 100%. Please be sure to look at these aspects with great care. Full assessment conditions and precautions are also spelled out in this guide. You are advised to look at these carefully. They have not been printed here as aspects may change from year to year, depending on the lecturing staff.

Your responsibility in assessment

As a student, you must participate in all assessments. If, for any reason, you miss a test or other important assessment, it is your responsibility to contact the lecturer and provide her/him with this reason, preferably in writing, within five working days of the missed assessment. If your reasons are accepted, you will undergo a special assessment. Please note that a medical certificate is required in the case of a missed written test.) All late written assessments (without valid reason) will lose marks. Please take this warning very seriously. We cannot make exceptions. The reasons for this strong position are as follows:

It is unfair that you should get a second chance or an extension when your classmates might have stayed up late or otherwise sacrificed their spare time to prepare and finish their work. It is unfair to your lecturer who does not teach only your group; lecturers have to plan their work carefully in order to meet all their obligations. When you do not prepare or complete your work, you inconvenience your lecturers and, ultimately, other students whose work has to be delayed because your work has yet to be attended to.

You are being prepared for the workplace where self-discipline, punctuality and consideration for others around you are valued.

Writing is a process

You are going to find out that writing is a process and that there are several steps that you need to follow when preparing for your assignments. Taking a process approach to assignments means that you are going to hand in some assignments more than once before your lecturer gives you a final mark. In other words, your lecturer can give you feedback on your writing before you hand in the final draft. This system is to your advantage: you can improve your work, so you should get a better final mark.

**Find out
more about
the writing
process in
unit 2**



Topics we will cover

These are some of the topics that we are going to cover in this course:

- Communication studies
- Effective communication
- The writing process
- Verbal and non-verbal communication
- Communication within organisations
- Barriers to communication
- Oral presentations
- Reading skills: scanning, pre-reading and skimming
- Library use
- Small group dynamics
- Report writing: free form and laboratory

In reality, we do not divide up skills in the way that we have in this book; after all, we often read and write at the same time; or we listen while we are writing. However, for the sake of making it easier for you to find your way around the sections in this book, it has been divided up for you as follows:

Unit 1: Introduction

This section gives you an overview of your course.

Unit 2: Written Assignments

In this section you will find out about the writing process, how to analyse a topic, how to find information in libraries, how to plan your written work and how to edit your work.

Unit 3: Reading and Vocabulary

In this section you are going to find out about reading skills such as scanning, previewing (pre-reading) and skimming that will improve your understanding of texts. You will find out about how to write a summary of a text. You will also learn how to develop an index and how to use a dictionary efficiently to develop your vocabulary.

Unit 4: Oral presentations

In this section you will find out how to make an effective oral presentation.

Unit 5: Communication skills for the workplace

In the last section of the course you will build your self-awareness and self confidence. You will find out about the process of communication and improve your listening skills. You are going to learn about communication in organisations — including: correspondence, meetings, report writing and employment applications. You will also learn about conflict resolution.

This course is full of aspects that should enrich you, both as a student and as a potential employee (and hopefully, later on, as an employer!).

Remember:

*The more you put into this course,
the more you will benefit.*

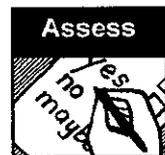
Assessment Criteria

When lecturers mark your assignments and tests, they do so according to certain criteria. These are known as assessment criteria. There are criteria for the content, language, structure, logical organisation, style, tone, presentation and referencing of assignments. Please go over these criteria and become familiar with them.

You should use these assessment criteria as a checklist before you hand in your assignments. Make sure that you have supplied content that is accurate, detailed and error free. Check your grammar and spelling. Make sure you have referenced your work correctly. Check that you have followed the guidelines for the presentation of your assignment. Just as the assessment criteria guide your lecturer when s/he marks your assignment, so you can use the assessment criteria to guide you when you are preparing your assignment.

I. Content

The content is the main part of any essay or report. Your lecturer will require your essay or report contents to be accurate and detailed. The table below shows the range of marks you can expect for content.



Mark awarded	Content
75-100 %	Accurate, detailed, no errors; excellent, original, insight shown
70-74 %	Very good, interesting, subject well-covered, a few points left out
60-69 %	Fairly accurate and detailed; few errors; material/subject well Covered, but not remarkable
50-59 %	More accurate than inaccurate; acceptable but superficial; only obvious points present/
40-49 %	More inaccurate than accurate; unacceptable, thin, insufficient material/ information, unconvincing
30-39 %	Did not understand the topic; many inaccuracies
0-29 %	Totally unacceptable, little or no relevant content

2. Language

All lecturers require essays and reports to be written clearly and free of grammatical and spelling errors. This means that you will have to check your work. The table below shows the range of marks you can expect for language use.

Mark awarded	Language (Grammar, punctuation, spelling, vocabulary)
75-100 %	Clearly expressed; very few errors; exceptional vocabulary.
70-74%	Mostly clearly expressed; a few grammar and spelling errors.
60-69%	Fairly clearly expressed; good use of grammatical structures and vocabulary. Spelling and vocabulary could be improved.
50-59 %	Understandable; acceptable grammar and spelling
40-49%	Difficult to understand; restricted use of grammar and vocabulary; weak grammar and spelling.
0-39%	Not understandable; very weak grammar and spelling

3. Structure and logical organisation

Your lecturer will expect your assignment to be organised in a logical way. An essay or a report needs to have a clear introduction, a main body and a conclusion. Within the main body of your assignment you should express the points you want to make. You should also link important ideas to one another. This is called structuring your work. The table below shows what marks you can expect for structuring your work.

Mark awarded	Structure and logical organisation
75-100%	Clearly set out, well planned, logical. Links clear, coherent. Key ideas supported, developed. Well-integrated introduction and conclusion.
70-74%	Very good. Logically, systematically organised with minor faults; links mostly clear, almost totally coherent. With few exceptions, all key ideas supported and developed. Introduction and conclusion functional.
60-69%	Fairly clear and logical; a few problem areas, but meaning evident. Most key ideas supported and developed, although not always fully. Some incoherence. Introduction and conclusion acceptable but need to be fully integrated.
50-59%	Acceptable. Some planning, some logical structure. Despite shortcomings, one can still follow. Some incoherence. Key ideas somewhat supported. Introduction and conclusion still acceptable but not quite well integrated.
40-49%	Difficult to understand. Not acceptable. Organisation needs much attention. Links infrequent and not always meaningful. Frequent incoherence. Key ideas usually not supported. Introduction and conclusion unacceptable and/or missing.
0-39%	Poorly planned, illogical. Totally unacceptable. Impossible to follow most of the time. Almost no links. Key ideas not developed. Introduction and conclusion unacceptable and/or missing.

4. Style and tone

This refers to the appropriateness of language and tone of your essay or report. Make sure that you write in a formal, academic tone. Use the terms of your discipline correctly and avoid slang. The table below shows the mark range you can expect for your writing style and tone.

Marks awarded	Style and Tone
75-100%	Distinctive, sparkling, sophisticated, resourceful
70-74%	Pleasant to read, use of language entirely appropriate to content. Pleasingly fluent.
60-69%	Fluent; style and tone support meaning; but not particularly interesting.
50-59%	Conveys message with some difficulty; tone sometimes inappropriate/irritating; jerky tone; slight limitations in style and mastery of idiom.
40-49%	Tone inappropriate. Clumsy or careless; register inappropriate, meaning clouded, stylistically poor, hazy, woolly, wordy
0-39%	Totally inappropriate register; dull; boring

You are going to find out more about referencing in Unit 2

5. Referencing

At the end of your assignment you are going to write a reference list of all the books you have consulted in order to write your assignment.

Marks awarded	Referencing
8-10	All entries in accordance with an accepted method
6-7	Errors/inconsistencies only minor.
5	A few obtrusive errors/inconsistencies in bibliography/text references.
3-4	More incorrect than correct entries; text reference/bibliography missing
0-2	Referencing required but not provided/adequate. Referencing incorrect/inconsistent.

6. Presentation

There might not be many marks awarded for presentation, but remember that a neat well-presented assignment creates a positive impression. The table below shows the mark allocation for presentation. You will find out more about how to present a neat assignment in the discussion below.

Marks awarded	Presentation
5	Professional appearance; neat writing/typing and spacing; hardly any typing errors. All required parts/pages (e.g. table of contents, page numbers); correct numbering
4	Neat but not quite professional in appearance; typing/spacing/ numbering inaccurate but not obtrusive; minor errors/omissions in formatting
3	Acceptable but not impressive in appearance; some untidiness; a few typing/spacing/numbering errors; errors/omissions in formatting
2	Untidy, illegible, typing errors impede reading. Many errors/omissions in formatting
1	Slovenly appearance; paper soiled; clearly scribbled in haste. Serious errors/omissions in formatting

Please note that in all the above assessment scales, a mark above 50% is a pass mark, while a mark below 50% is a fail mark.

Presentation of written assignments

You can gain an easy five marks by presenting your assignments in a way that is neat and legible. We strongly recommend that you follow these simple guidelines:

1. Paper

Please use single A4 sheets in plain white, lined, good quality paper. When you take the pages out of a pad, such as an examination pad, please make sure that you take out the paper neatly - no ragged edges. The reason for this is to make sure that your assignment looks professional.

2. Binding

Please use only one staple, which you should fasten in the top lefthand corner only. The reason for this is to enable your lecturer to open the assignment so that it lies flat. It is also easier to turn pages.

3. Organisation

It is important that you include a cover page with your full details on it, like the one in the illustration. Always check that your assignment cover contains the following information:

- Your name
- Your student number
- The course name
- The subject name
- The title of the assignment
- The name of the lecturer
- The due date

If your cover contains all this information you can be sure that your assignment will not go astray. Remember that lecturers often receive more than one set of assignments at a time. Providing your lecturer with the proper information will help him or her when recording your marks.

4. Appearance of page

Please do not add fancy borders, colours or decorations on academic assignments. If you need a wider margin than the one provided because you are using numbered headings that are too big to fit into a normal

margin, you can maintain neatness by drawing a temporary vertical pencil line to guide your numbers and paragraphs. Please remember it is the quality of your thinking, not your art, that will be assessed! A neat appearance always creates a positive impression — and you want your lecturer to assess your work in a positive frame of mind, don't you?

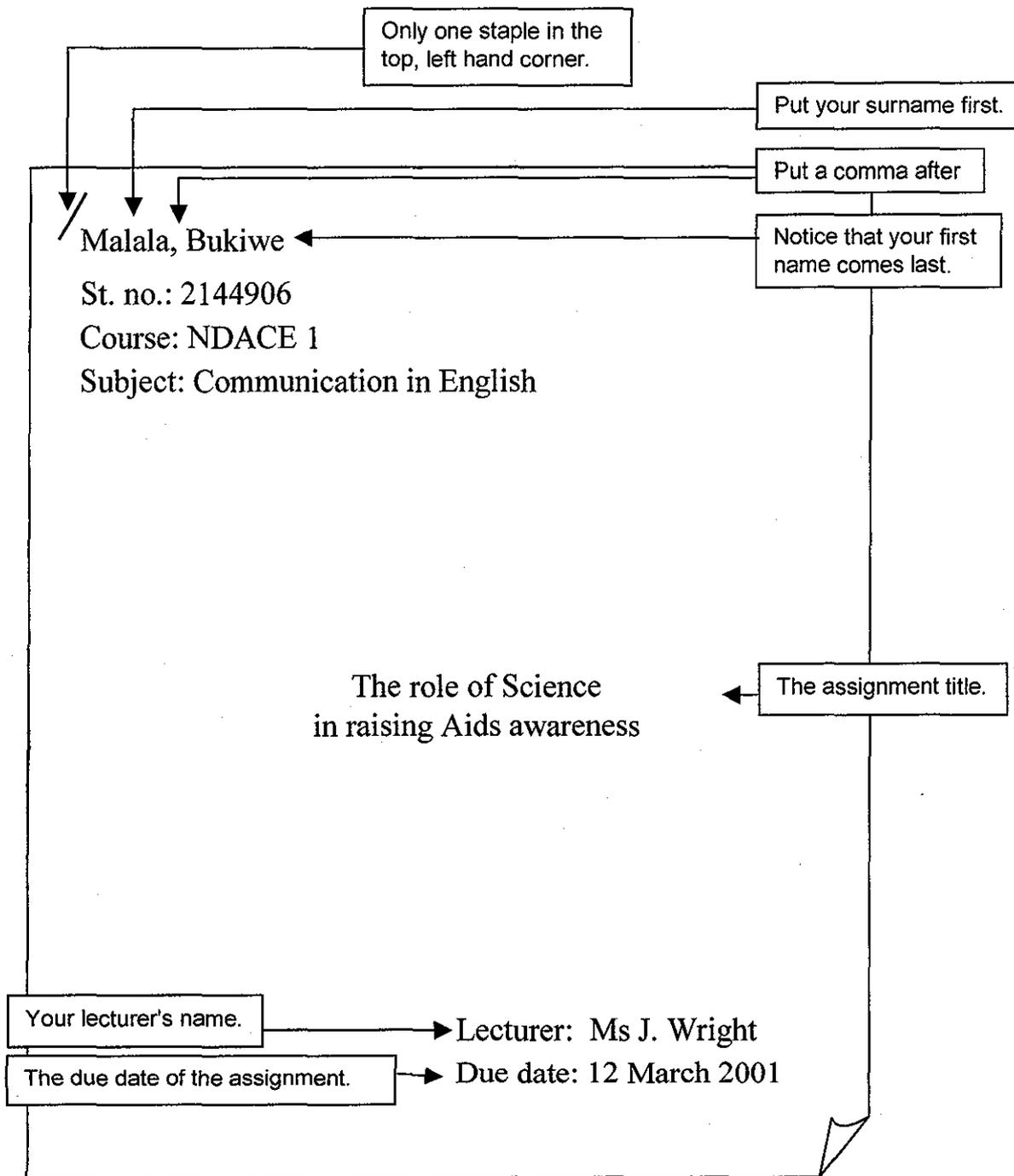
5. Numbering

Number your pages carefully — and ensure that the sequence is correct before handing in. Correctly numbered pages ensure that your lecturer is more easily able to follow what you have written.

6. Handwriting vs typing

If you are handwriting your assignment, make sure that you write as neatly as possible. Remember to only write on one side of a page. If you are going to type your assignment it should look professional, be attractively set out with enough space between items. It should also be edited for errors. Neat handwriting or typing that has been fully edited and professional in appearance creates a positive impression. Here is a summary of these presentation requirements:

	Instruction	Reason
Paper	Use single A4 sheets, white, lined, neat edges, good quality	It looks professional.
Binding	ONE staple, top lefthand corner ONLY	This enables your lecturer to open the assignment so that it lies flat; it is also then easier to turn pages.
Organisation	Include Cover Page with full details (see example below), then other pages.	Lecturers often receive more than one set of assignments at a time. Proper information helps your lecturer when recording your marks.
Appearance of page	No fancy borders, colours or decorations on academic assignments. If numbering is required in a task, draw a temporary pencil line to guide numbers and paragraphs.	The quality of your thinking, not your art, is being assessed! A neat appearance creates a positive impression (see point about Handwriting and Typed text).
Numbering	Number pages carefully – ensure sequence is correct before handing in.	Correctly numbered pages ensure that your lecturer is more easily able to follow what you have written.
Handwriting/ Typing	Write as neatly as possible. Write only on ONE side of a page. If text is typed, it should look professional, be attractively set out with enough space between items. It should also be edited for errors.	Neat handwriting/ typed text, fully edited and professional in appearance creates a positive impression.



Editing symbols and their meaning

When lecturers correct your assignments they use standard abbreviations or symbols to indicate where there is an error. Please familiarise yourself with these editing symbols. You should try to develop an awareness of the language errors that you tend to make. It is only by going over your lecturer's corrections that you will be able to improve your expression.

Symbol in left-hand margin	Symbol or annotation in your assignment:	This means...
?	Wavy underlining	Meaning unclear
¶	Also n.p.	Begin new paragraph here
C	Underlined words	Concord error
IM	^	Information missing here
OW	[]	Omit words
P	O (if punctuation is missing) or Ø (if it is incorrect)	Punctuation incorrect
PR	Underlined word	Preposition incorrect
R	Wavy line	Rewrite – unclear, needs to be improved
RP	[] around repeated word/s	Repetition
SP	Double underlining	Spelling
SS	Wavy line	Sentence structure clumsy
T	Underlined	Tense incorrect
WF	Wavy line	Right word, Wrong FORM
WM	^	Word missing here
WO	∞	Word order – swap positions
WW	[] around incorrect words	Wrong word choice

We wish you good luck in your studies and hope that you enjoy developing your oral and written communication skills in the field of chemical engineering and analytical chemistry.

Effective communication opens doors!

Activity 1: Jigsaw task, part 1



What is a jigsaw? A jigsaw is a group technique. Your lecturer will ask everyone to get into groups. You might be put into group 1, group 2, group 3, and so on. These groups are known as 'specialist groups'. Your group will be given a specific task to do. Here is a list of the tasks. Remember, you only have to do the task set for your group. You do not have to do all the tasks.

Group 1: Purpose and goals

What is the purpose of this study guide?

Name two broad goals that you should develop through studying this subject.

Go through all the goals and aims and ensure that you understand them.

Group 2: Course requirements

What does 'regularly' mean?

What is 'original' work?

What are 'deadlines' and how important are they?

How can a file help you?

Why do you think it is important to prepare for classes?

Group 3: Continuous assessment.

Is there a final examination at the end of the semester for this subject?

What aspects of work in this subject will be assessed for the final marks earned?

What will be the pass mark and the total for this subject?

Group 4: Assessment criteria

When are these criteria used?

Where will you find full information about the way in which your marks count towards the final total?

Why are these details not printed in this unit? Are they also important to know about?

What is a process approach to writing?

Group 5: Topics, presentation of assignments and editing

What are the main focus areas of this subject?

Give five reasons why it is important for students to follow the guidelines for the presentation of written assignments.

What is the meaning of these editing symbols: PR, SS, WM and WO?

Activity 1: Jigsaw task, part 2



When your group has found the information by studying section 1 of this study guide, you will then move on to part 2 of the jigsaw group exercise. Now, each specialist group member has to share his or her findings with the other groups. The way to do this is to form new groups.

You need to make sure that there is a member of group 1, group 2, group 3, group 4, group 5 and group 6 in the new group. What happens next is that the members take turns to report to the new group on what they have learned.

So now, you have learned a new group work skill. We will be using this group work method again in the course. Take a moment or two to reflect on the jigsaw technique. Do you think this is a helpful technique? Can you imagine using this technique if you form a study group with some colleagues and allocate tasks? Think about it - it could make you a more effective student.

*We work in groups to share knowledge
and skills.*



Unit 2: Written assignments

Introduction

In this section, you are going to develop a number of useful skills that will help you to cope with writing assignments. When you receive an assignment from a lecturer it is helpful to follow a particular procedure or process. This unit will introduce you to the writing process.



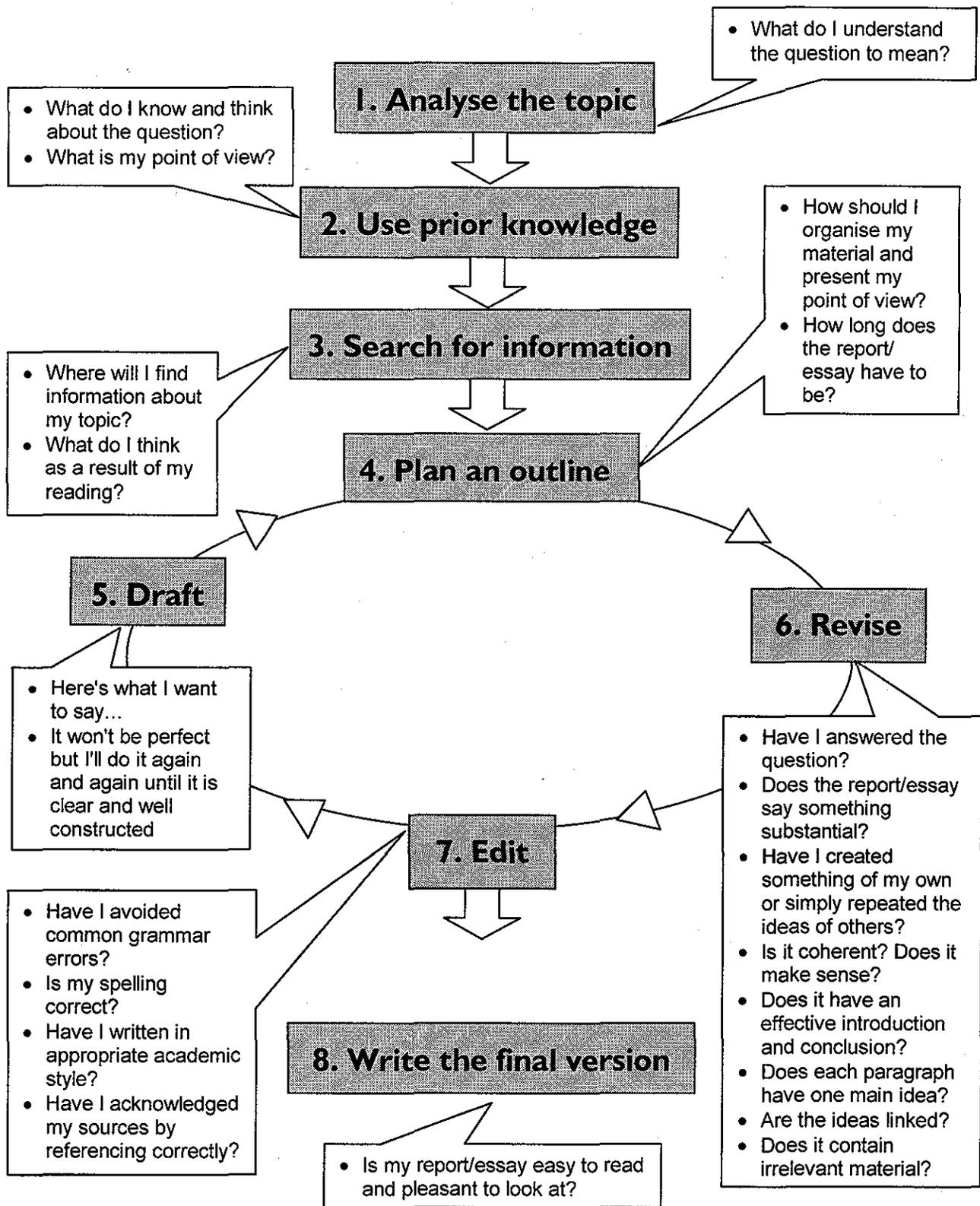
The writing process

We are going to introduce the writing process with an informative flow chart. A flow chart shows the different stages in a process. Our flow chart shows you the different stages of assignment writing. Whether you are writing a report or an essay, or another kind of assignment, you should always follow these stages. As you go through the stages, ask yourself the questions that relate to the different stages of the process as shown on the flow chart. If you do this, you will be sure that you have not forgotten to do anything and you will be confident that you have done your best before handing in your assignment.

You are going to use this flow chart each time you have an assignment to write. Please turn to the next page and study the flow chart carefully before you continue.



Report/essay writing: The different stages



Adapted from Murray, S. & Johanson, L. (1990) *Write to learn*. Cape Town: Hodder & Stoughton.

I. Analyse the topic

We are going to start at step one of the flow chart. Make sure that you have located this step on the flow chart. What question should you ask yourself? Your lecturer will always set a topic for your assignment. This will be based on a section of your course work that you will have to research and report on. Before you start writing you must be quite sure that you understand what the assignment requirements are. You do this by making sure you understand the instructions that you have been given.

Instruction words

Lecturers use words like 'analyse' or 'describe' to tell you what you should do in an assignment. It is important that you become familiar with the standard instruction words that you will find in your assignment topics.

Activity 1: Understanding instruction words

Working with a group of 3 other students so that you can share the workload, each select 10 of the following instruction words. Write down an explanation of these words in your first language. When you have finished, discuss your explanations with the others and try to express them in English.

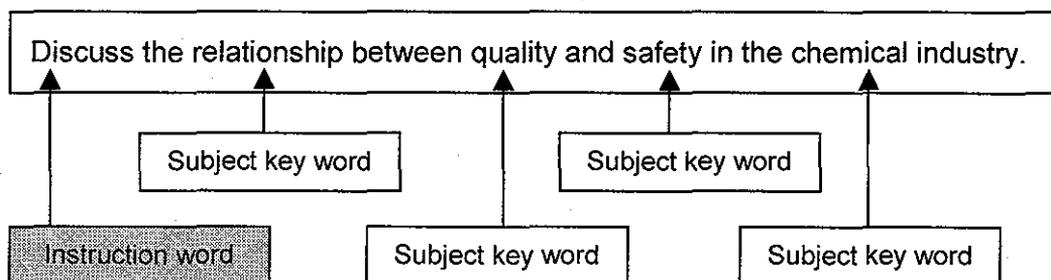


Instruction words:

Analyse	Describe	Motivate
Argue	Differentiate or Distinguish between	Name, mention or enumerate
Choose	Discuss	Outline
Comment	Enumerate	Prove
Compare	Explain	Justify
Contrast	Give an account of	Show
Criticise	Identify	State, state briefly or give
Debate	Illustrate	Summarise or conclude
Define	Interpret	Trace
Draw a diagram	Investigate	

What must you do?

The instruction words tell you what you are supposed to do in your assignment. But there are a couple of other key words that you should be looking for in your assignment topic, such as subject key words.

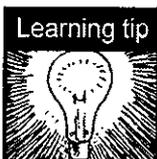


Check that you understand the subject key words. Do you know what is meant by *quality* and *safety*? Do you know what the *relationship* between quality and safety means? Do you know what is meant by *the chemical industry*?

What mustn't you do?

Think about what you should not do in this assignment. You should not write about the general manufacturing process or chemicals used; you should not write generally about safety and quality - you must focus on the specific topic - which is the relationship between quality and safety. If you are going to discuss processes make sure that you only discuss safety issues and quality assurance and how they relate to each other. What you must *not* do in an assignment is just as important as what you should do. So don't forget to ask yourself 'What mustn't I do in this assignment?' as well as 'What must I do?'

2. Use prior knowledge

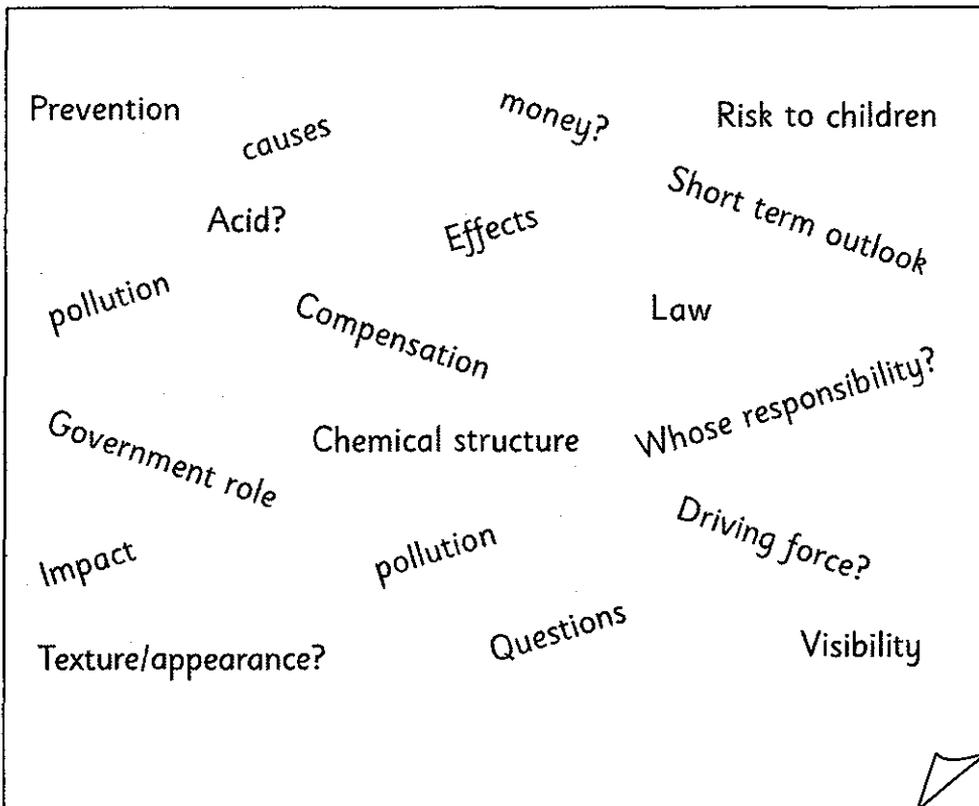


We are now at step 2 in the writing process. Refer back to the flow chart and see which questions you should be asking yourself at this point. As you think about the topic you will probably find that you already know something about it. The knowledge that you already have is your prior knowledge.

Brainstorming

Brainstorming means gathering what you already know. When you brainstorm, you start by writing down all key information, ideas and hunches

that you have about a project or assignment topic. Write these down on a blank sheet of paper, in any order. At this stage you are not going to answer specific questions or show any relationships among words. You also do not yet reject any ideas because these may be exactly what you are looking for later on. The aim right now is to think creatively! After you have brainstormed the assignment topic 'Discuss the relationship between quality and safety in the chemical industry' your page will look something like this:



Making connections

The next step in the thinking process is to make connections, using your page of brainstorming.

First find a few different colour pens. Using one colour, look at the words on the page of brainstorming. Underline a word in one colour and then search for and underline all related words and ideas, using the same colour. Do the same with another word that is not yet underlined (using a different colour), continuing until all words have been allocated to a colour group.

Next, look at each group of colour-linked words and give each group a name or sub-heading. These groups of points can now be numbered, then written down in a more linear or logically sequenced form. This will now form the basis of an essay or oral.

Mind-mapping

You can summarise and organise information in a mind-map. The purpose of this section is to look at two ways in which you can use mind-mapping as a helpful study method:

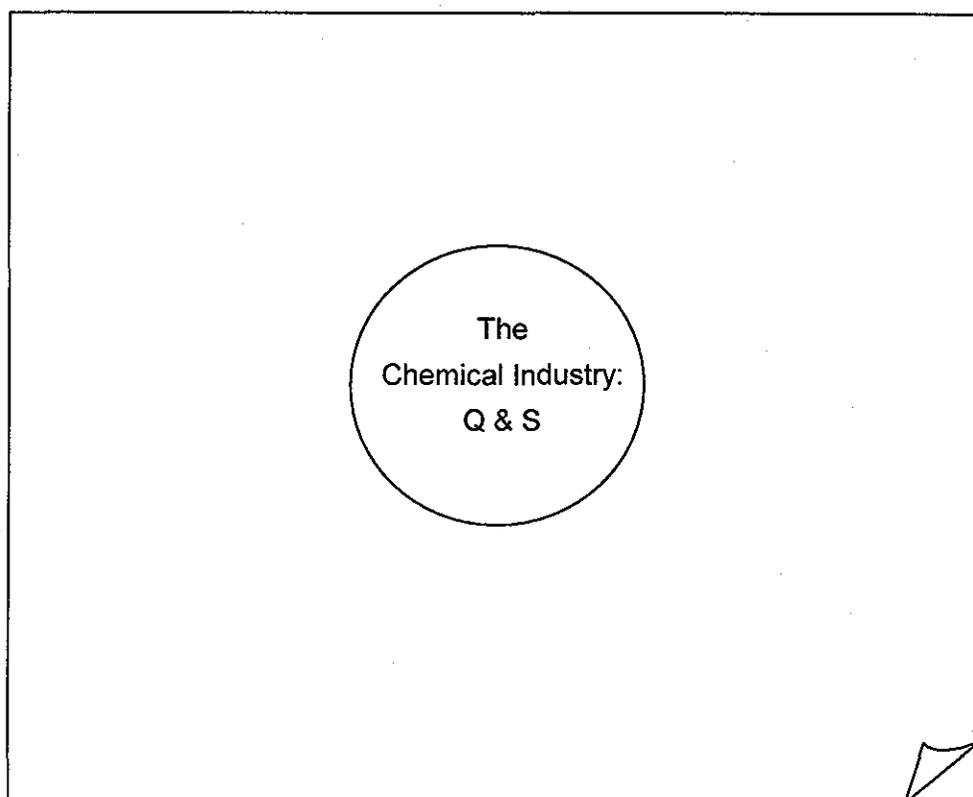
- You can either take notes from a source or sources of information and immediately write down key points in a mind-map; or
- You can first take notes in another form (e.g. linear notes) from one or more written (or oral) sources; then you can use a mind-map to integrate (bring together) the information that you have gained from these sources.

Using the following instructions, you can learn how to use this helpful organising tool.

Finding the centre

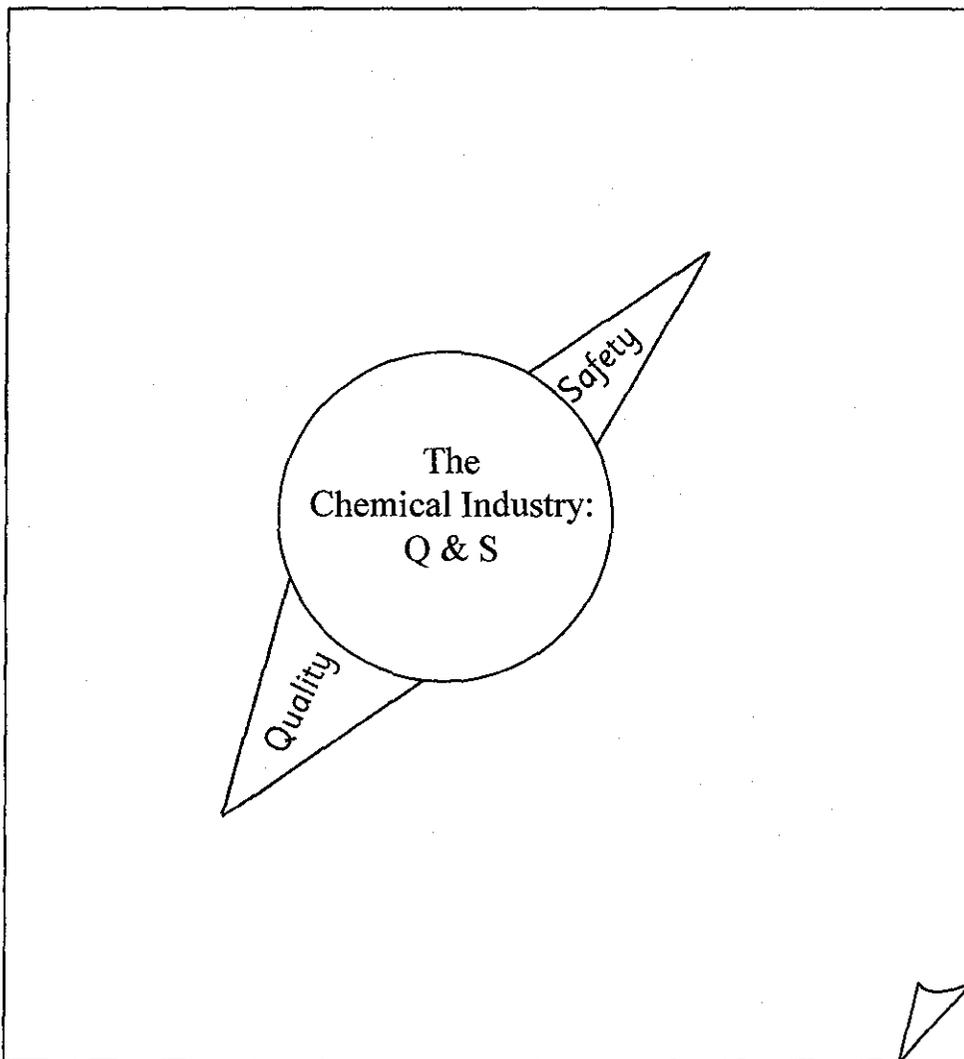
Imagine that you need to take notes on *The relationship between quality and safety in the chemical industry*. Your mind-map might begin as follows:

On a large piece of paper, draw a circle of about 4 cm in diameter in the middle of the page and write the name of the essay or assignment topic within the circle.

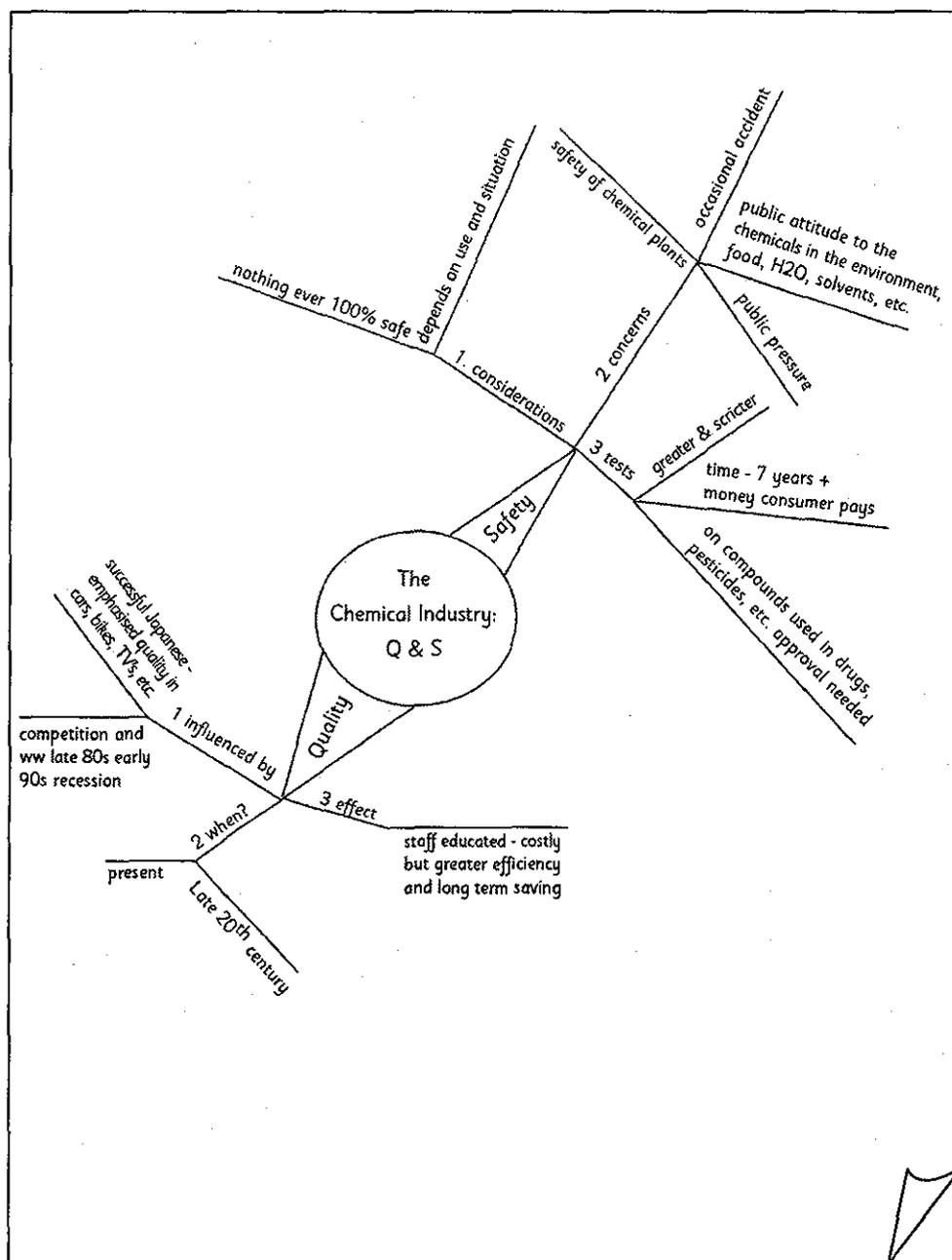


Adding the main branches

Next, imagine that you are looking down at the circle on your page as if it is a tree and you are a bird in the sky. Draw a few big branches spreading outwards from this trunk, each tapering to a thin point. There may be a few or several branches, depending on how many groups of ideas there are. Each branch represents one group of ideas. Inside each big branch, you are going to write a subheading that you have given that group of ideas. Look at this example:

**Adding more detail**

Next, from the end of each big branch, draw several smaller branches and twigs. Each of these branches and twigs should carry key details supporting the main point. Lastly, if you want to arrange your details in a special order, you should number parts — first put the big branches in the correct order, then the smaller branches, as shown in the example here.



Structure and organisation

Using this mind map, we have, on one page, provided ourselves with a structure for our information: the central idea, followed by several key points (big branches), each of which has supporting details (like facts and examples). An additional advantage of organising in this way is that we can include both the information which we already know, as well as the supporting information which we have found in other sources. We should now find writing the assignment much easier.

3. Search for information

We have now reached stage 3 of the writing process. Refer back to the flow chart to find out which questions you should be asking yourself at this stage. Here's a hint: this stage is finding information.

Accessing information in the library

Have you ever walked into a library and felt lost and said: 'I know what I want, but where is it, how can I find it?' If so, do not feel alone! We have all had that experience at some time or another. This section will help you to feel confident and comfortable in the library. Through doing the activities, you will learn the basics of what you need to know about how a library is organised and where to find valuable written texts and other resources that are stored there. If you still feel uncertain, ask a librarian. They are there to assist you.

How the library is organised

Different libraries may organise their information in different ways, but they all have certain common characteristics. The system of information classification in the Pentech library is known as the Dewey decimal classification system.

Melvil Dewey, who developed this system, divided all knowledge into ten main groups or classes. The Latin word '*decem*' means ten. Each class has a number (e.g. 400 is for Languages). Each class is then further subdivided into smaller groups, e.g. 402. Numbers after the decimal point (e.g. 402.7) indicate even further sub-divisions of a class.

Activity 2: The Dewey decimal system

As you go into the library, on your left hand side on the ground floor you will see a big notice board. There you will find a list of the main sections and subsections of the Dewey Decimal System. Write down the names of the ten classes of knowledge, as well as their broad Dewey Number classification. The order here is jumbled:



Description
Including the Bible, Koran, Talmud, hymns, prayers
Reference works covering all knowledge e.g. encyclopaedias, subject dictionaries
Includes books about government, defence, trade, laws, education, careers
Xhosa, English, Afrikaans, etc.
Includes plays, poems, books and writers
Natural phenomena
Related to the mind, thinking, theories about life and the meaning of life
Includes music, drama, painting, hobbies, dancing
Technology, medicine, transport, agriculture, manufacturing industries
Books about people, places, events

Now examine the Dewey number on the spine of a book, as well as inside. The number might look like this: 808.02 VIS. The number (808) indicates that this book is about literature, particularly essay writing. VIS indicates either that the author's surname or the book title begins with these letters.

The periodicals section

In this section in your library you will find items that are published regularly, for example newspapers, magazines and journals. These often contain the most up-to-date information and can be very useful to you in finding information for your assignments.

Activity 3: Periodicals

In the Periodicals section, write down the names of any journal related to your field of work, plus the name of a newspaper and a magazine that looks interesting. In each case, also write down the title of a selected article and the name of its author.

The audio-visual room

The Pentech Library also has an Audio-visual (AV) room (first floor). Here the library stocks videos and CD's on various subjects. You may borrow these or use them in the library in the special video viewing room.

Activity 4: Audio visual activity

Name any video in the window of the AV room.

The on-line index

The library has a computer search system, known as *Aleph*, which will help you to find the information you need. On the first floor, there are a few computer terminals to help you to find certain sources of information. You have to know how to use a mouse. After that it is fairly easy. There are written instructions with each computer terminal. Ask for help if you need it.

You can search in several ways. The screen is divided into two halves. If you are interested in information on a particular subject, click on subject in the left hand section of the screen and then follow the instructions on the right hand side of the screen. For example, if you are looking for books on Analytical Chemistry, type these words in the space provided and command the computer to begin searching. All books, videos or CD's with that title will be listed. Other search options include using the author's name, the title (if you know that, but not the author's name) and the Dewey number.

Activity 5: On-line index

Using a computer terminal with the *Aleph* system, look up the following:

The title and Dewey number of a book by Brune, Forkman & Persson about nuclear analytical chemistry (1984).

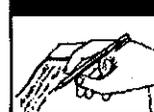
The author and year of publication of the book, Kinetic aspects of Analytical Chemistry (Dewey no. 543)

The title of a book by the authors Fifield & Kealey.

Where in the library will you find the journal Analytical Chemistry and what is its Dewey Number?

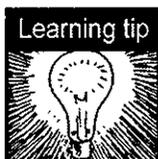
Who wrote Handbook of laboratory safety?

Write





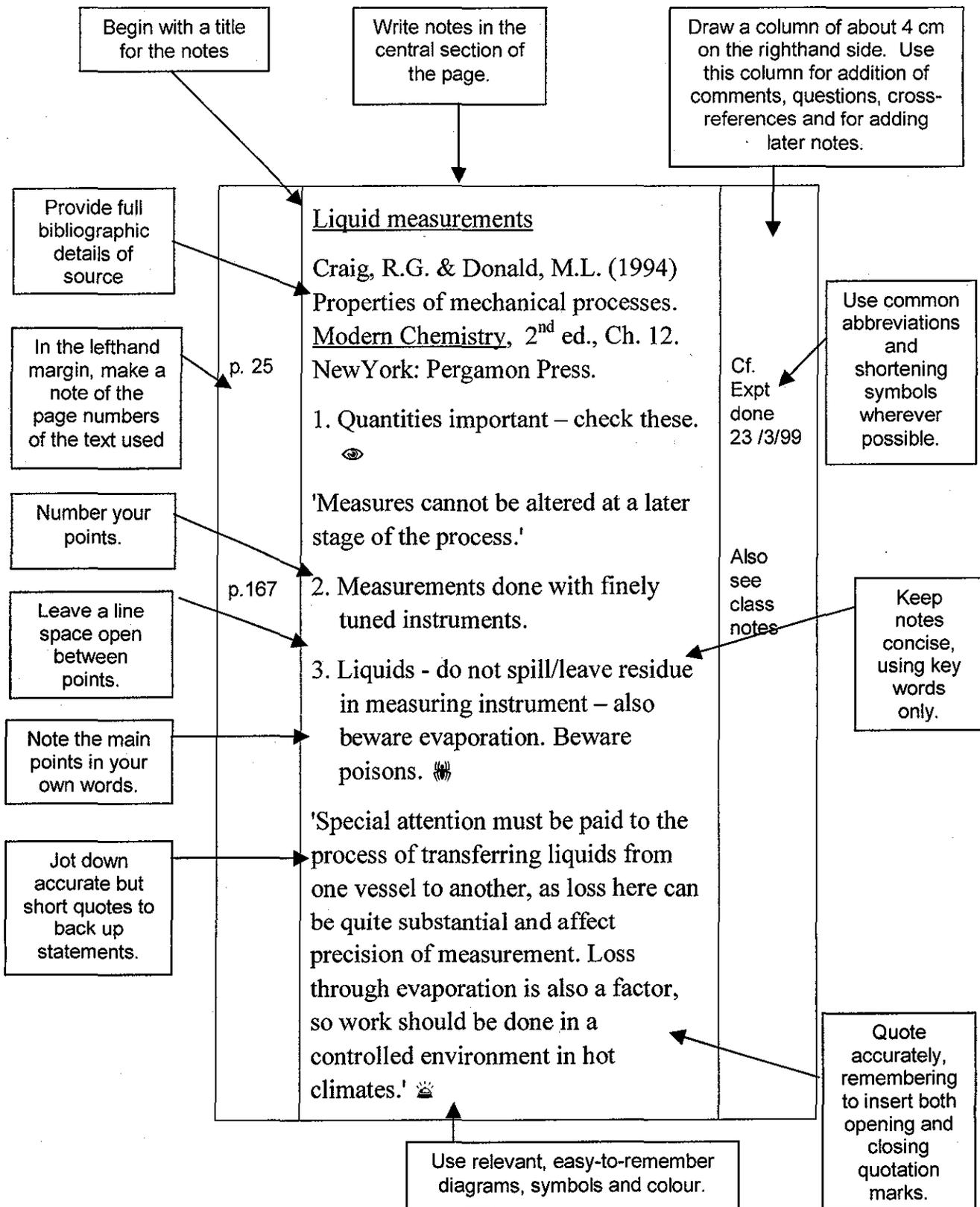
Taking linear notes from a written source



Learning tip

Once you have found the book or article you are looking for in the library, you will need to take relevant, clear notes for your assignment. Usually you will take notes in a linear form. This means that when taking notes, the points follow a sequence, one below the other. These points may or may not be numbered.

If you are taking notes in preparation for an assignment, you must make sure that you understand the topic before you begin. Only then should you begin to take notes. On the following page there are some guide lines for how to do this so that your notes are useful and easy to follow when you return to them at a later time:



Do not cram your notes – spread out!

Advantages

If you take notes in this way:

- You will more easily be able to use the notes that you need for your assignments;
- You will have the information you need for referencing;
- Your notes will be easier to follow; and,
- If you are using your notes for studying, you will find them easier to remember.

Note-taking in lectures

Taking notes in lectures is very much a daily part of any student's life. We have all taken notes at some time or another during our school or further studies. However, not everyone's notes are as useful and easy-to-use as they could be.

Whether you are taking linear (sequenced notes with numbers and sub-headings) or mind-map notes, there are certain hints that you should experiment with to see if they help you. Do not accept or reject any of these hints until you have tried them for yourself.

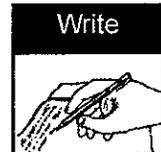
Hints

1. Try very hard to concentrate. This requires self-discipline.
2. Do not try to write down everything that the lecturer says!
3. Try to structure your notes in some way. Most lecturers use a basic structure: Introduction, Body (main points with support) and a Conclusion.
4. Write down a title and listen carefully for signals (see Linking/signal word notes) that indicate whether the lecturer is continuing a discussion of a main point (i.e. giving additional information, examples, exceptions, etc.) or going onto another main aspect.
5. Number points.
6. After the lecture, highlight, underline or circle key points. If notes are very untidy or confusing, it may help to rewrite them.
7. Use common abbreviations and symbols (like arrows to link points and yet not use words). Also invent some of your own – but don't forget to write down what each means! Some of those in the block below are official abbreviations but those in the last row have been made up. Can you tell what they might mean?

e.g.	re	etc.	&	%	@	N.B.	Info	Re	<	>
=	+	/	→	∞	∴	↑	≠	esp.	pt	
hwv	unl.	env.	sitΔ	fav.	princ.	qual.	indiv.	conc.	incr.	

Summary skills

The following is a list of guidelines for summarising a text, but these guidelines are jumbled. See if you can sort them into a more logical sequence! Number the items in pencil in the space provided. Number 1 has been indicated.



	revise (write a second draft)
	underline key ideas
	re-read slowly, trying to understand strange words from context
1	skim passage to determine theme
	count words again
	pre-read original. compare your version. is it accurate, flowing and logical? are there links between points?
	read instructions carefully
	write a first draft, ensuring flow, links
	write final draft
	put brackets around (or delete) non-essential details
	state number of words used (is your summary within the word limit?)
	if required, supply a title
	check that all key points are there
	revise and edit
	count words

4. Plan an outline



You are now at step 4 of the writing process. You have gathered all the information that you need to write the essay or report, but before you do so, you will need to plan your writing. To find out more about this stage of the writing process, please read the article below.

The expository essay

What does the word 'expose' mean to you? We know that 'to expose' means 'to show'. When you write an expository essay, therefore, you are writing with the intention of revealing or showing information to your reader. In this essay, I shall relate the process which a writer follows when writing such an essay.

To begin with, the writer obviously has to learn much about the subject before attempting to reveal it to any reader. She therefore begins by gathering information (taking notes), some of which may be discarded later. Her next task is to identify the main ideas of the information and organise these logically (still in note form), using an outline. This outline is like a plan that can be followed when writing. Within this logical structure there will be an introductory paragraph, then the body of the essay, and, finally the conclusion. Let us look at each of these parts.

The introductory paragraph has two important functions. It must first capture the interest of the reader and make him feel involved, otherwise he may decide not to read further. A variety of techniques may be used by the writer to achieve this purpose, such as a provocative opening statement, or the asking of a question. Next, the writer needs to give the reader an idea of what the essay is about. The writer does this through a thesis or purpose statement (in which she states the purpose of the essay). This thesis statement will often be in the form of a statement or an opinion which tells the reader what the main point of the essay is. Having read this thesis statement, the reader can decide whether or not he wants to read the body of the essay.

The body of the essay is the longest section of the essay. In this section, the writer sets out and explores or elaborates on the key points (key ideas) of the thesis statement in a logical sequence. Each paragraph in this section will have a topic sentence (usually – but not always - the topic sentence is the first sentence of the paragraph) which conveys one key idea, expressed as a fairly general statement. The rest of the paragraph comprises support for that main idea, such as facts, examples, descriptions, and often personal experience. To ensure that all details within a paragraph form a coherent whole, the writer uses linking words or expressions. In addition, the writer ensures that the paragraphs themselves are linked in a similar way.

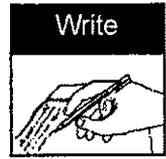
The final paragraph of the essay serves to conclude the expository essay. The writer will choose one of a variety of methods to conclude. For example, he may summarise what he has said, or he may return to his thesis statement so that the reader is taken 'full circle', as it were. What he would not do is introduce new information not previously raised in the essay. The reader should finish reading with a sense that the essay is complete.

To conclude, writing an expository – or any essay, for that matter – requires planning and effort, but, if the process outlined in this essay is followed, the task should be satisfying and not unduly daunting. Moreover, the resultant essay will be a pleasure to read!

Adapted from: Reid, J. (1982) The Process of Composition.
Englewood Cliffs: Prentice Hall. p.76

Planning your work

The worksheet that follows is an essay planning guide. Once you have gathered your information, you will need to plan your essay by deciding on how you are going to introduce your topic, what main points you are going to make and how you are going to support those points with explanations and examples.



Essay outline

Introduction:.....
.....
.....

Purpose of essay
.....
.....

Body:

1. first main point
.....

support: 1.1.....
1.2.....
1.3.....

2. second main point.....
.....

support: 2.1.....
2.2.....
2.3.....

3. third main point.....

.....

support: 3.1.....

3.2.....

3.3.....

4. fourth main point

.....

support: 4.1.....

4.2.....

4.3.....

5. fifth main point.....

.....

support: 5.1.....

5.2.....

5.3.....

6. sixth main point

.....

support: 6.1.....

6.2.....

6.3.....

Conclusion:.....

.....

.....

5. Draft

You are now at stage 5 of the writing process. Now you can start writing or drafting. A draft is a first or rough version. The first draft is never good enough to hand in. People who are good at writing will tell you that they draft and re-draft their work.

When you start writing, you want your text to flow well. In your essay plan you will have a rough outline. Now you are going to start filling in the gaps. To do this you must write clearly and logically. Understanding English linking words can help you to achieve this.

Linking words

Linking words are also called signal words. These words can be called the glue of writing: they provide connections between:

- individual words
- parts of a sentence
- sentences
- paragraphs

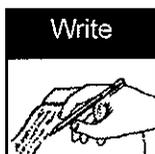
Linking words can be used in several ways to achieve this. Their specific functions are:

- To signal that what follows is a result of what precedes (goes before)
- To signal that what follows is a summary
- To signal that what follows is similar to what precedes
- To signal that what follows is an illustration, qualification or an example of what precedes
- To signal a contradiction, contrast or *concession*
- To signal a sequence or number of things
- To signal that what follows is being emphasised
- To signal that what follows involves a comparison of similar things

A *concession* involves naming exceptions, additional considerations or cases that do not fit in with the rest. For example: She is alone; however, she is not lonely).

Note

We may also use pronouns to signal the reader that we are referring back to a previously mentioned point. Such words often appear at the beginning of a sentence. Examples are: *this/these (here) that/those (there)*. In the second sentence of this paragraph, *such* has the same function. (Notice the word 'this' in the last sentence too! In other words, we use these words frequently to link one sentence with the next.)

**Activity 6: Linking words**

Study each set of words listed in the block on the next page, then underline the one word that differs from the others in each set.

After selecting the word from the group, identify the function of the rest of the group and explain why that word differs from the rest of the group. Be sure to explain your selection based on the functions listed above. Study the example below:

for example to illustrate however for instance

Answer

However is the odd word out because its function is *concession*, the word *however* signals a concession or exception while the others all concern examples.

Now do the same with these linking words:

- 1 since in summary because consequently
- 2 in conclusion finally in other words in summary
- 3 therefore but unlike in contrast
- 4 I repeat The important point is Again This is important because
- 5 at the same time similarly likewise in other words
- 6 in the first place next finally like
- 7 in conclusion whereas although conversely
- 8 that is in short in general in other words

Activity 7: Find the linking words

Read through the article 'Quality case histories'. Then read it again and this time write down all the linking and signal words that you can find. In each case, identify their function.



Quality case histories

This section presents a series of case histories where the application of quality principles has resulted in improved performance, often with significant cost savings. Looking at case histories serves to demonstrate the practical applications of quality, where the general techniques used may stimulate their application in new areas and hopefully, by providing specific examples, will help to prevent similar mistakes from being repeated in the future.

The first example chosen illustrates the principle of using a simple Pareto analysis, the second shows the importance of the customer/supplier relationship, the third describes the use of a corrective action team to solve a multipart problem, and the fourth demonstrates the importance of the quality education process and the vital role of management support.

Customer complaints - how to remove them

Poly(methyl methacrylate), better known as Perspex, is a widely used material which accounts for a significant portion of the acrylics industry. A major manufacturer of poly(methyl methacrylate) noted that the largest number of customer complaints originated from the handling of the product after manufacture. The company therefore set itself the task of reducing the number of complaints by doing whatever was necessary to remove the root cause of the problem. By using a simple Pareto analysis they were able to identify the vital few non-conformances that were leading to greatest customer dissatisfaction. The complaints concerned matters such as poor packaging, late deliveries and delivery of incorrect grades of material.

The Pareto analysis shows that one of the more important errors was that incorrect product was being loaded at the distribution site. The problem was tackled at source, first by identifying the opportunities for error, for example by making sure that pallets were correctly located and that the movement of pallets within the warehouse was kept to a minimum, so reducing the potential for paperwork mistakes. Secondly, a monitoring system, involving all members of the department, was introduced for monthly random sampling of pallet locations.

The result of these quality actions was that location errors fell dramatically and that distribution complaints, from all causes, were reduced by 65% in one year.

Dry ice losses - benefits of customer/supplier co-operation

A long standing problem associated with the supply of dry ice is the difficulty of maintaining the very low temperatures necessary to prevent sublimation during packing, transport and delivery. The usual method of packing solid CO₂ is to place it in cool boxes made of fibre-glass or similar material.

A large supply organisation found that a recurring complaint from customers was that the deliveries of dry ice were underweight owing to losses from sublimation of the solid during transit.

Discussion with the customer led to their suggestion of placing a thin layer of scrap dry ice pellets on the top of each box to inhibit the evaporation. The supplier was happy to adopt this solution and, as a result of no longer having to compensate customers for underweight deliveries, made a net saving of ,26 000 per annum.

Corrective action team - how to make permanent improvements

Methylene chloride (dichloromethane) is a chemical that is in demand world wide and as such, like many other chemical exports, presents particular demands for specifications that meet international standards. A major UK manufacturer of methylene chloride found that it had an on-going problem with the containment drum suppliers. The manufacturer exported their methylene chloride to over 92 countries and required from the suppliers several different drum types, often at short notice. However, they found that frequently there were errors in the types of drums supplied and it was obvious that the root cause of the problem was the instantaneous demand for a wide range of drum styles.

A CAT was formed and it was quickly decided that the ideal corrective action was to rationalise to one drum and one fill weight. The team found it necessary to enlist the help of other departments and of the supplier in order to acquire the skills necessary for their new initiative and eventually a totally new drum was designed. The new drum design not only successfully replaced the existing wide range of different styles but was also made to take account of new and more stringent international regulations.

The benefits for both the supplier and customer were numerous, such as productivity improvement and cost savings in excess of ,100 000, a reduction in end-user complaints and additional business of approximately 95 000 drums per annum. The improvements came about as a result of finding the correct blend of skills amongst the team members, including those of the supplier as well as the customer, and then implementing the corrective action that they recommended.

Quality education - measurement, communications and recognition

A plant team set about improving an environmental problem associated with unpleasant smells. A solution to the problem was found which not only stopped the emissions by also increased production by 20% and provided more business for their internal feedback supplier. The material, trimethylamine hydrochloride, is produced by the addition of trimethylamine (TMA) to hydrochloric acid. When an excess of amine is used in the reaction a powerful fishy smell is produced. Complaints were made by residents from as far as six miles from the location of the plant. The problem was identified to be the pH meter used for the process control. A team of process operators collected plant data around the clock and looked at the relevant measurement control. It was found that the TMA was being added too fast for the pH meter to register the resulting change in acidity. The fix was to add the amine slowly at the back end of the process. Although this approach resolved the environmental problem, the batch times were slowed and the subsequent production rates were cut.

By using simple brainstorming techniques, the team conceived of the idea of adding the TMA at an initially faster rate over the first few hours, followed by a trickle addition of the remaining batch. By operating the process in this way batch times were cut and the smells, which were the initial cause of the problem, were completely eliminated. This is an example where a problem is turned into an opportunity. The quality improvement arose from the education of the process operators in the techniques of quality measurement and communication and the empowerment of the team by their management. The team responsible for this initiative was recognised by receiving a prestigious award from the Chief Executive.

Conclusion

Quality in the chemical industry is essential. It can only be accomplished moving from a fixing-inspecting fire-fighting mentality to one of prevention, continuous improvement and teamwork. Quality is about people as much as systems and depends more than anything else on a change in each individual's attitude.

The quality process is a strategic process for improving everything that an organisation does - to the benefit not only of themselves but to their customers and the community in which they operate.

Heaton, A. (Ed.) (1994) The chemical industry, 2nd ed.
London: Blackie Academic & Professional.

Using references in your writing

When you are writing your essay you are going to want to refer to the information that you found in books or periodicals in the library. In order to do this you will need to learn how to quote from sources in your essays.

Referencing within the text

'Why do we have to know about referencing?' you may ask. Firstly, it allows you to acknowledge the help you have received from other people's information and work. Secondly, not to do this is internationally regarded as the academic equivalent of theft, punishable by law! We use the term plagiarism to indicate such theft.

Visser (1989) refers to plagiarism as '...the deliberate attempt to pass off as one's own another person's work or ideas.' In other words, you copy their work but do not tell anyone. (Here I have written the actual words of Visser in quotation marks; however, even if his ideas had been expressed in different words, I still would have had to acknowledge that the ideas are his.)

You may think that your lecturer will not notice if you copy someone else's words, but the truth is that lecturers can very easily notice this. For these

reasons, you should never copy out of books; and you must regard correct referencing as an essential skill.

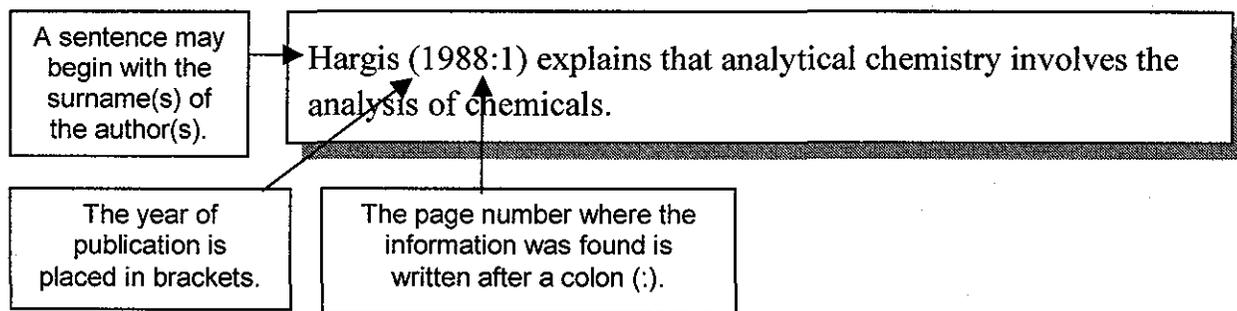
The purpose of this section is to show you how to include referencing information within the body of your assignment, after you have taken notes from a source such as a textbook or journal.

The Harvard Modified system of referencing

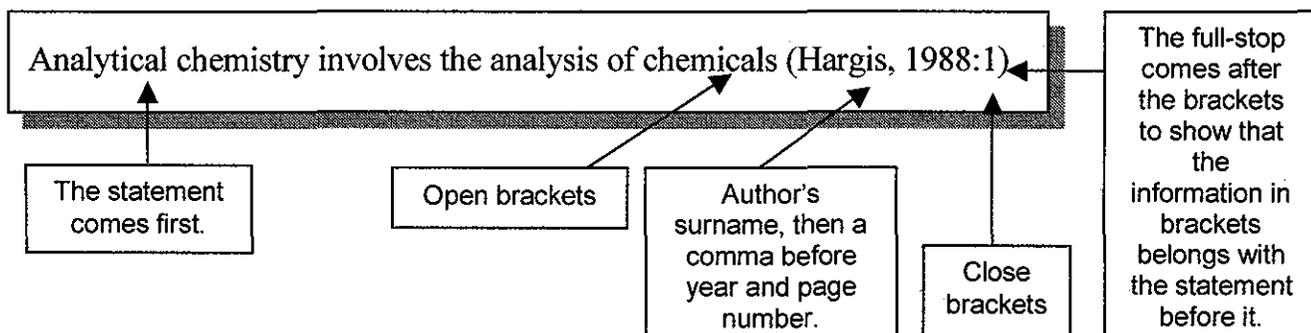
This is the referencing system used at Peninsula Technikon and as well as among the international science community.

Features

This system has the same purpose as the Vancouver method (see Textual Features 2), i.e. to acknowledge sources of information. However, whereas the Vancouver Method provides only numbers in the body of the text (these refer to a numbered list at the end of each chapter), the Harvard Modified system provides more detail within the text itself. One can do this in two ways: the surname of the author, then, in brackets, the year of publication and a page number (that is why we must remember to make a note of these when taking notes). Look at this example:



An alternative is to write the statement first, then put the referencing details afterwards. Look at how we can give exactly the same information as in the example above, but arrange it differently:



Question

For what reason do you think that you might want to write the author's surname, plus the referencing information, before the statement (and vice versa)?

Activity 8: Referencing

Let us now look at an example of text showing in-text referencing. The text here illustrates the Harvard Modified system of referencing. Read the text, then answer the questions that follow.



Preparing Analytical Chemists for Industry

Traditionally, undergraduate training of chemists has included core courses in quantitative analysis and instrumental analysis, which provide a strong foundation in basic chemical theory. In a recent study of doctoral education in chemistry, a task force examined the training provided by chemistry graduate school curricula. Although it recognised that students receive a strong fundamental foundation in science, the ACS Presidential Task Force (1996:8) concluded that students need more preparation to

...apply their knowledge and other abilities in concert with others to the best advantage of a team; to effectively communicate objectives, strategies, and results to others; to foster creativity, flexibility, problem-solving abilities, and communication skills.

We agree! As the turn of the century approaches, chemists in general and analytical chemists in particular will need a broader range of technical and non-technical skills to start successful industrial careers. These skills need to be developed at the undergraduate and graduate levels.

How will the gap between the academic training of analytical chemists and the skills required of those in industry be closed? In this Report, we will explore the differences between academia and industry and identify the kinds of skills needed by industrial scientists that are often underdeveloped in newly graduated analytical chemists. These nascent but missing skills, if incorporated into academic programmes, will enhance the likelihood of a student's success in a challenging and fulfilling industrial career. We will also briefly review short courses, undergraduate and graduate programmes, and opportunities for curriculum development that can provide training in industrially orientated analytical science.

Analytical chemistry in industry is fundamentally different from that in a university. Thorpe (1986:237) points out that industrial scientists focus on solving real-world problems (often several at a time) quickly with the resources at hand and collaborate with teams of chemists and engineers who may be located throughout the world. Effectiveness in a global team-orientated environment relies heavily on the industrial analytical chemist's skills in communicating with colleagues from different technical disciplines and cultures.

In addition to thorough, broad and in-depth knowledge of analytical chemistry, industry expects analytical chemists (indeed, all employees) to possess other skills. Logan (1991:6) indicates that these include good oral and written communication skills, thoroughness, and the ability to work with others, set clear goals and objectives, take the initiative, and use and manage ideas and information.

In industry, as in much of life, communication skills are of paramount importance. Effective communication is needed not just for presentations at internal and external meetings and symposia, but also to sell ideas to managers who may or may not be technically trained.

Problem-solving skills are the core of analytical chemical science. These skills are the chief reason industry values analytical chemists. An obvious, challenging and interesting kind of analytical chemistry problem solving found in industry involves investigating customer complaints, according to Sevenants & Sanders (1984:293) and Thorpe (1984:603). It is unfortunate that too few problem-solving articles like these appear in journals, because problem solving is a large part of most analytical chemists' jobs.

Adapted from: Thorpe, T.M. & Ullman, A.H. (1996) Preparing analytical chemists for industry. *Analytical Chemistry*. 68:15-16, 477-480.

Questions

1. Why do you think that the full bibliographic information about the sources is not inserted in the passage of text itself? What is included?
2. When there are one or two authors (e.g. Sevenants & Sanders), both names are mentioned in the text. When is *et al* used?
3. For what reason do you think that, in the case of some references, more than one information source is mentioned (e.g. Sevenants & Sanders plus Thorpe)?

*In the original journal article, the Vancouver system was used instead. What advantage do you think that the Vancouver system may have over the Harvard system? (Consider, for example, if there were several sources to support a point, each with two or more authors.)

End-of-text referencing

When referencing, not only should you acknowledge your sources in the body (text) of your assignment, but also in a list on a separate page at the end of your assignment. Look at the example below (it gives full details of the sources referred to in the earlier journal article extract – see Referencing Within the Text – as well as a few extra examples for you to study), then answer the questions that follow.

References

ACS Presidential Task Force on the Study of Doctoral Education in Chemistry. (1996) Are we matching Ph.D supply and demand? CHEMTECH, 26, 8.

Furr, A.K. (1990) Handbook of laboratory safety, 3rd ed.. Boston: CRC Press.

Haines, P.J. (1995) Thermal methods of analysis, London: Blackie Academic & Professional.

Kramers, H. (1988) Private communication.

Logan, T.J. (1991) Making yourself marketable as a Ph.D scientist. Chemistry, 1, 6.

Sevenants, M.R. & Sanders, R. (1984) Anatomy of an off-flavour investigation: the 'medicinal cake mix'. Analytical Chemistry, 56, 293.

Thorpe, T.M. (1984) What caused the drums to bulge? Analytical Chemistry, 56, 603.

Thorpe, T.M. (1986) Industrial analytical chemistry: the eyes, ears and handmaiden to research and development. Journal of Chemical Education. 63, 237.

An article in a journal

A textbook

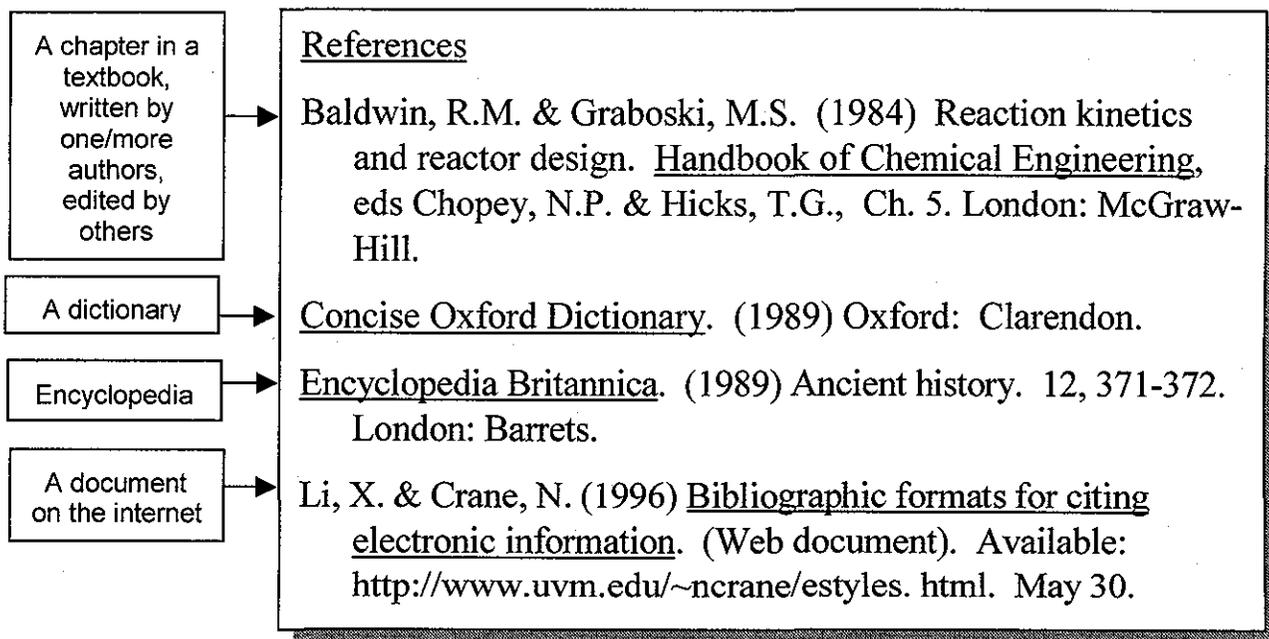
A textbook

An interview

Articles in journals

Other sources

It is also useful to know how to reference other sources. Here are a few examples:



Write

Questions

1. In what order are the entries arranged?
2. When there is more than one source by an author/s, how is the order decided?
3. Describe the format (i.e. Hanging Indented) used. What are its advantages?
4. Look at the spacing between entries. Make a note of this.
5. In the case of a chapter in a textbook, or an article in a journal, which part of the entry is underlined: the chapter/article OR the textbook/journal?
6. Why are the Encyclopaedia and newspaper entries different from the others?
7. What does & mean?
8. Find out what www, http and html mean.

Activity 8: End of text referencing

In each block below you will find information about an end-of-text reference. All the information that you need is there, but it is jumbled. Organise the information correctly and write it in the form of a references list.



1987 Flow of non-Newtonian fluids through granular media Longman Publishers Z. Kemblowski, M. Dziubinski and J. Merti Vol. 5 Chemical processes Chapter 6 Sydney	C.F. Bohren and D.R. Huffman 1983 London Absorption and scattering of light by small particles Wiley Publishers	P.G. Nelson pp. 20-21 Jan. 1994 Education in Chemistry Vol. 31 no. 1 Introducing... atoms and molecules	Biotechnology in animal feeds and animal feeding F. Zadrazil, A.K. Puniya and Singh, K. Chapter 4 Verlagsgesellschaft (VSH) (Publisher) Biological upgrading of feed and feed components R. J. Wallace and A. Chesson (editors) 1995
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6. Revise

You have now reached stage 6 of the writing process. You now have to revise what you have written. Go back to the writing process flow chart and remind yourself of the sort of questions you should be asking yourself at this stage.

Peer feedback on draft

It can be helpful to get feedback on your first draft. In addition to asking yourself the questions that you will find on the flow chart, you can also ask a colleague to give you feedback on your essay and you can do the same for him or her.

Ask a fellow student to assess your essay, using the following table as a guide. Ask your colleague to also write his or her comments below your work as shown on the following page.

Presentation, structure and referencing	/10
Presentation (visual appearance)	
Structure: Introduction	
Purpose statement	
Paragraphs	
Conclusion	
Referencing (in-text/end-of-text)	
Referencing (on sep. page - back)	

Comments about the above:

.....

.....

7. Edit



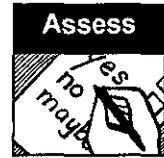
You are nearing the end of the writing process flow chart. Once you have received feedback and revised your first draft it is necessary to edit your work. Look up stage 7 of the flow chart to check that you understand what is meant by *editing* your work.

Peer editing

If you are writing your assignment on computer you can get the computer to do a lot of editing for you. MS Word will show you when you have made a spelling or grammatical error. Don't leave those errors on your page - correct them!

If you are handwriting your essay you will find that it is often easier for another person to spot your spelling or grammar mistakes. Ask a fellow student to help you edit your work, using the following table as a guide. If he or she has any comments to add, ask them to do so at the end of your essay as shown on the following page:

Meaning and correctness	/10
Tenses	
Spelling	
Punctuation	
Clarity of meaning (meaning is clear)	
Content - enough convincing information	
Other:	



Comments on the above:

.....

8. The final version

Once you have finished editing your work you may have to re-write it again if there were many spelling and grammatical errors. Correcting your own errors is a very valuable learning experience. If you don't correct your errors you will continue to make the same mistakes again and again; but if you make a habit of correcting your errors you will find your writing improving and needing less and less correction.



Before you hand in the final version of your assignment to your lecturer please check the assessment criteria for presentation.

You will find this information in Unit 1

The more you write the more you learn!



Reflection

A large rectangular area with a dotted line border, intended for writing reflections.

Unit 3: Reading and vocabulary

Introduction

The purpose of this chapter is to teach you reading skills that will help you when you have to go to the library and find information; and to develop your vocabulary.



The chapter begins with a short survey to get you to think about what you read, how you read it and why. This is followed by a fairly thick section on reading skills. You will be able to practise these skills as you go through the material.

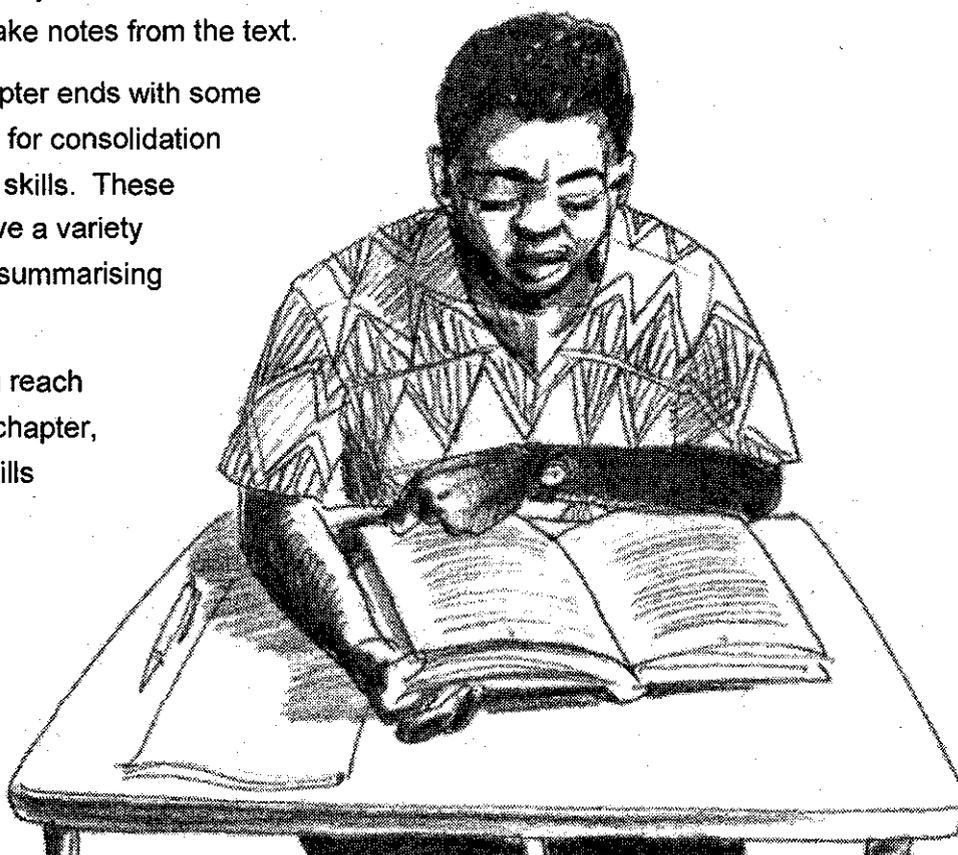
The following section gives you advice about developing a vocabulary index and using a dictionary.

The next part of the chapter has a variety of vocabulary building and reading exercises, as well as some guidelines to help you to understand how writers organise their information in textbooks.

There are also two reading exercises for you to do. These will show you how the notes you make alongside a text that you are reading can help you later, either when you want to revise or if you have to take notes from the text.

Finally, the chapter ends with some more exercises for consolidation of your reading skills. These exercises involve a variety of reading and summarising skills.

By the time you reach the end of this chapter, your reading skills should be well developed!



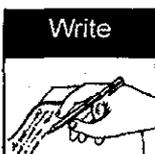
Reading

Do you think reading is important? We live in an age where print has to compete with the very powerful electronic mass media. There is so much to read, yet many people find this difficult, especially when the language that they have to read is not their home language. It is easier to look at pictures, especially when they move!

However, if, in future, you want to be able to participate in decision-making processes and be a real asset to your community, you have to be able to absorb messages - sometimes very detailed messages - which are written. You need to be able to read efficiently.

Before we look at the first of three reading skills, however, you should do a short survey of your own reading – look at what you read, why you read it and how you read it.

Activity 1: Your reading



Think of three different kinds of materials that you read and write down the name of each, one below the other, under the heading of the first column (What I read). Now ask yourself, 'Why do I read this?' (That is, for what purpose?), and 'How do I read this?' (For example: slowly). Write your answers alongside each one in the way shown here:

What I read	Why I read this	How I read
Map	To find out how to get to a place	Slowly, carefully

From this exercise, you have surely noted that the way in which you read different kinds of materials depends largely on your purpose.

Reading skills

In this section, we will look at three reading skills that can help you in your studies. If you take the time to become familiar with them, you will find that they help you to take maximum advantage of sources of information. These

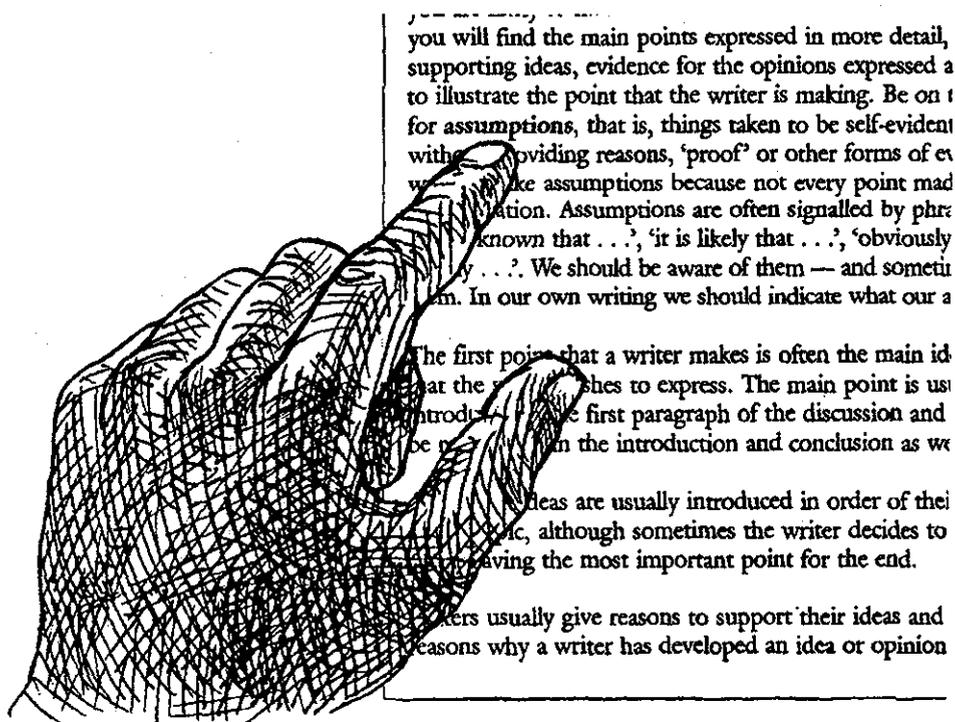
skills are Scanning, Previewing and Skimming. The first reading skill we will look at is called scanning.

Scanning

You have probably practised this skill for years without knowing how useful it could be in your studies. Why do you scan and how do you scan? You scan when you have a specific purpose, namely to find a specific (particular) item of information, such as a word or number. How? You run your eye quickly down the page, perhaps using a finger to keep your place, looking for a special word or number.

Let us look at an everyday example. Every time you use a telephone directory, you need to scan. For example, if you are looking up the surname 'Sondashe' in the telephone directory, you use the alphabet as the basis of your search, because you know that the telephone directory is arranged alphabetically). Once you have found the appropriate page, run your eye (and perhaps finger) searching for that specific name. While you are doing this, it is helpful if you visualise (have a picture in your mind) the word or number that you are looking for.

Scanning is, therefore, a quick method of reading. It can save you time that you can more usefully use for more detailed reading.





Activity 2: Scanning

Practise your scanning skills. Scan the text in the block below, then answer the questions that follow.

1.4 Sectors of the industry

The major sectors of the chemical industry are those which form most of the chapter headings in this book, plus chapters 9 and 11 in volume 1. Thus they are:

- Chlor-alkali products
- Sulphuric acid (sulphur industry)
- Ammonia and fertilisers (nitrogen industry)
- Petrochemicals
- Polymers (Dyestuffs)
- Agrochemicals
- Pharmaceuticals
- Phosphoric acid and phosphates (phosphorus industry)

An alternative categorisation, shown in Table 1.1, is based on the end uses of the chemicals. Here the basis of the comparison is value added, i.e. roughly the difference between the selling price and the price of the raw material plus processing costs. This tends to balance high-tonnage but relatively low-priced products like basic petrochemicals against low-tonnage but very high-value products like basic pharmaceuticals, although, as Table 1.1 shows, the latter come out very much on top.

The petrochemicals sector provides the key intermediates or building blocks (derived from oil and natural gas) such as ethylene, propylene, benzene and toluene. These are the starting points for the synthesis of an enormous range of industrial organic chemicals, which are produced in the downstream processing of the key intermediates in some of the other sectors listed.

The polymers sector is the major user of petrochemical intermediates and consumes over half of the total output of organic chemicals. A brief inspection of Chapter 4 indicates a large number of high-tonnage commodity polymers, e.g. polythene, polystyrene and polyvinyl chloride (PVC), and demonstrates why such large quantities of ethylene, benzene, etc., are required.

From Heaton, A. (Ed.) (1994) *The chemical industry*. 2nd ed. London: Blackie Academic & Professional.



Questions

1. In which volume would you find chapters 9 and 11?
2. Name one sector of the chemical industry beginning with the letter A.
3. How does Table 1.1 provide an alternative categorisation of sectors of this industry?

4. Complete: high-tonnage but products;
low-tonnage but products.
5. From what are the key building blocks derived?
6. Give any two examples of polymers covered in Chapter 4.

Previewing

The next skill we will look at is previewing. This skill is very helpful when, for example, you want to find out what a textbook is all about. When you use this skill, you look at various parts of the book. Your purpose is to discover what the book is about and whether it will help you with a task, such as an assignment, or preparing for a test.

When you preview, there are certain parts of the book that you should examine.

The first is the cover.

Activity 3: Judging a book by its cover

Examine the front and back covers of the Chemistry textbook shown here, as well as its spine. Using a pencil, label the information. Always label the category of information that you find, for example: surname of author.

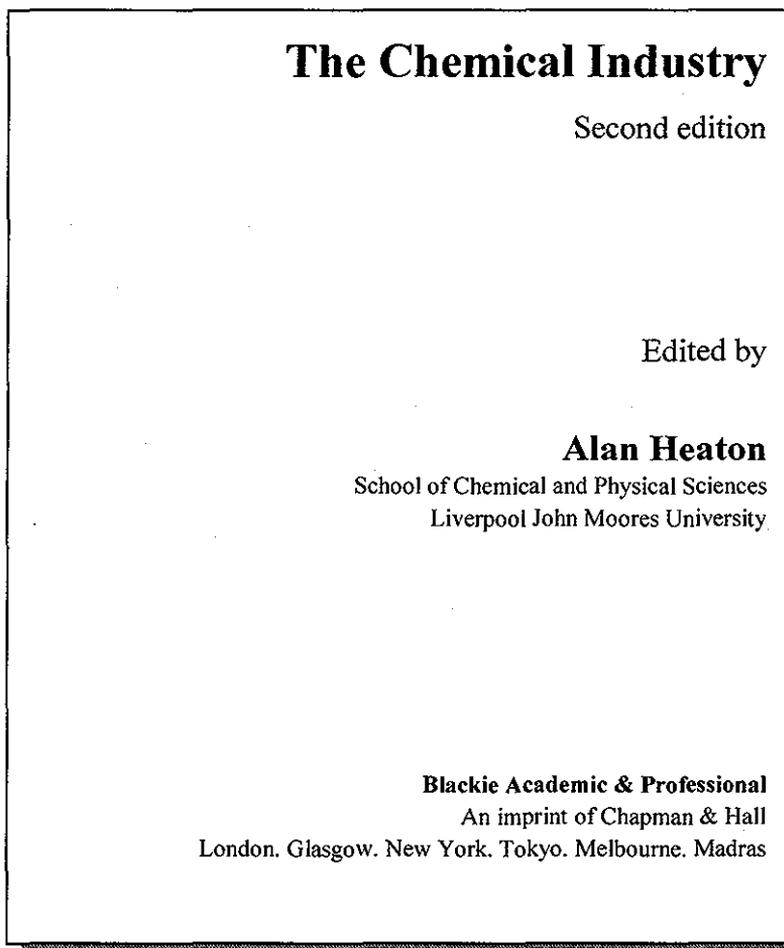
<p>THE CHEMICAL INDUSTRY</p> <p>Second edition</p> <p>Edited by Alan Heaton</p> <p>As environmental concerns grow, so too does the profile of the chemical industry which is increasingly seen as the root of all polluting evil, or as a responsible industry doing all it can under impossible economic conditions.</p> <p>Increasing awareness of health and safety concerns, and of the concepts of quality control and management, have also served to focus attention on its activities.</p> <p>In this introduction to each of the major sectors of the chemical industry, the authors cover the important chemistry, products, processes and relevant statistics. Each contributor draws on his/her extensive experience to give a balanced coverage which is both easy to read and authoritative. The text makes liberal use of chemical structures, figures and tables of data and there are bibliographies for further reading.</p> <p>ISBN 0-7514-0018-1</p>	<p>Second edition</p> <p>THE CHEMICAL INDUSTRY</p> <p>Heaton</p> <p>Blackie A&P</p>	<p>Second edition</p> <p>THE CHEMICAL INDUSTRY</p> <p>Edited by Alan Heaton</p> <p>Blackie Academic & Professional</p> <p>An imprint of Chapman & Hall</p> <p>INTERNATIONAL STUDENT EDITION</p>
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Note

When you preview, you often use the skill of scanning which we looked at in the previous section.

I. Title page

Next, you should examine this title page and answer the questions below.

**Questions**

1. What information do you find here that you do not find on the cover?
2. Why could this information be useful?

2. The back of the title page

The back of the title page is important. There is information here that you normally need for a list of references/bibliography, such as the year of publication and details of the publisher. Examine the example here, then complete the blank spaces on the next page. The International Standard Book Number (ISBN) is used when you want to order copies of this book.

Published by
Blackie Academic & Professional, an imprint of Chapman & Hall
Wester Cleddens Road, Bishopbriggs, Glasgow G64 2NZ

Chapman & Hall, 2-6 Boundary Row, London SE1 8HN, UK

First edition 1986
 Second edition 1994
 © 1994 Chapman & Hall
 Typeset in 10/12 pt Times by Thomson Press (India) Ltd, New Delhi
 Printed in Great Britain by the Alden Press, Oxford
 ISBN 0 7514 0018 1 (PB)

A → Apart from any fair dealing for the purposes of research or private study, or criticism or review, as permitted under the UK Copyright Designs and Patents Act, 1988, this publication may not be reproduced, stored or transmitted, in any form or by any means, without the prior permission in writing of the publishers.

B → The publisher makes no representation, expressed or implied, with regard to the accuracy of the information contained in this book and cannot accept any legal responsibility or liability for any errors or omissions that may be made.

A catalogue record for this book is available from the British Library.

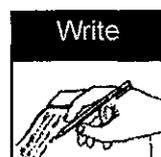
Library of Congress Cataloging-in-Publication data
 The Chemical Industry / edited by Alan Heaton. –2nd ed. p. cm.
 Includes bibliographical references and index.
 ISBN 0-7514-0018-1
 Chemical industry. 2. Pharmaceutical industry. 3. Chemical engineering. I. Heaton, C.A.

Other addresses were also provided here

A few other details were provided at the bottom of this page

Questions

- What is the copyright symbol? In what year was the book published? Why may this information be important to you as a student?
- What is the ISBN no.? What is this used for?
- What is the gist of the information provided in the paragraphs labelled A and B?



3. The preface

The preface or foreword is also situated early in a textbook. Its function is to tell the reader about the book, e.g. its focus and the limits of its content. In addition to a Preface, some textbooks also have an Introduction, which serves a similar purpose. Read the questions below this Preface and scan for the answers in the Preface itself.



Preface to Second Edition

In this second edition the original chapters have all been revised and updated, with major revisions to the chapters on Dyestuffs and the Sulphur, Phosphorous, Nitrogen and Chlor-Alkali Industries, because of the different approach adopted by the new authors.

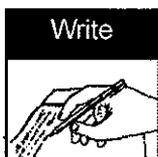
We have taken the opportunity in this second edition to add three completely new chapters, as follows: Chapter 1, Introduction, provides an overview of the chemical industry and also acts as a lead into the chapters which follow. The growing importance of, on the one hand Quality and Safety and, on the other Environmental Issues, are recognised by devoting chapters 2 and 3, respectively, to these topics. This has resulted in the original chapters being re-numbered.

Almost all the statistics and tables have been brought completely up-to-date and we hope that this plus the increased range of topics will widen the readership of the book. It is also worthwhile emphasising here that a second edition of the companion volume – An Introduction to Industrial Chemistry by C.A. Heaton – was published in 1991 and it is to that edition (referred to as Volume 1) that references in this book refer.

On a personal note I would like to thank all contributors for their co-operation and stress that they are expressing their own views and not necessarily those of their respective companies. I also wish to thank Phil Hughes of Zeneca Agrochemicals and Dr Albert Percival of Schering Agrochemicals for advice and information on chapter 7. Thanks are also due to Mrs Margaret Glynn and Mrs Sue Abraham for typing my own contributions, and to my wife Joy for her patience and support during the writing of this book.

The team of authors hope you will enjoy reading this new edition and find it both informative and interesting. I would be pleased to receive comments on the book.

Alan Heaton



Questions

1. For what reason have some of the chapters (e.g. the one on Dyestuffs) been revised in this edition?
2. How many new chapters have been added?
3. Why have Quality and Safety and Environmental Issues been included?

4. What second edition of a companion volume was published in 1991?
5. Name any two people whom the editor, Alan Heaton, thanks in this Preface.

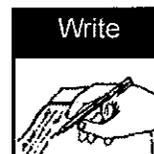
4. The contents page

The contents pages of a textbook tell the reader where to find specific categories of information, such as information in a chapter. Scan the part of a contents page provided here, then answer the questions that follow.

CONTENTS	
Editorial Introduction to the First Edition	xiii
Preface to the Second Edition	xv
Introduction	
Alan Heaton	
1.1 Development of the chemical industry	1
1.2 What the chemical industry does	2
1.3 Characteristics of the industry	4
1.4 Sectors of the industry	6
1.4.1 High-volume and low-volume sectors	7
1.5 Conversion of chemicals into consumer products	8
1.6 The chemical industry	9
1.6.1 Its importance	9
1.6.2 Major chemicals-producing countries	9
1.6.3 Multinational chemical companies	9
1.7 Quality and safety	10
1.7.1 Quality	10
1.7.2 Safety	11
1.8 Environmental aspects	12
1.9 The importance of team work	12
References	13

Questions

1. For what reason do you think that the page numbers for the Editorial Introduction and the Preface look different to the page numbers for Chapter 1?
2. On what page number will you find information about consumer products and the chemical industry?
3. How many subsections are there concerning Quality and Safety?



This has been discussed further when you studied Referencing in Unit 2.

5. Index

At the back of a textbook, you often find helpful information. Examples are an index, which is an alphabetical list of contents, Appendices, containing additional information to help the reader when using the textbook, such as tables, illustrations - and a list of references, which are sources of information used in the textbook. Sometimes a References list appears at the end of each chapter.

Here is a sample page from an index. Scan it, then answer the questions below.

plant growth regulators 251	free radical 63
plasticisation 107	interfacial 94
polyacrylonitrile 165, 176	'living' 68, 80
polyamide 176	slurry or precipitation 90
Polycyclic aromatic carbonyl dyes 175	solution 90
polyenes 143	step growth 57
polyester 153, 168, 174, 176, 177, 178	supported catalysts 72
polymer films	suspension or dispersion 91
gas barrier 114	polymer manufacture 86
permeability 114	polymer properties – effect of temperature 98
polymerisation	polymers
anionic 67	annealing 112
bulk 88	blends or alloys 106
cationic 69	chain flexibility 103
chain growth 61	chain symmetry 109
coordination 71	cold drawing 58
emulsion 91	cross-linked 75, 105, 110, 121, 132

Write

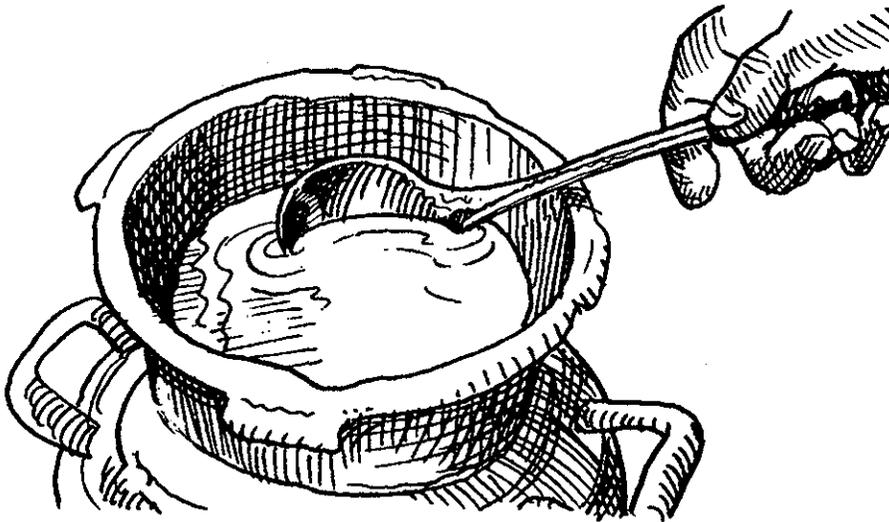


Questions

1. What do you notice about the order of items in the index?
2. Why do you think that some words are indented and others not?
3. On which page will you find information on interfacial polymerisation?

Skimming

The third valuable reading skill we will look at is skimming. What is 'skim' (skimmed) milk? It is milk from which the cream has been skimmed (i.e. off the top).



When you read you can choose to skim, taking only the richest part of a text and thereby gaining the most important information. You do not have to read everything - but whatever you select, you should read quite carefully!

Which parts of a text are the richest?

- The title (it often summarises the content);
- the abstract or summary (if there is one, it tells you briefly what the whole article is about);
- the first paragraph (here the writer usually provides some background and introduces the rest of the text);
- subheadings (these summarise the content of sub-sections);
- the first sentence of each paragraph (the main idea of a paragraph usually falls in the first sentence of a paragraph);
- look at pictures, diagrams and captions under pictures (these provide additional information); and, lastly,
- the final paragraph (it concludes and often summarises the whole text).



Activity 4: Practise skim reading

Skim the section of a chapter provided on the next two pages, then answer the questions. Remember, you do not need to read the whole article to answer the questions correctly.

Ch. 1: Introduction to thermal methods — P.J. Haines

1.1 Introduction

The effects of heat on materials have fascinated and benefited humanity since the very earliest times. Even the observation of fires and the burning process was both a pleasurable, and if uncontrolled, painful experience. The use of fire to cook foods, and of ice to preserve foods, probably contributed greatly to the settlement and welfare of early peoples and cooking was perhaps the very first 'chemical experiment'. The production of both organic and inorganic pigments by heating natural materials allowed the decorative arts to develop [1].

The skills which people first acquired in the controlled use of heat allowed the manufacture of ceramics, mortars, glass and metals. Primitive apparatus dating from around 2 500 BC [2] is known and the problems that arose with burning materials and the damage caused by fire are frequently seen in early settlements.

These skills, and the products they gave, were largely empirical 'arts' and their spread was jealously guarded by those who first discovered the most satisfactory technique. However, with the spread of information through travel, the methods were transmitted to people in other countries, who added their expert knowledge to improve the methods still further. The alchemists were responsible for many discoveries and their experiments in the synthesis and decomposition of natural and artificial substances laid the basics for modern chemistry [3,4]. Jabir ibn Hayyan wrote a *Book of Furnaces* and a *Book of Balances* around AD 800, but we have no evidence that he combined both [5]! In studying the history of materials, we also come to realise the effects that ageing has on their properties.

As the study of chemistry became more disciplined, the range of substances studied increased and it became necessary for scientists to be able to distinguish between different substances and materials. By studying their properties and reactions, it became possible to identify not only the constituents of a substance, but often the particular source from which it came. This is the beginning of the discipline known as *analytical chemistry*.

The modern student of chemistry or materials science may well start his or her experimental study of the subject by observing the nature of a range of materials, their appearance, mechanical properties and density and may then choose to heat the materials as a first attempt at classification [6].

A small sample, heated in a test tube, may undergo both physical and chemical changes and may alter in a large number of ways, or it may be completely stable. Table 1.1 gives some examples of behaviour that may be observed when solid substances are heated in air [6,7].

It must be noted that a single observation is not complete in itself, but requires additional chemical or physical measurements. For example, we cannot know what gas is evolved without a simple chemical test or physical measurement, such as a spectrum. The need to use complementary analytical techniques must be recognised throughout any investigation.

The addition of some simple apparatus to determine accurately the temperature of the event, and to control the heating, or to measure colour, plus any change in weight, or perhaps the extent of expansion or the nature of the volatiles evolved, gives a great deal more information to the analyst.

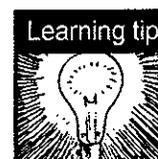
Source: Haines, P.J. (1995) Introduction to thermal methods. Thermal methods of analysis, London: Blackie Academic & Professional.

Questions

1. In early times, what was the function of fire?
2. How could fire provide both pleasure and pain?
3. Apart from cooking, what other process involves using heat?
4. Name two products that were made by people in their first experiments with heat.
5. Why did the early manufacturers protect the techniques of their special products?
6. For what reason did scientists eventually have to be able to distinguish different substances and their sources?
7. Nowadays, how may a chemistry student start to study the subject?
8. What may happen to a small test tube sample?
9. In addition to observation, what else may be needed to complete an observation?
10. Name one reason that simple apparatus may be used, apart from measuring temperature, controlling heating, measuring weight changes or the amount of expansion of the elements.

Developing your vocabulary

As you read more widely in your field you will find yourself coming across new words all the time. If you want to increase your vocabulary it is a good idea to keep a note of all the new words you have learned through reading or from your lecturer. An effective way of doing it is to make your self a useful vocabulary index.



Preparing the index

Prepare 52 pages of a notebook (A4) using two pages per letter of the alphabet (you may want to allow only one page for less common letters like X and Z).

If you are unsure how to cut the pages, look at a personal telephone directory or address book that is organised in a similar way.

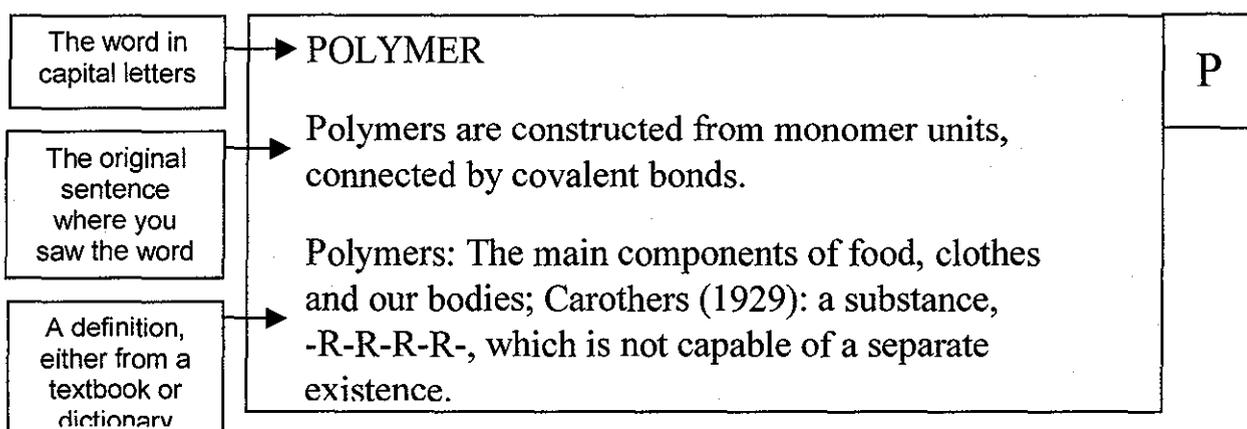
Vocabulary index	A
	B
	C
	D
	E
	F
	G

Using the index

Whenever you find a new word, write it down. Look up the word in a dictionary or an explanation in a textbook. Ensure that you understand the meaning.

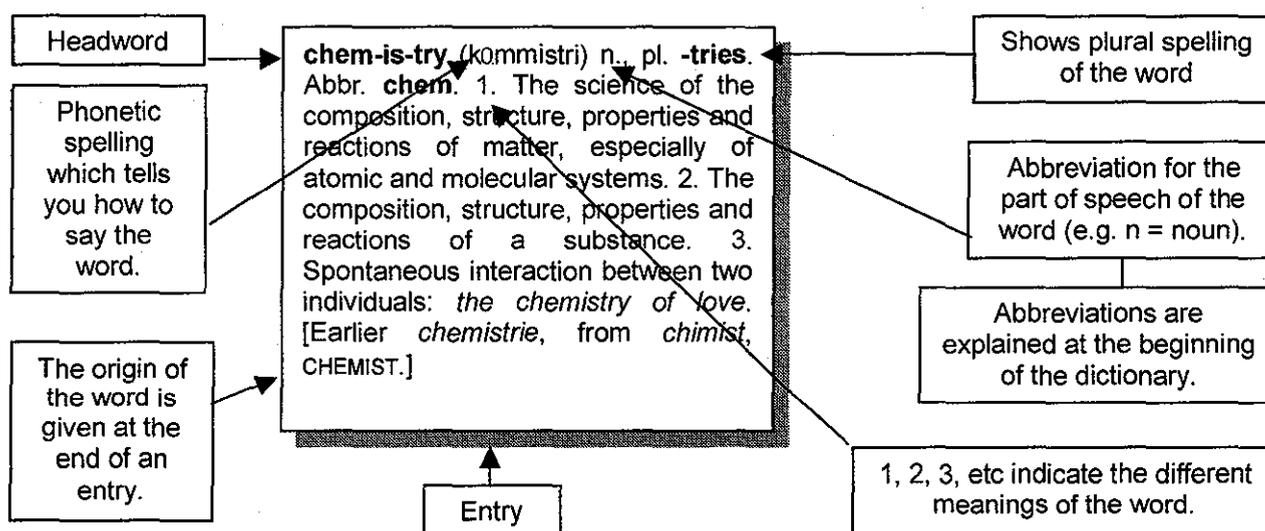
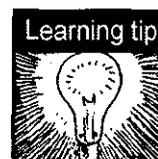
Write down the word in capital letters. Below this, write down the original sentence in which you found the word; and a dictionary or textbook definition. See the example at the bottom of this page, an entry under P.

When you have done this, you should write a personal interpretation of the word, showing how you would use it in a sentence. Also try to write down the word in your own language.



Using a dictionary efficiently

You can develop your vocabulary and language skills by learning how to use a dictionary effectively. The dictionary will give you the definition of the word you are looking up, but it will also give you plurals, past tenses of verbs, explain how to pronounce words, and so on.



Tips for effective dictionary use

1. The words in the dictionary are arranged alphabetically.
2. If you open the dictionary in the middle, you should be on about M.
3. The headword is the word you want to look up.



4. The words at the left (and sometimes at the right) at the *top* of a page are there to guide you: the one on the left tells you what headword appears first on that page; the one on the right tells you the last word that appears on that page.
5. When you find the headword, it is followed by an entry for it (this is the information about the headword.)
6. You will notice that the symbol ~ appears in the entry. This stands in place of the headword in that entry, although a suffix or prefix may be added (e.g. if the headword is Thunder, you might read '~ing' – meaning 'thundering').
7. The information in the entry includes the meaning of the headword and of different forms of the headword, e.g. noun, adjective, verb, etc. (These are often printed in italics.) It will also often give typical use of that word in a phrase (e.g. if you look up Thunder, the entry will include the expression 'a crash of ~').
8. If you see what looks like a word written in a strange language, this is the phonetic spelling of the headword – it tells you how to pronounce the word. However, you need to understand what the symbols represent if you are to use this feature properly.

Activity 5: Vocabulary building



Below are 26 words. Discuss the meaning of these words with a partner then try to fill in these words in the numbered spaces in the reading that follows. (If you write them on the page itself, use a pencil.)

Polyesters	Favourable
Furthermore	Employment
Although	Concept
Impact	Beneficial
Era	Crude oil

Profitable	Opportunities
Until	Fibres
Into	Chemical
Produced	Dominated
Example	Quadrupling
Particularly	Expanding
Employed	Products
Expansion	Polymers

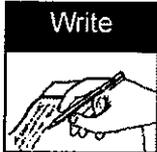
Environmental Issues

Up (1) _____ about 1960 the general public was not really aware of chemicals as such. They met them only as consumer or end (2) _____ such as insecticides like DDT, the penicillin antibiotics, and new (3) _____ such as nylons and (4) _____. These were all clearly desirable products which were very (5) _____, and in some cases life-saving. Thus the public's (6) _____ of chemicals, (7) _____ admittedly based on a limited understanding of them, was a very (8) _____ one. The industry which produced them, the (9) _____ industry, was therefore clearly needed. It (10) _____ these by now essential products and provided (11) _____ for a large number of people. (12) _____, it was (13) _____ rapidly, introducing many important new products, (14) _____ several (15) _____ and plastics, and was also very (16) _____. A major reason for this was that it was the (17) _____ of very cheap raw materials, e.g. (18) _____. Of course, this was well before the shock of OPEC's (19) _____ of crude oil prices in 1973. The (20) _____ of the industry created more (21) _____ for employment and in some areas one or two

large chemical companies (22)_____ the local economy and community. An (23)_____ was ICI on Teesside, which had an enormous local (24)_____ through both the tens of thousands of people whom it (25)_____ and the amount of money which it injected (26)_____ the economy.

From Heaton, A. (Ed.) (1994) *The Chemical Industry*, 2nd ed., London: Blackie Academic & Professional. p.39.

Activity 6: More vocabulary building



After discussing the meaning of the list of words below, read the following text and select from the list the words/terms that fit into the blank spaces. (Again, use pencil if you want to write on the page itself.)

extended	advent
principles	established
account	definite
revolution	development
complex	range
forerunners	conduction
definition	precision
vast	practical
relate	samples
applications	drawbacks

Ch. I Introduction to thermal methods

Historical development

The history of the (1)_____ of thermal methods from earliest times is considered in papers by Mackenzie [2] which include an (2)_____ of thermometry from the sixteenth century.

The (3)_____ of thermometric scales and the start of practical calorimetry in the eighteenth century, particularly by Lavoisier and Laplace [8] really brought about a (4)_____ in our thinking and in the (5)_____ approach to studying the effects of heat. It led directly to the work of Fourier on heat (6)_____ and to the elegant experiments of Joule on electrical heating and calorimetry [10]. The chief (7)_____ of their equipment were that it often required large (8)_____ and a long time to complete the experiment. Chemical reactions and physical measurements on gases were (9)_____ of today's analytical techniques.

The development of scientific instruments during the earlier part of the twentieth century allowed the (10)_____ of thermal measurements to be (11)_____ - for example, the measurement of the coefficients of expansion of silica by Henning [11] using an optical method led to the development of modern interferometric dilatometers [12] and the design of the thermo-balance, especially by Honda [13], has led to the modern TG systems.

In the second half of the twentieth century, (12)_____ improvements in instrumentation, sensors, data acquisition, storage and processing have been made, especially with the (13)_____ of microprocessors. The (14)_____ sensitivity and reproducibility of modern instruments are high, and their range of temperature of operation has (15)_____, together with the quality of temperature control.

Thermal methods of analysis are now used in a very large (16)_____ of scientific investigations. Besides the more 'chemical' areas, such as polymers, fine organic chemicals and pharmaceuticals, they have (17)_____ to electronics, in construction, geology and engineering, in materials science and in quality control. They very often give information impossible to obtain by other analytical methods. Very often, a (18)_____ material, such as a polymer composite, will show (19)_____ and characteristic effects on heating which (20)_____ to its nature, composition and history. These observations are informative about its properties and working life.

Source: Haines, P.J. (1995) Introduction to thermal methods. Thermal methods of analysis. London: Blackie Academic & Professional.

Textual features I

When we prepare an essay or even write a chapter for a textbook, we need to know how to organise our information so that it is easy for others to follow what we are trying to communicate. When we look at Oral Presentations, we find that we also have to organise our information there so that the audience can easily understand the message that we want to share.

The purpose of this document is to show how the author of a textbook organises information in a section of a chapter. There are TWO activities in this document. The second one may require you to look up words in a dictionary.

Activity 7: Finding textual features



Read through the text in the block on the right, then, read it again, this time taking note of the information that is given in the labels.

Here is a section of a chapter.

Chapter 1: Introduction

Before beginning a serious study of quantitative analysis it is important that students have a general understanding of analytical chemistry, of which quantitative analysis is the major part. As the book delves into specific theories and practices, it becomes important for one to be aware of how such things fit into the general goals of analytical chemistry. When deeply immersed in the chemical and mathematical procedures used to obtain data and calculate results, it is easy to lose sight of why the answer was desired and to what use it will be put. *These* general considerations often influence what methods and procedures are used and how mathematical calculations are performed. *In this chapter* we describe what analytical chemistry is, the role played by quantitative analysis, and the general methodology used to carry out quantitative determinations.

Here on the righthand side is an explanation of what you are reading

The writer introduces the section: he gives information (about what is needed before a student can begin to understand quantitative analysis).

The writer explains the need for such information (such an understanding is valuable and may affect choice of methods, procedures and calculations).

He uses a PURPOSE STATEMENT to prepare the reader for the content that follows in the rest of the chapter. In so doing, he provides the order of content too. The reader then knows what to expect.

A subheading explains the focus of the text below.

In the introductory sentence, the writer defines analytical chemistry. In the next sentence, he explains how he is using the word 'analysis' here.

Here the writer prepares the reader for a list of six problem areas where analysis is used.

Numbers are used to provide a logical reading sequence.

Analytical Chemistry

Analytical chemistry is a branch of chemistry involved with the analysis of chemical substances. Analysis is used *here* in a broad sense to include identifying substances, called qualitative analysis; determining the concentration or amount of substances, called quantitative analysis; and determining the structure of substances. The theory on which the processes of analysis are based and the instrumentation or tools with which measurements are made are integral parts of the analytical chemist's domain.

The variety of problems in which analysis plays a role is indeed great. Below are listed six broad areas in which analytical chemistry is commonly involved. With a little thought you should be able to add to this list.

1. *Establishing economic value.* Determining the amount of silver in a coin, the amount of oil in shale, and the amount of protein in animal feedstock are examples.
2. *Determining health hazards.* Establishing the concentration of sulphur dioxide in emissions from a coal-burning power plant and the amount of pesticide residue on fresh fruit and vegetables are *two diverse examples*.
3. *Diagnosing disease.* Clinical determinations *such as* those for glucose and urea are absolutely essential to the physician in making a proper diagnosis and making it quickly. Many clinical laboratories are set up to determine more than 50 substances routinely.
4. *Controlling quality.* Virtually all manufacturers try to achieve a constant, pre-determined quality of a product. To do *this* they often need to know the quality of their raw materials. Drug and processed-food manufacturers must analyse their starting materials, additives, and finished products regularly to ensure that their product meets acceptable standards.
5. *Relating properties to composition or structure.* Both the physical and chemical properties of alloys, adhesives, lubricants, plastics, *and so on*, depend on their chemical composition. *Similarly*, the activity or effectiveness of pharmaceuticals, pesticides, and herbicides depends largely on their chemical structure.

The writer points out that analytical chemists work closely with other kinds of scientists and chemists in solving problems.

An example of such a situation is provided to illustrate this point.

The paragraph ends with a repetition of the main idea of the paragraph stated earlier, i.e. that scientists need one another if they are to be effective.

6. *Conducting research.* Analytical chemistry plays a major role in many research projects. Following the accumulation of pesticides in the food chain or the metabolic fate of drugs in the human body, determining the nature of catalytic surfaces necessary to convert coal to natural gas, looking for new ways to separate, identify, and determine the concentration of important enzymes and proteins and developing new and better instruments for making quantitative measurements *are but a few examples.*

It should be obvious that analytical chemists often work in close co-operation with other types of chemists and scientists. Consider, *for example*, a chemical manufacturing plant that suffers a large explosion. Management wants to know the cause of the explosion. Engineers will be called upon to assess the damage, estimate the force of the explosion and try to pinpoint its source. They may *also* establish the effect of different types of equipment failure or malfunction. Organic or inorganic chemists will be called upon to determine what improper conditions or impurities could have resulted in undesirable reactions leading to explosive products. Physical chemists will be needed to calculate the amount of explosive energy that could result from the various possible reactions. Analytical chemists may work with *all of these* scientists, analysing residue samples from around the explosion site to identify the combustion products in hopes that they will provide a clue as to the nature of the explosion reaction and/or the location of the explosion. *Also*, they may decide to analyse the raw materials being used to determine if impurities are present that could be responsible for an undesirable reaction or condition that might lead to an explosion. The effectiveness of the scientists and engineers in solving this problem will be diminished if their knowledge is limited solely to their own disciplines. The extent to which we know things beyond our own discipline is important in determining our effectiveness in many endeavours both scientific and non-scientific. *Also*, it is, of course, the reason that many of you are enrolled in an analytical chemistry course and reading this book.

Source: Hargis, L.G. (1988) *Analytical chemistry*. Englewood Cliffs: Prentice-Hall.

Questions

1. Identify the introduction. What is the function of an introduction?
2. Which three words signal to the reader that the writer is going to tell him/her what is to follow? What do we call such a group of words?
3. What is the function of a subheading?
4. Why does the writer provide examples?
5. How can the writer show the reader that he is emphasising a point? (See last paragraph.)
6. The italicised words in the text help the reader to understand where s/he is in the text – like map labels that help you to find your way. See if you can tell what direction these words provide in each case.

Textual Features 2

Read this extract from an Analytical Chemistry textbook, noting the features pointed out in the labels. After going through the passage carefully, respond to the questions that follow.

**1.4 Computers and thermal methods**

If you go into any modern laboratory, there are often as many computers as there are instruments. The computer forms a vital part of the 'armoury' of any analytical laboratory, and its use in combination with thermal analysis techniques is very important.

The use of computers may be divided into approximately four parts:

1. As a means of instruction in the operation of the instrument.
2. To make the collection, interpretation, storage and retrieval of instrumental data easier for the operator.
3. To allow the user more easily, and more accurately, to calculate the results of an experiment.
4. To simulate the behaviour of the instrument, or of the sample, under special conditions.

Note decimal numbering: 1 is the chapter number, 4 tells us that this is the fourth subsection of Ch. 1.

In 1.4.1, (see overleaf) the last numeral here (1) tells us that 'The computer as an instructional tool' is the first section of information under the larger subsection, 1.4, entitled 'Computers and thermal methods'.

Numbers are used here to indicate four parts. Letters (e.g. a, b, c, etc.) could also have been used.

Note the numbers in brackets here, as well as further on. These numbers refer the reader to information sources used by the writer of this textbook. At the end of each chapter of this textbook there is a reference list for that chapter. This system of referencing is called the Vancouver method.

The general interconnections of a computer with thermal analysis system is shown in Figure 1.3.

One or more instruments are connected to the computer via the experimental control interface and also via the data acquisition interface. The user interacts with the computer via the keyboard and the VDU screen. The data produced may be stored in a large variety of ways, but most systems involve both hard disc and floppy disc storage. Display of results, hard copy of thermal analysis curves and of calculated parameters, such as coefficients or expansion from a TMA experiment, may be produced on printers or plotters.

Computers may be used in the planning of the experimental work by writing a method into the computer system. The method can preset the analyser to the selected starting conditions, load the sample from a robotic autosampler into the analyser and carry out the run, controlling the heating programme and the purge gases. The data obtained may then be analysed according to a selected regime and a report presented to the analyst with the thermal analysis traces, the results for, say, melting point and heat of fusion from a DSC trace, plus an assessment of the results on each sample for purposes of quality control [21].

1.4.1 The computer as an instructional tool

There are several 'computer-aided learning' schemes available for analytical chemistry, notably from the ACOL organisation [22]. Similar systems may be written for most commercial instruments, and are often available from the manufacturers. As an example, the 'PL-Show' computer programs [23] give both an overview, and also specific applications for a wide range of thermal analysis equipment.

The program can instruct, as a 'bench textbook' in the definitions, mode of operation and applications of a selected thermal method. The menu system leads the user through the choice of method and conditions, such as sample size and heating rate, and gives specific instructions for the operation of the particular instrument involved. Many such systems are 'fail-safe'. For example, they will not allow you to continue if you choose the wrong temperature limits (which might burn out the furnace), or if you have not turned on the analyser, or even if there is an obstruction that would impede the movement of the furnace!

Source: Haines, P.J. (1995) Introduction to thermal methods. *Thermal methods of analysis*, London: Blackie Academic & Professional.

Questions

1. In the number 4.6.8, what is the number of (a) the chapter? (b) the main section of this chapter? and (c) the number of its minor section?
2. In section 1.4 of the reading, why do you think the writer chose to use individual numbers rather than full decimal numbers (e.g. 1.4.1, 1.4.2, 1.4.3, etc.)?
3. What do the bracketed numbers (in the righthand section) tell the reader?
4. Make a note of any words that you did not understand in the reading. Discuss these with your partner or group. If you cannot determine the meaning of all the words or expressions, look them up for homework, using a dictionary or a textbook glossary on the subject.

Write**Discuss**

Remember to add new words to your vocabulary index at every opportunity.

Reading a text for meaning

You need to get the most out of your reading so when you read you have to be sure that you understand what you read. The following exercises will help you to develop these skills.

Activity 8: Reading for meaning

Below is an extract from a newspaper article. Read the text once, then, while reading it a second time, draw a flow chart in the left hand margin beside the block of text. This flow chart should reflect the development of ideas in the text. The first two paragraphs have been done for you.

Summarise only the main points of each paragraph. Do not be distracted by examples and details which are not central to the gist of what the writer is trying to convey. Please time yourself for the reading and the task.

Only 33% of 1st yr tertiary students have learned enough science to cope in 21st century life



Study showed how much apartheid led to scientific illiteracy



Research can also help education departments to improve science ed.

SA students are scientifically illiterate

A survey measuring scientific literacy shows that only one in three students entering tertiary education has a sufficient grasp of science to cope with life in the 21st century.

Researchers Dr Rudiger Laugksch of the University of the North and Professor Peter Spargo of the University of Cape Town used a sample of 4 223 students entering the three universities and two technikons in the Western Cape for the first time in 1994. Their results, published at the end of 1999, provide an unprecedented insight into the extent to which apartheid education fostered scientifically illiterate students. However, the research will also help national and provincial education departments to improve science education in South African schools in years to come.

The findings confirm that 'scientific literacy levels reflected the hierarchy of inequality of apartheid education policies.' Only 19% of African students entering the field of natural sciences, for instance, scored a pass, compared with 38% of coloured students, 62% of Indian students, 56% of white students (and an overall total of only 45%). The figures were highest – with the same population group ranking – for students entering faculties of engineering, 51% of whom were classed 'scientifically illiterate' they were lowest for human sciences students (25%). The test gauged students' understanding of the nature and general limitations of science, as well as the impact of science and technology on society.

Matric results were a clear indicator: students with the highest aggregate – an 'A' – also displayed the highest level of scientific literacy (68%), followed by those with a 'B' aggregate (51%), 'C' (34%) and 'D' (20%). Only 10% of students with an 'E', 'F' or 'G' matric result were classed as scientifically literate.

There was a significant gap between universities and technikons. Approximately one in four technikon entrants (26%) and two in five university entrants (42%) were assessed as scientifically literate.

Gender also made a difference, male students having higher levels of scientific literacy than female students in all population groups. A significantly greater proportion of males (60%) than females (40%) took subject combinations that included physical science, however, and, say the researchers, the difference in science subject combinations of male and female students 'probably accounts for the difference in scientific literacy levels between genders.'

The matric science subject combinations chosen were more significant in developing science literacy than the actual number of science subjects studied.

One science subject in matric was better than none. Three science subjects in matric, however, did not necessarily give higher levels of scientific literacy than taking only two. Students choosing physical science as a subject scored consistently higher levels of science literacy than those who did not, even though the test is not biased towards physical and chemical sciences. Those choosing physical science together with geography scored best overall.

Students with 'science push' parents also scored best.

Such parents, according to Laugksch, '...insist that children complete their homework; expect their children to do well in science at school; think that science is an important subject; would like their children to have a career in science, medicine or engineering; and encourage their children to go to a university, technikon or technical college.

'The attitude of parents to science, and the educationally conducive home environment they create for their children, seem to be important for their children to achieve scientific literacy. As luck would have it,' he adds, 'this is something that all of us can do something about.'

Lickendorf, E. S A Students are Scientifically Illiterate. Mail and Guardian.
(Jan. 14 to 20 2000, p. 10.)

Questions

Respond to these questions, always giving a reason/s for your answer:

Overall, what do you think is the main message of the writer? Is he saying that:

1. Only 1 in 3 tertiary education students will pass?
2. The results of apartheid education are reversible?
3. Scientific literacy levels are a result of the inequalities of apartheid?
4. The test that was mentioned specifically tested engineering versus human sciences students?
5. Matric results are significant?
6. Males are better at science than females?
7. The more science subjects studied in matric, the better?
8. Parents and the home environment can make a difference?



Reading for meaning 2



Read the text below, then using a pencil, write labels for each paragraph (the first has been done for you). In addition, answer the questions that follow on the last page.

The history of the atom.

**Electricity:
The Force That Transformed The World**

1. In order to talk about electricity, it is necessary first to talk about the atom. The idea of the "atom" has a long history, one extending back to about 600 B.C. and the time of the ancient Greeks. They believed that all matter was made up of atoms. The word "atom", in fact, comes from the Greek word "atmos", which means "indivisible". It was not until 1897 that it was discovered that the atom is not indivisible but is composed of even smaller particles. Among these particles is one called the *electron*.
2. Electrons orbit around the centre or nucleus of the atom, much as the planets in the solar system orbit around the sun. Electrons closer to the nucleus are held more tightly than those in the outer orbits. It is the electrons in the outermost orbit of certain kinds of atoms that can be made to flow as electric current.
3. Electrons flow easily through certain kinds of materials called "conductors". Many metals, such as silver, copper, gold and aluminium, are good conductors. Good conductors are used in electric circuits to provide a path for the current.
4. Other substances provide strong resistance to the flow of the current. These substances are called "insulators", which are used to confine a current to the desired path. Substances, such as hard rubber, glass, wax and certain kinds of plastic, are good insulators. Thus the cord on an electric appliance consists of a piece of wire, generally copper, surrounded by a type of plastic or vinyl, which is the insulator confining the current to its path.
5. The pressure that makes electrons flow along wires is called "voltage". Voltage may be created by a generator at a power plant or by an electric battery. When you turn on a light or an electric appliance, electrons are drawn from a generator at a power plant. When you turn the light or appliance off, there will be electric pressure or voltage built up at the switch, but no current will flow. It is somewhat similar to the way a water system works.
6. When you turn on a water faucet, water flows through the pipes, which is like electric current flowing through wires. When you turn off a faucet, water pressure remains but no water flows through the faucet. Similarly, when you turn off an electric appliance, voltage remains, but no current flows. In a water system, the whole operation depends on water pressure generated by a water pump. In an electric system, the generator (or battery) creates the pressure called voltage.

Adapted from: (1988) Lines, Potomac: The Potomac Electric Power Company (PEPCO).
Reprinted in Curry, D. (1988) Short Readings in Science, 9-10.

Vocabulary questions

From Column B, select the equivalent expression for the expression written in *italics* in Column A. Place only the letter of your answer beside the numbers of Column A (e.g. 3c).

Column A

1. ...*in order to* talk about electricity...
2. ...composed of *even* smaller particles...
3. ...*much as* the planets...
4. ...metals *such as* silver, copper...
5. ...*Thus*, the cord on the electric appliance...
6. ...*generally*, copper is surrounded by...
7. ...and it is *somewhat* similar to this...

Column B

- a. similar to
- b. in most cases
- c. still
- d. like
- e. to
- f. in some ways
- g. therefore

Multiple-choice questions

1. Electrons will flow easily through copper and silver because they are good
 - a) particles
 - b) conductors
 - c) regulators
 - d) insulators
2. Electrons are smaller particles of
 - a) circuits
 - b) currents
 - c) voltage
 - d) atoms
3. One function of an insulator is to confine an electric current to its
 - a) voltage
 - b) orbit
 - c) path
 - d) generator

Practice



4. Similar to the way that planets orbit around the sun, electrons in an atom orbit around the
 - a) nucleus
 - b) generator
 - c) flow
 - d) voltage
5. A substance that offers strong resistance to the flow of electric current is called
 - a) a battery
 - b) a conductor
 - c) an appliance
 - d) an insulator
6. Another term for electric pressure is
 - a) current
 - b) voltage
 - c) faucet
 - d) switch
7. Rubber, glass and wax are good
 - a) insulators
 - b) conductors
 - c) regulators
 - d) generators
8. At a power plant, a generator is used to create voltage, which is the pressure that makes ...
 - a) atoms
 - b) circuits
 - c) electrons
 - d) orbits... flow along electric wires.

Activity 9: Reading skills

Skim the following text, then read the text again and this time write the jumbled (mixed up) subheadings in the box below in the underlined spaces provided.

List of subheadings

colour illustrations

vocabulary

chapter outline

end-of-chapter questions and problems

checklist for review

problem-solving programme

Chapter theme

Preface

To the student

The purpose of this textbook is to introduce you to the basic facts and principles of chemistry. Chemistry is a vital and dynamic science. It is of fundamental importance, not only to all the other sciences and modern technology but also to any explanation of the material things around us. Consider these diverse questions. What is the environmental role of ozone in the earth's atmosphere? What is responsible for the red colour of Io, one of Jupiter's moons? How can we see inside a patient's brain without doing harm? All of these questions involve chemistry, and they are just some of the questions you will explore in your reading of this text.

Features of the Text

Each individual learns in a different way. For that reason, we have incorporated a number of different features into the text to help you to master the subject. We hope that by becoming familiar with these features, which are listed below, you will be able to tailor a study program that meets your particular needs.



Each chapter is preceded by an outline. A chapter is broken into parts, and these are divided into sections and subsections. A glance at the outline will give you an overview of a particular chapter. You may find this outline of value in reviewing. For example when you finish studying a chapter, go over the outline and try to fill in the main details of the discussion under each heading.

We begin each chapter with a theme, something specific that reveals the real-world relevance of the chapter topic. For example, we open Chapter 2 with a discussion of sodium, chlorine and sodium chloride. This then leads naturally into a series of questions (e.g. How do we explain the differences in properties of different forms of matter?).

Most people are strongly visual in their learning. Fortunately, chemistry presents many opportunities for beautiful photography and colourful graphics. When you see something, you tend to remember it. With this in mind, we have chosen colour illustrations that both clarify the discussion and help you visualize it. Also, computer-generated colour images have been used for all molecular models. These images convey the three-dimensionality of molecules more effectively than conventionally drawn figures.

You learn only to the extent that you are involved with a subject, and you learn by doing. It often looks deceptively easy when your instructor explains how to solve a problem. But problem solving is like learning to swim or to play a musical instrument. It becomes easy only with practice. To learn to solve chemistry problems, you must work through the solutions on your own, building your skills by practising with many different problems. We introduce each problem-solving skill by an Example, in which you are led through the reasoning that is involved in working out a particular type of problem. Each Example is accompanied by an Exercise, which is a similar problem that you can try; the answers are at the end of the book.

Chemistry uses words in a precise way, and it is important that you develop a vocabulary of terms in order to read and communicate effectively. When a new important word is introduced in the text, we have flagged it by putting it in boldface type. The definition of that word will generally follow in the same sentence in italic type. All of these words are collected at the end of the chapter in the list of Important Terms. They also appear, along with a few other words, in the Glossary at the end of the book. Whenever you are reading along and you encounter a word whose definition you do not recall, look in the Glossary.

When it comes to reviewing (revising), students generally develop their own techniques. What we have tried to do is accommodate these differences by presenting various review possibilities. For example, you may find that the list of Important Terms is useful, not only because it is a list of new words, but also because as you look over the words you see the structure of the chapter. Many chapters also introduce one or more mathematical equations to be used in problem solving. In the chapter, these are noted in blue type; then, in the Checklist for Review, these are listed as Key Equations. Finally, we present a list of Operational Skills. This is a summary of the chapter's problem-solving skills. Each operation skill tells you what information is needed and what is to be solved in a given type of problem. Each operation skill also refers back to the Examples that discuss that problem-solving skill.

The end-of-chapter questions and problems begin with Review Questions. These have been designed to test your understanding of the chapter concepts and theory. Generally, they can be answered by straightforward recall or by simple extension of the chapter material. After these questions, we have listed several sections of problems to help you master problem-solving skills.

Adapted from: Ebbing, D.D. (1993) *General Chemistry*, 4th ed.. Boston: Houghton Mifflin.

Questions

1. What is the purpose of this textbook?
2. Other than in the areas of modern technology and other sciences, why is Chemistry important to us?



3. Do all people learn in the same way?
4. What is at the very beginning of each chapter?
5. In the majority of people, which sense is powerful for learning?
6. What is essential if you are to learn well?
7. Why is it important for a Chemistry student to develop a good vocabulary?
8. What is the word used to describe how somebody learns?
9. Does everybody revise in the same way?
10. What section appears first in the end section of a chapter?
11. Write two sentences in which you summarise the structure of this textbook.

Summarising

Summarising is an important academic skill. If you become efficient at this you will find that you are able to use the information that you are reading. When you summarise the author's words you change them into your own words. By doing this, you will 'own' the knowledge in the text.

Activity 10: Summarising



Skim the following text. The sections that you do not need to read have been shaded. After you have skimmed the text, summarise the contents as briefly as you can - in your own words.

Chapter 2: Quality and safety issues

by Christine Ryan and Tony Ryan

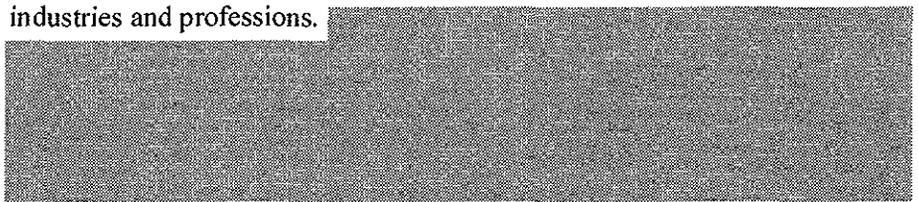
The quality revolution

What is meant by the word 'quality'? In the modern context, quality is not merely concerned with the quality of a particular product or service but rather the quality of the business as a whole, embracing everything that happens in the company. For this reason it is often referred to as 'total quality' or 'total quality management' (TQM).

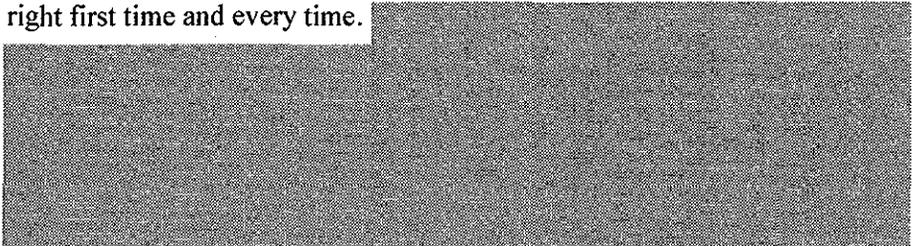
The concept of quality with which we are familiar today was probably first established in Japan, having been marketed there most notably by two American academics, Edward Deming and Joseph Juran.



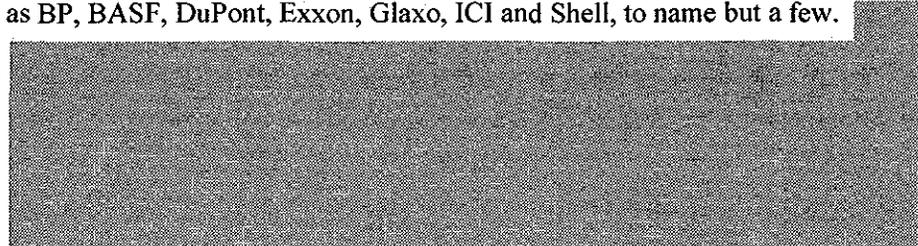
Since its introduction, when total quality was concentrated on quality control in the manufacturing sector, quality has spread to embrace the service industries and professions.



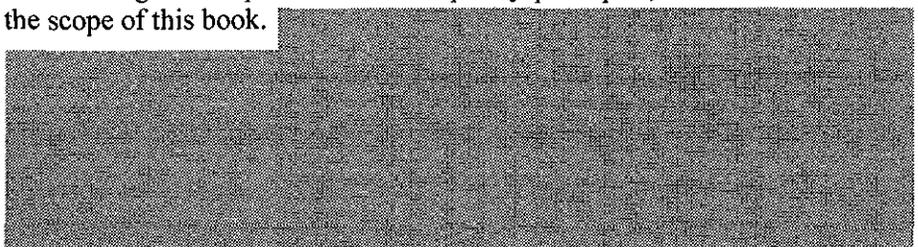
Quality is about the total way in which a company does business, and it is based on establishment of the principle of giving complete customer satisfaction, at the most favourable cost to all concerned, by getting the job right first time and every time.



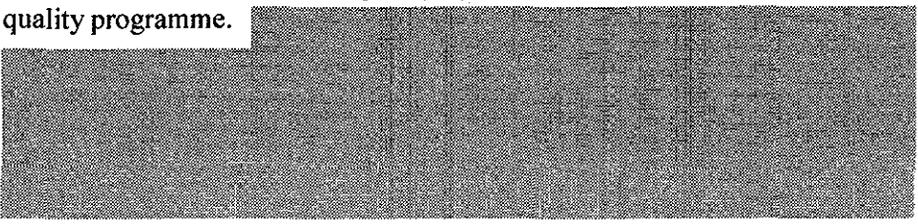
Over recent years, the quality concept has become increasingly adopted by commercial organisations including multinational chemical companies such as BP, BASF, DuPont, Exxon, Glaxo, ICI and Shell, to name but a few.



There are many publications dealing with specific quality issues and numerous books and courses are now available which detail the intricacies and training and implementation of quality principles, but these are outside the scope of this book.



Three of the most renowned quality specialists have each devised their own quality programme.



Having briefly established what quality is, how then do we identify a 'quality product'?

Failure to recognise the need for change in the workplace, in terms of the quality of a business, has led to the decline of many industries.

Those who remember the 1950s will recall that Japanese-manufactured goods were generally regarded as shoddy and offering poor value for money.

So, the need for quality is clear. It is all about survival – of the industry, the company, and of the individual's job. TQM can provide the techniques needed for improving the overall performance of an organisation. There are many companies, such as Rank Xerox and British Telecom, that can point to tangible results, but it should also be remembered that total quality is not a substitute for good research and development, although it does have a very important role to play.

From Heaton, A. (Ed.) (1994) *The chemical industry*, 2nd ed.
London: Blackie Academic & Professional.

Learn to read. Read to learn.

Unit 4: Oral Presentation

Introduction

This unit is shorter than the others, but no less important! The main section, entitled 'Making a successful oral presentation', will give you as much advice as possible about this subject.

After a brief introduction, the chapter has a Self-awareness questionnaire designed to get you to reflect on (think about) your own experience of 'doing orals' and how you feel about that. This is followed by some advice set out in point form about how to overcome fear and prepare properly; how to use an outline or cards for notes; and the use of visual support. There is a case study for you to go through and consider. The chapter ends with a sample of an oral outline which you may wish to use for your oral, and a copy of the assessment form that your lecturer will use to assess your orals. You should take the time to look at this document carefully, making sure that you understand all the criteria involved in an oral assessment.

Making a successful oral presentation

The purpose of this section is to guide you in your preparation for, and delivery of, a successful oral presentation. Even with experience, many people find that making a presentation is quite daunting. If we are not used to the fairly formal setting in which such presentations tend to take place, it can be quite overwhelming. Very few speakers escape the 'butterflies'. However, with experience we should find it increasingly less frightening, especially if we apply the principles of successful presentations.

You learn to speak well by speaking; but everyone's speaking skills can be improved by applying certain techniques. First, you have to fine-tune your *self-awareness*.

Activity 1: Developing self-awareness

First, on your own, read through and respond as quickly and honestly to all the questions that follow. This should take you around 20 minutes.



Self-awareness

Your feelings

1. How do you feel about talking to groups?
2. Do you have any negative self-doubts when you stand up? Why?
3. If you are nervous, does this affect your voice? For example, does your voice sound calm or shaky?

Body movements

4. Are you aware of your body movements while speaking? Describe them.

Audience reach

5. Do you use any technique to capture the attention of your audience at the beginning? If so, give an example.
6. Do you reach out to your audience (i.e. really try to communicate with them) while speaking? If so, how do you believe you accomplish this?

Notes

7. How important are your notes to you during a presentation? Give reasons.
8. Describe the typical appearance of your notes. Tidy? Untidy?
Are they composed of key words and ideas only, or are they full notes?
9. Are your notes for orals easy to use and non-distracting to your audience during your talk?
10. Do you learn your notes 'off by heart'? If so, does this cause any problems during your oral?

Rehearsal

11. How many times do you rehearse before presenting a speech? Is this enough?
12. Do you rehearse before an audience? Do you use a tape-recorder or videotape your speech?
13. Do you write up or otherwise display the title of your speech? Suggest why this might be important for your audience.

Voice

14. Do you vary your volume, pace and pitch? (Do you know what these terms mean?)
15. Do you use vocal emphasis for important points?
16. Do you enunciate (form) words clearly?

Audio-visual support

17. Do you make sufficient use of visuals to complement your speech?
18. Are your visuals easy to understand and readable? Do they have impact?
(i.e., do people respond with interest to them?)

Responses to questions

19. How do you feel when you get questions from the audience? Explain.
20. How do you respond to questions? Do you have a strategy or policy?

Time management

21. Do you keep track of the time during a time-limited speech? How do you do this?

From what I have reflected on, I need to work on the following aspects (also suggest how you may do this).

The secrets of successful presentations

There are two secrets to successful presentations. The first is *facing your fear* and the second is *preparing well*.

Facing your fear

Let us first look at fear. One of the reasons that people are so nervous about presentations is that they so badly want to do well and yet feel very self-conscious standing up in front of others, when everyone is looking at them. They fear that they will make a fool of themselves, do things that will make others laugh at them. Remember that only a very immature audience would do that! The key to success is to focus on the message instead of on fear. Your confidence will also improve greatly if you follow the second secret to a successful presentation: preparing well.

Being well prepared

If you want to be confident, you need, in all respects, to be well prepared. Let us consider the different ways in which you can prepare. These basically fall under three categories:

- Think
- Find and organise information
- Practise

Think

The first questions to ask concern the audience, the purpose of the presentation, the event of which it will be a part and the venue: Who will be my audience? What is the occasion? What do I want to achieve? In what size venue will I be making my presentation? What equipment will I need (overhead projector, slides)? How much time do I have?

Find and organise information

Next, you should gather all the information which you want to include and organise it (see section on mind-mapping and the speech outline). Put all information in the correct sequence in a folder or file.

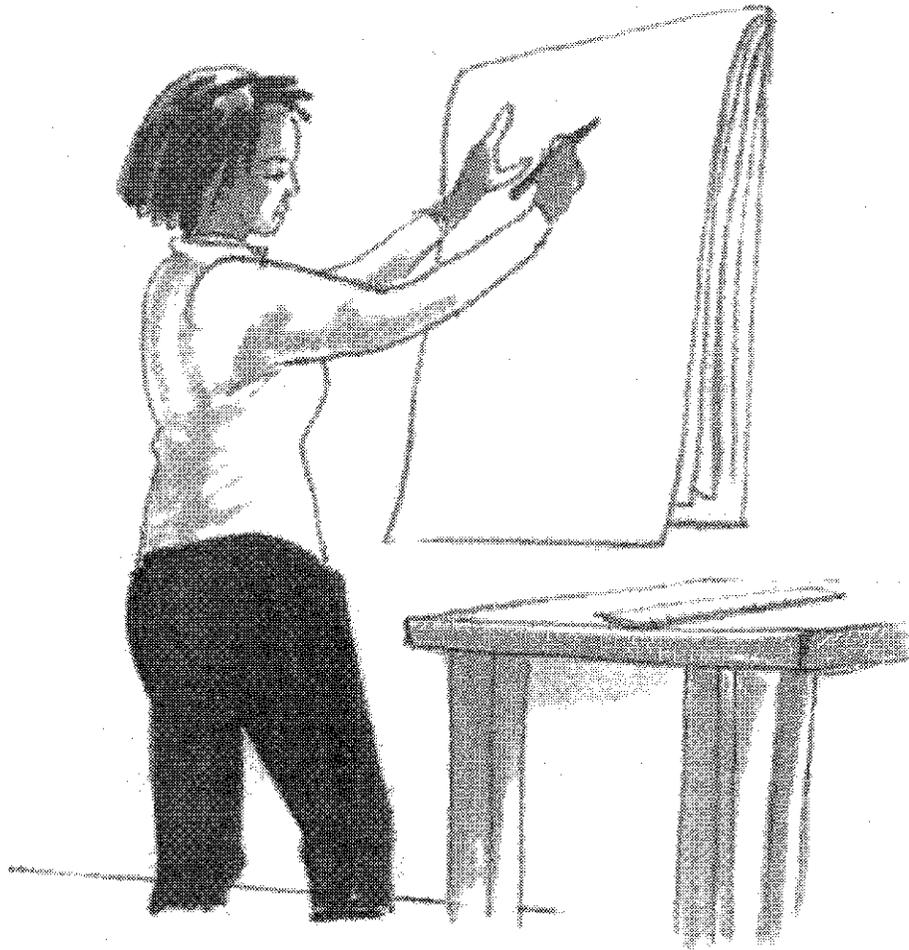
Practise

Most important: you must practise the presentation, using the outline. Here are some tips:

Preferably, practise at least once in front of an audience of co-workers or friends who can give advice on improvements. Tape record/video record the oral to check that words are clear and the pace flowing. Speak for a while in front of a mirror to raise awareness of facial expressions.

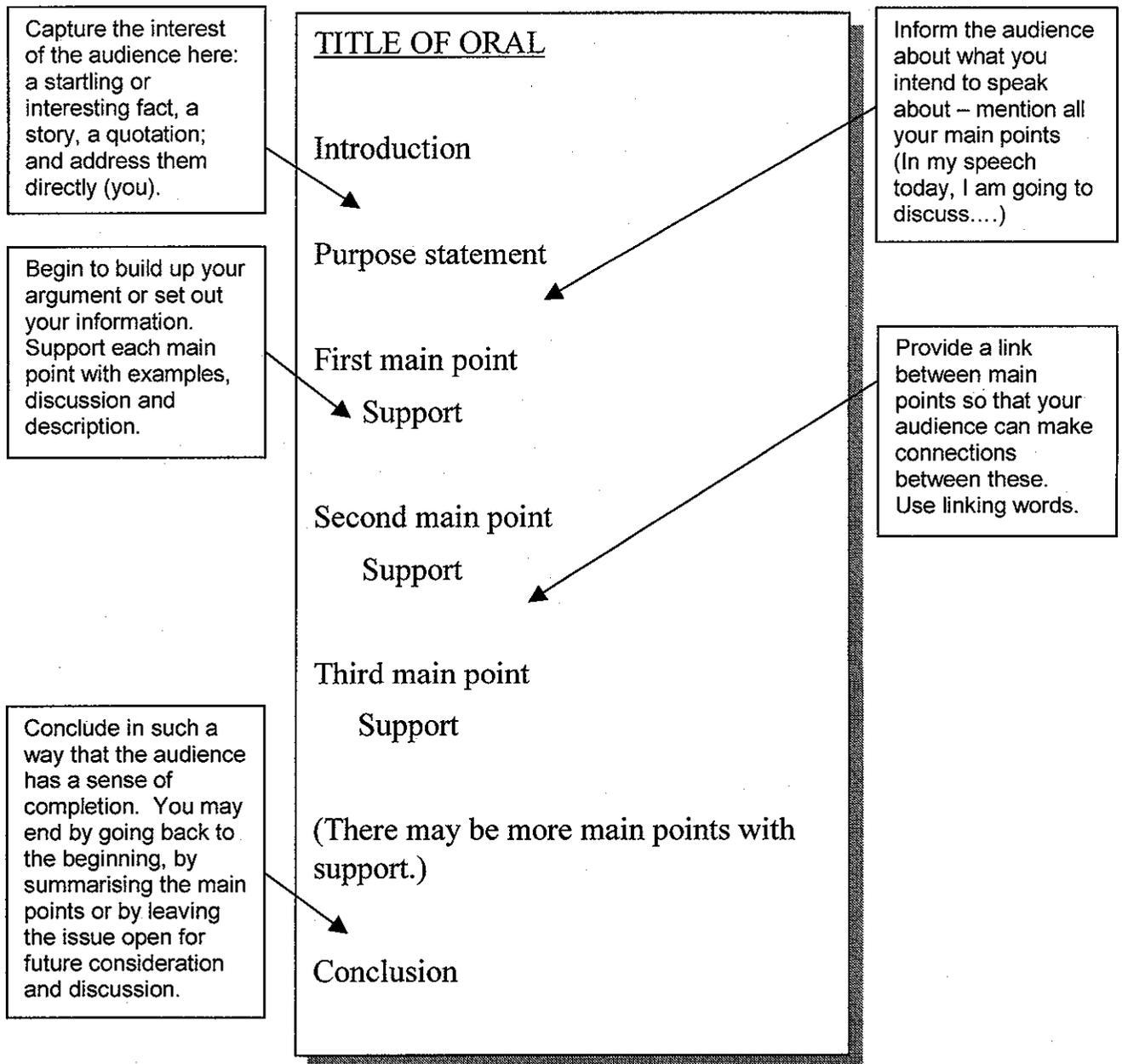
Visualise the audience. Imagine that it is they who are sitting there, not colleagues or friends. Select some friendly, interested faces, and focus on them. This will help build confidence.

Speak in a lively, enthusiastic manner. After all, if a speaker sounds bored, how can s/he expect others to be enthusiastic?



The speech outline

Now look at the explanation of a speech outline. There is a blank outline further on in this unit. An outline is useful when you are planning your presentation, because it helps you to organise your information – and, as it includes only key points, not full sentences, it fits onto one or two pages. Of course, you can always put these points onto a series of numbered cards too, which are smaller and therefore less noticeable to the audience. An outline is useful if you forget where you are during the presentation itself. You can use the same kind of outline for organising written information too, such as an essay. Look at the outline format below:



Using visual support to enhance your presentation

It is much easier for an audience to concentrate on an oral presentation that is accompanied by visuals. Not only do these add interest, they may help the audience to understand something that is not so easy to describe in words, e.g. a process, or an experiment. Using visual support tends to make your audience sit up and take notice. Let us look at a few simple aids:

Charts

The information and pictures must be clear from a distance. It is essential to walk to the back of the venue to check that any pictures and labels are clear. Aim at being bold and clear. Also, do not cram too much information on any chart. Keep it simple and - very important - neat.

Overhead projector

Because the OHP is often poorly used, it requires some attention here:

- Ensure that you use black, dark blue and dark green colour pens for your writing. Unless the nib is very thick, it is difficult to see many other colours (e.g. red and light brown) from any distance.
- Try not to get too much information onto one transparency. Rather use more transparencies. Be neat.
- If you want to use the disclosure method (covering the information with paper and then slowly revealing it), be sure to check the screen to see what the audience is seeing. Sometimes the speaker does not realise that the transparency is crooked or that the picture is on the ceiling!
- Be concise. Use key points, not full sentences.
- Once people have had a chance to read what is written, switch off the projector. If you do not, people will tend to focus on it instead of listening to you. (It is better NOT to speak while the audience is reading.)

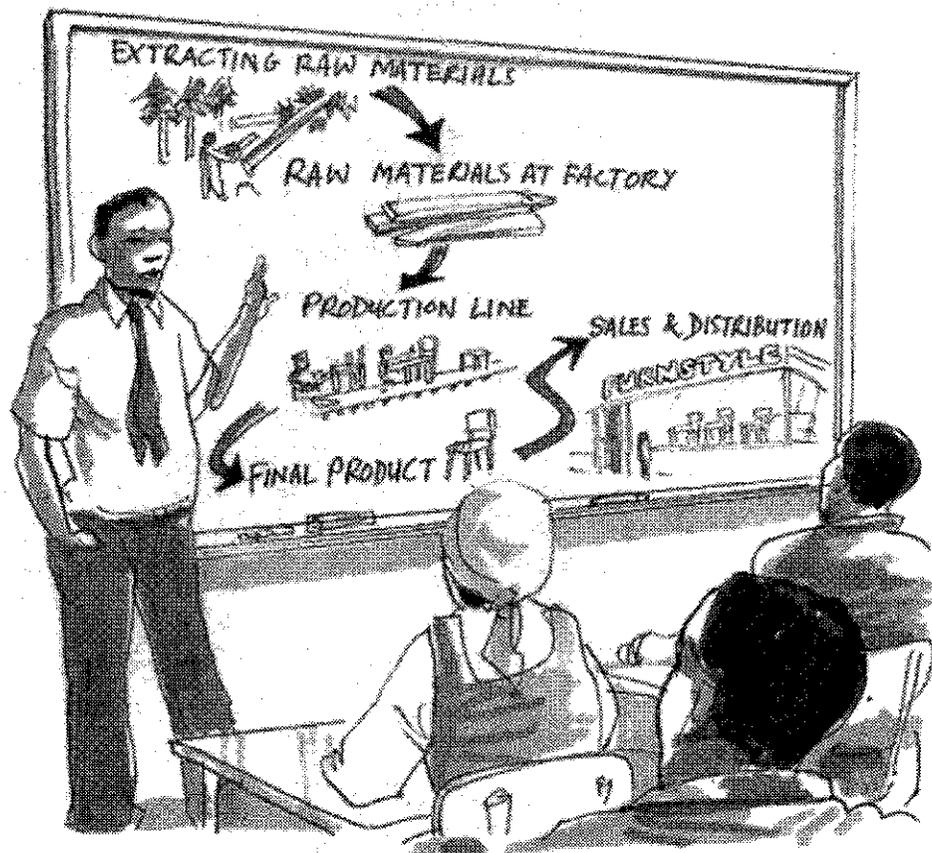


Power point

You may find that a Power point presentation, using a special projector, will add real interest and professionalism to your presentation. There are also specialised computers that can be linked to a projector so that the image on a computer screen can be projected onto an overhead screen.

Chalkboard or Whiteboard

If you use these, try to write in straight lines (it sounds obvious, but it takes practice). Also, begin on the lefthand side of the board and move to the right. Create 'pages' on the board by using vertical lines.



Activity 2: A case study

Read the following case study and identify all errors made by Mr Simms and suggest how he could have done things differently.

It is twelve minutes past eight. The audience of Grade 11 and 12 school pupils is beginning to get restless. The speaker was supposed to have begun his address at eight o'clock. The principal had told the pupils that morning that a representative of the local technikon would be coming to talk to them about Analytical Chemistry as a career option. Now the principal looks at her watch in annoyance before walking to the entrance for the second time to see if the speaker has arrived. As she stands there anxiously, a car drives into the school yard and parks.

A young man dressed in a lab coat gets out of the car and then opens the boot, removing a pile of loosely-arranged papers. He runs his hand through an untidy mop of hair and then slams the boot and looks up. Seeing the principal standing at the door, he smiles nervously, then walks across to her.

'Sorry I'm a few minutes late,' he says. 'I'm Tom Simms.' He begins to put out a hand to shake hers, but drops some of his papers in the process. 'Oops, let me just pick these up.' He pushes the stray papers onto the top of the heap, then, balancing them carefully on one arm, he reaches out again and shakes Ms Tamara's hand. She smiles at him and says, 'Welcome Mr Simms. I am Ms Tamara, Principal of Central High. We were just wondering whether you had forgotten us. Come this way. The pupils are waiting.'

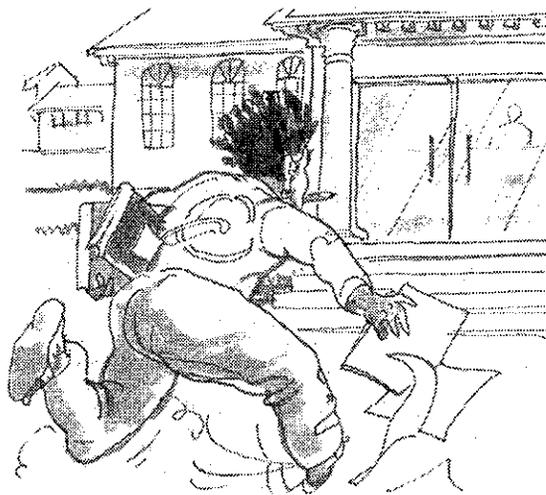
Ms Tamara leads Mr Simms into the hall. There is a loud buzz by now. The pupils are very restless.

Mr Simms walks up onto the stage behind Ms Tamara, who introduces him to the audience. (They clap with moderate enthusiasm.) She indicates to him a slanted podium where he should stand to speak and shows him the overhead projector. She then moves to the side of the stage to take a seat with some of the teachers of the senior grades.

Mr Simms shuffles his papers onto the podium, but finds that, because they are loosely arranged, they are tending to slide off the surface. Seeing no alternative but to hold them on the desk with one hand, he clears his throat, looks up at the students and begins to speak.

For the next twenty minutes, Mr Simms talks about Analytical Chemistry as a career. While he is speaking, he leans on the podium. He speaks in a jerky, nervous way, pausing a lot and filling each gap with a long 'Uuummmm'. At times, he raises his right hand and scratches an imaginary itchy spot behind his ear, or waves his hand in circles in a vague way. Most of the time he reads directly from his notes, occasionally looking at the pupils.

Suddenly, it seems as if he cannot find his place in his speech. He frowns, shuffles his papers around, apparently searching for something. In the process, he drops pages on the floor. The pupils, who are bored, become restless. A few muffled laughs are heard. Suddenly, a paper jet flies across the hall and there is an outbreak of laughter. All pretence at interest in Mr Simms' speech is abandoned. It takes a very determined and stern Ms Tamara to bring the pupils to order.



Oral presentation outline

Introduction.....

.....

Purpose statement.....

.....

Body

1st main point.....

Support 1.....

2.....

3.....

2nd main point.....

Support 1.....

2.....

3.....

3rd main point.....

Support 1.....

2.....

3.....

4th main point.....

Support 1.....

2.....

3.....

5th main point.....

Support 1.....

2.....

3.....

Conclusion.....

.....

Oral presentation assessment

Surname: First name:

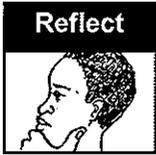
Topic:

	Criteria	Comments	Mark
30	Content Interesting, relevant, accurate, original, has depth, well structured		
20	Audience reach Effective body language; establishes rapport through Appropriate facial expression, good eye contact, upright posture, meaningful gestures. Lively, enthusiastic, no distracting mannerisms. Confident; shows interest in audience; creates appropriate atmosphere, tone; handles questions well		
10	Audio-visual support Relevant, appropriate; easy to understand; neat; creative; has impact; care and preparation evident		
20	Speech and voice Appropriate projection, volume, tone, pitch, articulation, tempo, emphasis		
20	Language Fluent; adequate vocabulary, grammar; appropriate level of language for audience		

General comments.....

Date: Assessed by:

Making a good presentation can open doors!



Reflection

A large rectangular area containing 25 horizontal dotted lines for writing.

Unit 5:

Workplace communication

Introduction

While the first chapters of this book are intended to help you to develop the skills that you will need to be successful in your studies generally, this chapter focuses on the communication skills that will enable you to function effectively in the workplace.



The chapter begins with an overview of the communication process, intended to help you to understand the many aspects that make up what we consider to be the relatively simple act of communication. The section that follows focuses specifically on communication in the workplace.

A section on listening has been deliberately placed in this chapter. Although listening could also have been placed in Chapter 2 where note-taking in lectures is discussed, it has been placed here simply because its general importance in the workplace cannot be over-emphasised. Many barriers between people in general, as well as conflicts between employees in the workplace, are a result of poor listening skills.

There are two case studies which challenge you to analyse communication situations and the barriers that can arise in the workplace.

The last section concerns correspondence, employment applications, meetings and report writing. These notes and exercises are intended as a guide for you. When you are in the workplace, you will probably be expected to be able to write some or all of the documents covered here. You will also be expected to have a basic understanding of meeting procedure and basic investigation techniques.

Start planning for work now

Even though your future workplace may seem quite some time away from now, it is not really. Within a very short time, you will be expected to play your part in contributing to the success of your workplace – and effective communication skills will take you a long way along the road to achieving personal success. Do not wait, therefore, until you are working to begin to develop and refine your skills. Start today!

Self-awareness and responsibility in the communication process

Improving one's communication skills takes time and effort. It is a process that begins not only when you become more aware of yourself but also when you concentrate on what others are saying and doing. This is vital, as you need to be aware of potential (possible) problems that could arise if you are not careful. To begin with self-awareness, try this exercise.

Activity 1: Developing self-awareness

Write



Write a short (10 lines) description of yourself as if you are seeing yourself through another person's eyes. Begin with your first name, and then describe yourself in as much detail as possible. To give you an example, here are the first few lines of someone else's description:

Thandi is 23 years old. She was born in Port Elizabeth and now works at a hospital in East London. As a communicator, she is especially good at speaking, because she likes people and forgets about her own shyness when she is showing an interest in others (etc.).

When you have finished writing, read your description. Reflect on what you have learned about yourself from this exercise. Have you noticed new things about yourself?

Growing in awareness

You need to be constantly aware of how you communicate and the effect/s of this, not only afterwards but while you are communicating. Before you start to think seriously about how you can communicate more effectively, ask yourself these questions. As you respond to each question, do three things:

- Think of a reason that the question is being asked
- Give a reason for your answer
- Think what you can do to change any unsatisfactory situation

5. Before speaking to a group/audience, do you prepare and rehearse well?

0	1	2	3	4	5	6	7	8	9	10
Never			Seldom				Usually		Always	

6. When you are working in a group, do you tend to dominate the group?

0	1	2	3	4	5	6	7	8	9	10
Never			Seldom				Usually		Always	

7. Do you write and re-write an assignment to improve it?

0	1	2	3	4	5	6	7	8	9	10
Never			Seldom				Usually		Always	

8. When you are in a group, do you make a contribution to the discussion?

0	1	2	3	4	5	6	7	8	9	10
Never			Seldom				Usually		Always	

Remember, each question requires a consideration of reason(s) for the question and what you can do to improve or change the situation. Discuss your responses with a partner. Then reflect: Has answering these questions given you any insight into your communication style? Do you now have a greater awareness of how you communicate? Are you now more aware that your communication style affects other people?

The communication process

Before you start this section, please go over the glossary of terms that we will be using in this section.

Glossary

Components: Parts, or elements of a greater whole

Encode: This means to change an idea (which the receiver cannot perceive) into a form which is perceptible (it can be, for example, seen or heard), so that it can be understood. For example, if you are with a friend and you want to go to see a film, you have to communicate this idea to your friend through spoken or written words, so that your friend knows what your idea is. He/she then decodes the message and responds.

Express: Put thoughts/feelings into words/actions.

Perceive: Notice/observe through using your senses - smell, taste, touch, hear, see. ('Perceptible' is the adjective form, meaning that it can be observed by the senses.)

Represents: Stands in place of, or is a symbol of, something/someone else.

Requests: Appeals for assistance/help.

Whenever basic communication takes place, three components are present:

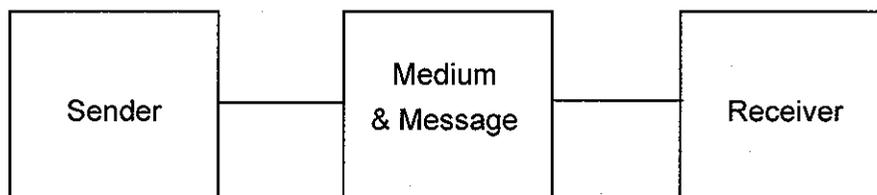
Component	Function	Intention/qualities
The sender (The Communicator, Encoder, or Source)	Encodes and sends the message	He/she wants to express thoughts, feelings or requests to achieve mutual understanding.
The receiver (The Decoder)	Receives and decodes the message; responds	He/She is the person for whom the message is intended and, normally, tries to understand the message.
The message (Always in a Medium)	The ideas/ feelings/of the sender that need to be communicated to the receiver (and vice-versa).	A message represents, in word or non-word form, (e.g. picture form) the thoughts, feelings and intentions of the sender of that message. The receiver must be able to perceive (e.g. see or hear) the form of the message. This perceptible form of the message is called the Medium.

Note

The relationship between the message and the medium can be compared to the relationship between, for example, an apple (the medium) and its nutrients (the message). Each is a part of the other – you cannot eat an apple without getting its nutrients, and you cannot get the nutrients without eating the apple.

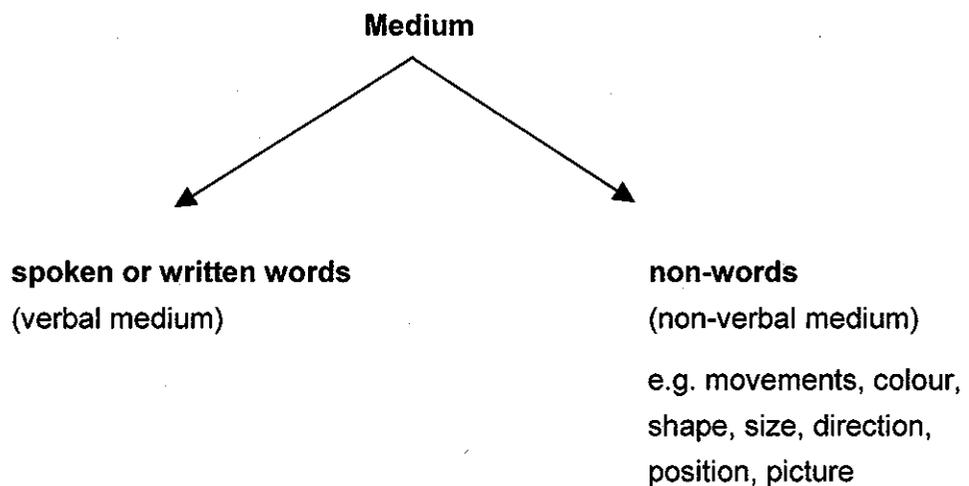
1. Communication is a process

The diagram here shows the three basic components of communication mentioned on the previous page. Do you notice that they are the same size? Why do you think this is the case?



2. The Medium

The medium of communication is always a kind of language.



3. The channel

The message (in its perceptible form, the medium) has to be 'transported' or carried by some means so that it can reach the receiver. This means of 'transport' is called a *channel*. In face-to-face communication, this channel consists of light and sound waves which carry visual images and sounds. However, if you want to communicate with someone who is not present, you need to find some way to carry your message over the distance between you and that person (and vice-versa). The telephone is such a channel.



Can you think of other channels that you might use in the workplace to send messages?

Sometimes, when more than one channel is available, one needs to select the best one. Can you think of a situation, in your future workplace, when one channel would be better than another? Briefly describe this situation.

4. Codes, encoding and decoding

In communication theory, the word 'code' refers to a system or arrangement of information that is understood by people of the same language and/or culture. For example, as a Xhosa speaker, I may wish to tell you, an Afrikaans speaker, that I have a dog. I know the Xhosa word for *dog*, i.e. *inja*, but do not know the Afrikaans word. I know that you know what a dog is, but I do not know your code - the unique arrangement of symbols that is the code for 'dog' in your language. Unless I know your code, I cannot communicate meaning.

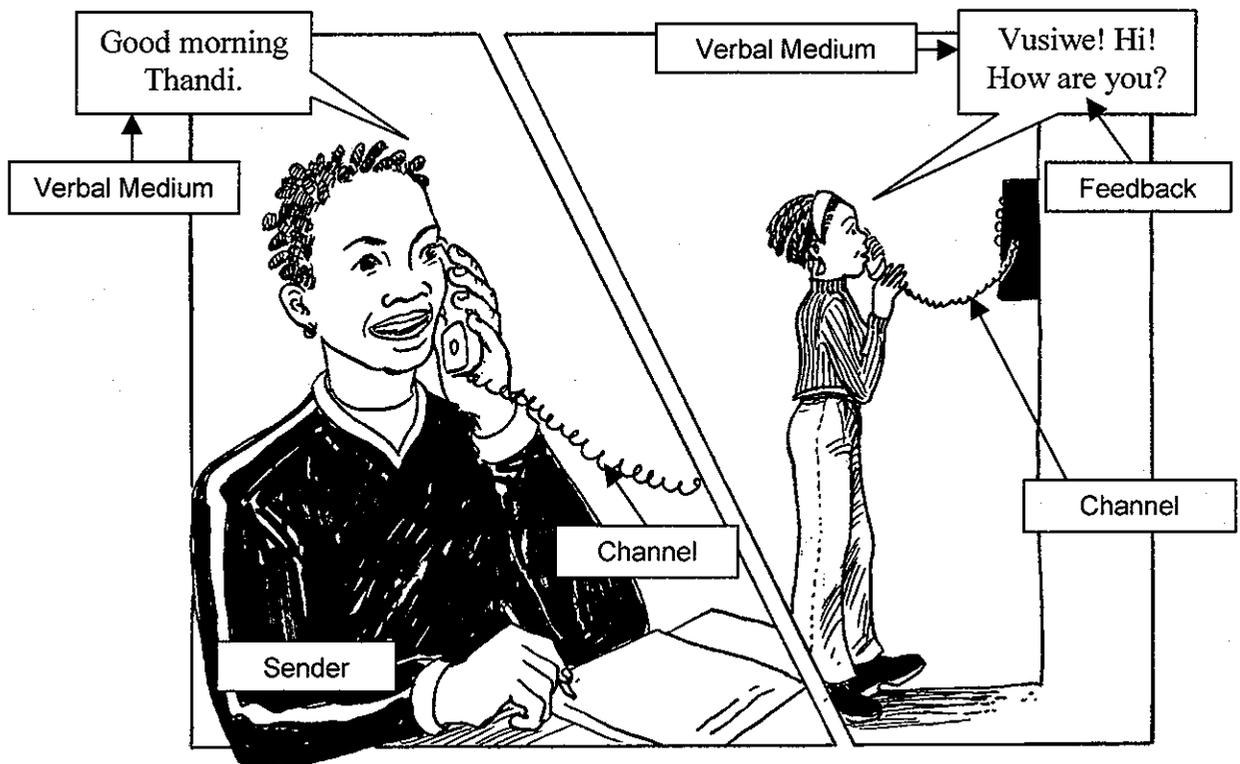
You may wonder where the words 'encode' and 'decode' come from. The prefix 'en' means 'into', while 'de' means 'from'. Encode therefore means to put into a code, while decode means to take the meaning from a code.

Try to think of examples of other codes that one would need to know in order to communicate with another person who uses that code.

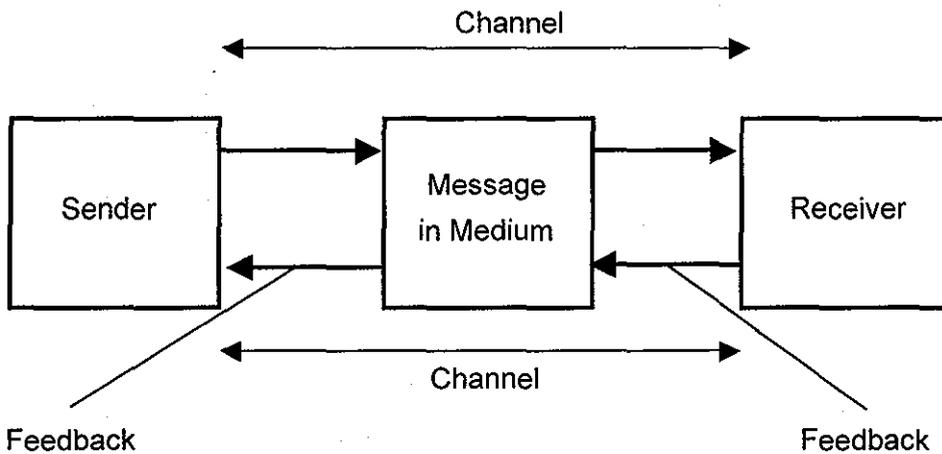
5. Feedback

Feedback is the word we use to describe the response (e.g. a spoken answer) or reaction (e.g. a smile, a nod) that the receiver gives to the sender of the message. This feedback is very important. It gives the sender several possible messages, e.g. the receiver understood my message or I need to give the message in a different way, because the receiver has misunderstood my message; or perhaps the receiver did not receive my message. The medium of the feedback may be verbal (spoken or written words) or non-verbal (e.g. a gesture), or both (a spoken reply, along with a smile and a wave, for example). The channel used for feedback may not be the same as the one that the sender used. For example, I can phone to ask a question, while the receiver sends me a fax to provide an answer. Can you think of other reasons that feedback would be important in your future workplace?

The next illustration illustrates the communication process in the case of a telephone call.



Now compare the drawing with the diagram below. This diagram has the channel and feedback illustrated.



6. Barriers

Barriers are things that interfere with the success of communication and can occur at any stage of this process. These barriers will be described and discussed further on in this section.

7. Verbal and non-verbal communication

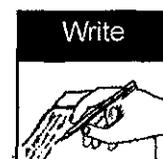
Verbal communication consists of words, while non-verbal communication is communication without words.

We most frequently use channels that convey spoken and written words (verbal mediums) as words are descriptive and the channels involved are convenient means of communication. Do not confuse 'media' with 'medium' – the expression 'the media' refers to channels of communication used to reach the public, e.g. radio and TV.

A message can also be conveyed without the use of words, for example, by means of signs, symbols, colours, facial expressions, tone of voice, body movements, choices we make - and even the car we drive.

In the workplace, let us consider the kinds of oral and written (verbal) communication used. Under each heading, you have been given two examples. Provide at least another three in each group.

Oral	Written
Meetings Telephone conversations	Reports Letters



8. Non-verbal communication

The most common forms of non-verbal communication include the following:

Body movements

These are commonly referred to as 'body language'. For example, your facial expressions, eye contact, gestures, posture, hairdo, dress, way of walking, etc.



What does her body language communicate to you?

Sign language

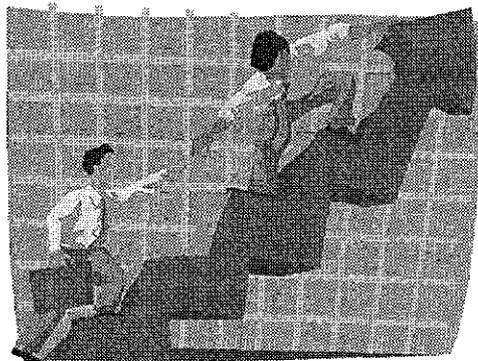
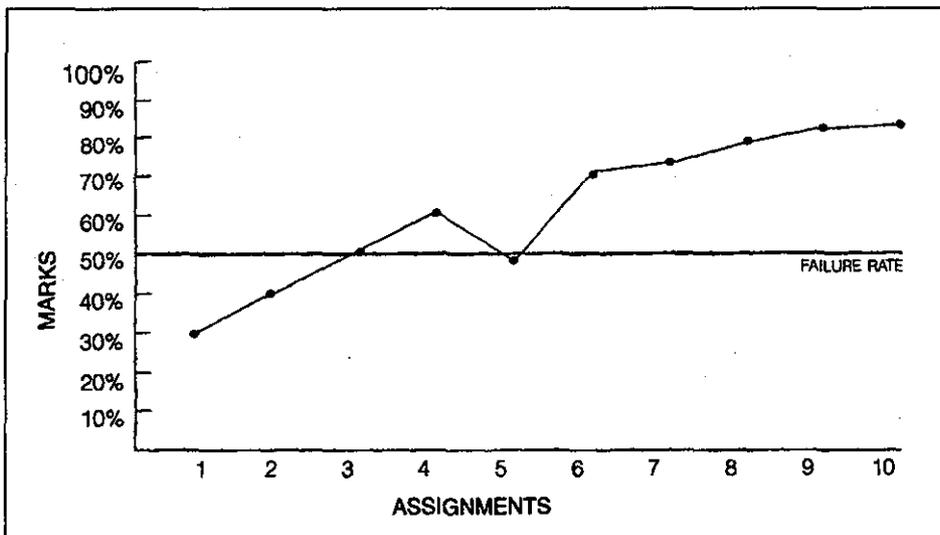
Sign language is something which we may see or hear, such as traffic signs, an ambulance siren, and internationally recognised symbols, such as the rest room sign, accommodation, etc. Here are some commonly used symbols:



What do these signs communicate to you?

Picture language

Picture language consists of diagrams, charts, graphs, sketches, maps and cartoons.



What do these graphics communicate to you?



Activity 2: The communication process

By now you should understand the communication process in greater depth. See if you can complete the following paragraphs by choosing between the word pairs in brackets:

Communication is a (one-way/ two-way) process by which a message in a chosen (channel/medium) is conveyed by a sender to a receiver. This (channel/medium) may be verbal and/or non-verbal, i.e. made up of words and/or non-words. An example of a non-verbal medium is (a nod/a written word).

The sender has to choose the most appropriate and effective (channel/medium) for the message, such as a telephone or a letter. The sender must also be sure that the receiver can understand the (code/channel) in which he/she has encoded the message, otherwise the message will be meaningless. For example, if an English-speaking sender wants to get a message to a Swahili speaker, the English speaker should either use Swahili, or find out if the Swahili speaker can understand the (code/channel) of English.

Now, with a partner, consider at least four ways in which effective communication would be important in your future workplace. (N.B. During this discussion, think about possible consequences of ineffective communication.)

Barriers to communication

Many factors can lead to communication breaking down, partially or fully. These factors that interfere in the successful exchange of messages between a sender and a receiver are called 'barriers' or interference. Often, more than one factor is operating at a time.

It is important for you to realise that barriers are only potential or possible future causes of communication breakdowns. Depending on the circumstances, some barriers may have a more negative impact on communication than others. For example, if you have a headache, depending on how severe it is, you may still be able to communicate effectively with another person.

Human choice plays a great role. For example, even if you feel tired, you can choose not to speak irritably to someone who asks you a question.

Barriers that arise from a person's attitudes or perceptions are most difficult to overcome. If, for instance, you are an older manager who feels threatened by a new, highly qualified employee, this may affect the way you speak to him. If you think that he may take over your job, you may interrupt him, or ignore his ideas and suggestions so that he does not get a chance. You may not even be conscious that you are doing this. Overcoming such an attitude barrier may take tact, time, maturity and patience on the part of all concerned.

Barriers may arise at any stage of the communication process (perhaps in more than one stage). The sender may speak too fast, the medium may be unknown (a foreign language), the channel may be faulty (the telephone is crackling), or the receiver distracted by something that is bothering him (so he does not listen carefully).

Types of barrier

A reading on the different kinds of barriers to communication follows. In each case, the name of the barrier has been left out. You'll find the left out headings in the box below. You should study the list, using a dictionary when necessary. Then use the list to provide appropriate headings for each paragraph in the reading. In each case, also provide some of your own examples of the different barriers to communication.



Psychological/perceptual/ social barriers	Environmental barriers
Semantic barriers	Physiological barriers

1.

This kind of barrier arises when something in your physical environment prevents a message from being successfully received, or makes it difficult for this to happen, e.g. you cannot hear the words of the caller on the phone because of the noise of drilling in a construction site nearby; or your desk is in front of an open window overlooking a busy and interesting street.

2.

Sometimes factors affecting your body can affect your concentration as the sender or receiver of a message and prevent you from adequately encoding or decoding a message. An example might be a headache or tiredness.

3.

When your feelings and the way you see/understand things (your perceptions) interfere with your encoding or decoding of a message/s, ineffective communication may occur. (In other words, what is within – feelings, perceptions - affects what happens between you and others.) Often you can tell what someone is feeling by observing their body language, e.g. facial expressions and movements. What causes the strong emotions that can lead to a breakdown in communication may be related to age, gender, religious, educational and status differences. If, for example, you believe that someone is too old to know what is going on, this may cause you not to listen carefully to what he/she has to say (i.e. selective listening). In other words, you hear what you want to hear.

4.

Barriers in this category are caused by differences in understanding of the meaning of words used. These differences in understanding may be the result of differences in people's backgrounds, their language proficiency, the use of slang, culturally-specific humour or jargon (the language of a profession). In such cases, the receiver does not understand the message of the sender and may feel excluded and even resentful or angry as a result. This shows that the sender of a message should always try to send messages which are clear and based on commonly understood words.

In conclusion, effective communication is the result of many factors. If you want to be an effective communicator, you should be aware of the potential barriers that exist and try to encode your messages as clearly and simply as possible. Be assertive (firm and confident) but not aggressive, when sending messages.

Always encourage the receiver to give you feedback about your message by being open to a question/s and a request for an explanation (making clearer).

As a listener, concentrate on the message being sent – listen actively. Do not interrupt. Try to follow without making judgements or jumping to conclusions. Encourage the sender of the message by showing interest, e.g. by nodding, looking at him/her and making noises that show you are concentrating and are interested, for example, 'Mmmm... yes, I know what you mean...I understand.'

Be aware of possible channels and select the most appropriate one for the message and circumstances. Be aware of the needs of the receiver in this respect.

In all communication situations, try to be open to what people have to say and their right to express themselves, even if you disagree with their views.

Listening

Listening is one of the most crucial, yet most neglected, skills. It is for this reason that we will look closely at listening in this section.



Listening to learn

Listening is seldom taught in schools, even though pupils spend so much of their time listening. Schools tend to emphasise reading and writing, because it is assumed that you don't know how to read and write when you come to school - whereas you can speak and listen (Berko, Wolvin and Wolvin 1995:78). This is not really so, because, while you may be able to speak and listen, how you do so is seldom considered. Learning to listen is particularly important: it may take up about 45% of your time.

Do you know that there is a difference between hearing and listening? Burton and Dimpleby (1995:116) point out the difference: '...often we hear other people talking but we don't always listen to what they are saying.' In other words, we don't concentrate on what we hear. What is the point of a person speaking if no-one is listening? There is no point, is there? Basically, there is no communication between two people if one person is not listening. For this reason, Burton and Dimpleby stress that listening is an active choice: you have to choose to listen - and to continue listening!

How can we improve our listening skills?

Furr (1998:21) explains that changing poor listening habits takes effort, because, usually, one has been listening in this ineffective way for many, many years.

As with improving any skill, the first step is awareness. To become more aware, you need to ask yourself a few questions, such as: How good a listener am I? What can I do to ensure that I listen carefully? Do I support and encourage the speaker by the manner in which I listen?

Furr (1998:20) has provided several thought-provoking questions, some of which are listed below, which we can ask ourselves to assess how well we listen. Read through them and consider them carefully.

If you realise that any of these describe your way of listening, then you have some work to do to improve your listening skills!

When someone is talking to you, do you really listen, or do you:

- start to think about your answer to what they are saying?
- become impatient and interrupt so that you can state your views?
- struggle to understand something that is said, but do not ask the speaker to explain further
- change the subject to one that is more important to you?
- think about something else that is worrying you

Furr (1998:20) explains that we all sometimes act in one of these ways, probably because: 'We take care of ourselves first.'

Burton and Dimbleby (1995:116) point to typical problems of listening, such as allowing oneself to start thinking of something else, pre-judging the speaker and his/her message, and failing to provide verbal (words) and non-verbal (actions) encouragement to show that we are listening attentively.

Self-knowledge helps us to understand why we may find it difficult to listen to certain speakers. With this insight, we can try to overcome any barriers which may prevent us from listening effectively.

To develop self-knowledge, we need to try to develop an awareness of what makes us different from others with whom we communicate, for example, our age, cultural background, religious beliefs, likes and dislikes. Some of these may be more important to us than others, and may cause us not to want to listen to others who are different. It is important to remember that we do not have to agree with what another person is saying in order to listen to what he or she is saying!

Burton and Dimbleby (1995:116) also suggest that the listener should look, with attention, at the speaker; nod, smile (when appropriate) and say "yes" and "I see" at appropriate times.

Burton and Dimbleby (1995:116) pass on advice from psychotherapist Carl Rogers, who suggests that the listener should try to repeat in his or her own words what the speaker is saying. While this may slow down a conversation, in the long run it saves time because it ensures that you and the speaker have a common understanding and you do not have to sort out misunderstandings later. This is especially valuable when the issue is important.

References

Berko, R., Wolvin, A. and Wolvin, D. (1995) Communicating. Boston: Houghton Mifflin.

Burton, G. & Dimbleby, R. (1995) Between ourselves. London: Arnold.

Furr, D.L. (1998) You never listen to me. Esteem, Pilot issue. May.

Exercise



Activity 3: Listening skills

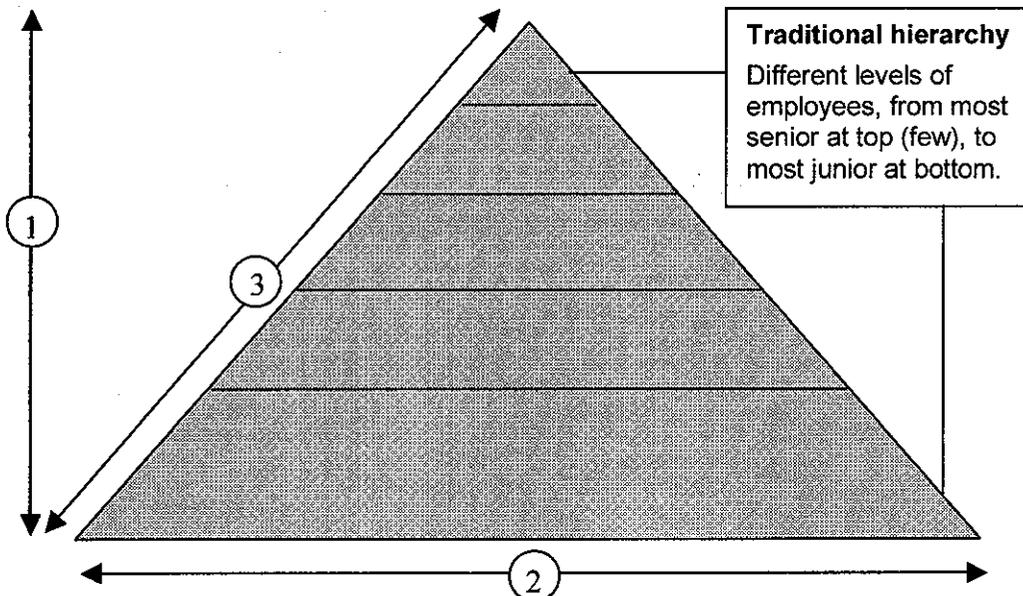
Plan the improvement of your listening skills by completing these statements:

This is what I usually do which indicates that I am listening carefully:

These are the things I need to do if I want to become a better listener:

Communication in organisations

In most organisations, there is a formal management and organisational structure, commonly called the *hierarchy*. Messages are sent within this structure, from senders to receivers. This structure is represented by the triangular diagram below. Take note of the arrows that indicate the direction of communication within this hierarchy:



1. The arrow on the far left represents vertical communication and is used to indicate vertical upward and vertical downward communication (i.e. communication that occurs between a more senior and a more junior member of staff, each from any different level).
2. The arrow below the diagram represents horizontal communication (i.e. communication between members of staff who are on the same level).
3. The arrow that runs parallel to the left side of the triangle represents **DIAGONAL** communication (i.e. communication between members of staff who are on different levels but also in different departments or divisions of the department.)

The 'chain of command' (i.e. from one level to the next, without missing a level) should generally be followed when one communicates, whether it is with a more junior or a more senior member of staff.

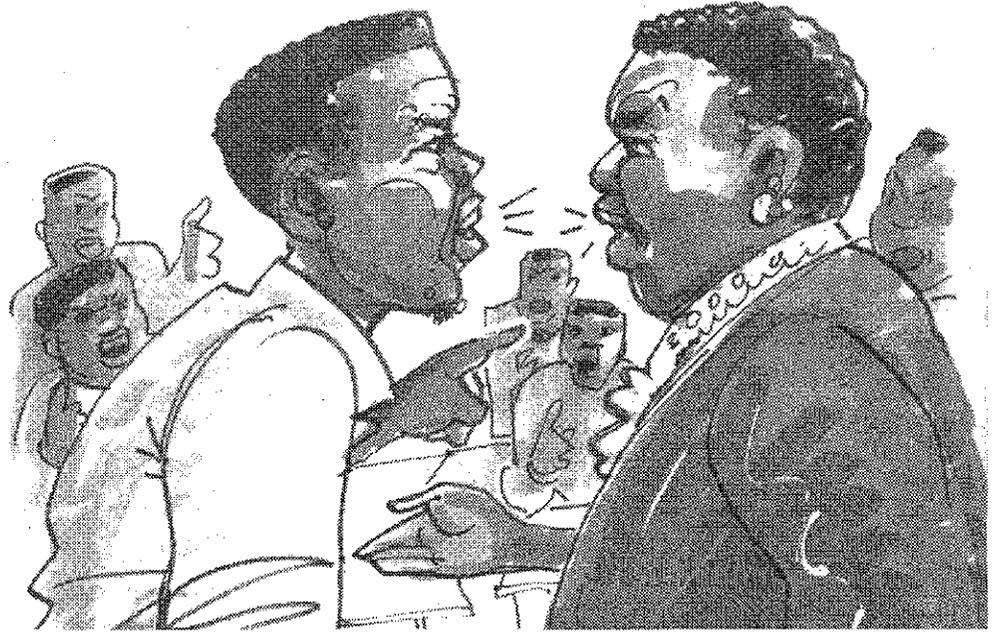
Activity 4: Organogram of Peninsula Technikon

After studying this page, draw the hierarchy of the Peninsula Technikon, showing where your Department fits into the hierarchy.



Conflict management

You have already learned about barriers to communication. In this section of work, you will consider how barriers affect relationships and the effective running of an organisation, and how such barriers can be overcome.



Conflict

The traditional view of conflict is that it is unnecessary and harmful. This view started to change when behavioural science researchers and management writers began to identify causes of organisational conflict and the advantages of effectively managed conflict. The current view is that conflict in organisations is inevitable and even necessary, no matter how organisations are designed and operated. This does not mean that conflict is always beneficial - but it can be.

Benefits of conflict

Even though conflict can cause chaos, all conflict is not so. One potential benefit is that situations are looked at in a new way. Conflict can lead people to search for new attitudes and ways of doing things. Situations that affect staff may be changed and improved as a result. While conflict can lead to a feeling of threat because weaknesses tend to get attention in conflict situations, the conflict also causes strengths to be revealed. A dispute over alternatives may provide the prompt for a search for an acceptable, better, alternative.

Unfortunately some hostility and bad feelings may also result from conflict situations. Negative feelings tend to be stronger than the benefits. This

suggests that the degree of conflict needs to be controlled to avoid very negative consequences.

Causes of Conflict

What causes conflict? Reflect on this for a while before you read about the different causes below.

Shared resources

Not everyone has access to limited resources, so the sharing of these can cause problems.

Differing goals

When different groups have different interests, goals or priorities, these differences may make it difficult for the people who have to work together to agree on action.

Individual independence

Some individuals become possessive about their departments or areas of work. They may see attempts to share that area as a threat and react with hostility.

Personality types

Sometimes two departments simply cannot work together because of the different kinds of people who tend to work there (e.g. an artist in one department and an accountant in another).

Perceptions

Individual differences in the way people look at problems may contribute to the conflict. In other words, the perceived conflict may be greater than the real conflict of interests.

Organisational ambiguities

An ambiguity is something that has double or multiple meanings. Even when individuals would not normally clash, they may do so if their responsibilities and goals are not clear. Also, if members of different areas know little about each other's jobs, they may make unreasonable demands on each other without intending to do so and this could cause conflict.



Activity 5: Resolving conflict

Read through the description of methods that follow, then decide which one you think is 'best'.

Resolution of Conflict

To solve or improve a situation where the conflict has 'frozen', a number of approaches may be tried:

Appeal to the chain of command

There is usually some common superior for all individuals, groups and departments. One obvious method is to take the problem to the appropriate manager. There are limits to this, however. The seniors themselves may be involved in the dispute. Moreover, the higher-level managers cannot possibly know all the details of operations at lower levels and so are perhaps not best qualified to judge. They also seldom have time to be burdened by settling of problems and may come to see more junior staff as being incapable of solving their own problems.

Dominance of the stronger party

Conflicts may be settled by the party (person or group) which gains advantage (the upper hand). As long as this party's position is to the advantage of the whole system, this method of resolution will probably be seen as preferable. However, there may be a problem because the defeated party may be embarrassed by the defeat and a number of negative consequences may follow, such as resignation, or a request for transfer.

Bargaining between competitors

The bargaining method has been widely and successfully used in resolving labour disputes. Settlements achieved here often involve compromise (give and take), in which both parties lose something and there is no clear winner. Sometimes this approach may be blended with the first approach and a neutral senior controls the bargaining process.

Modifying organisational relationships

Some organisational relationships are dysfunctional (do not function well) and this leads to conflict. When work patterns impose a strain on relationships - e.g. when a person has to report to two people - then there is often great awkwardness and difficulty. If changes can be made to this faulty organisational structure, then problems can be resolved.

The problem-solving approach to conflict resolution

This directs attention to the argument itself and away from the parties in the conflict. In this way, emotional aspects that make communication difficult are avoided. Both sides are committed to the same goal, namely finding a solution to the problem. This approach has been described as the *win-win* method, in contrast to the *win-lose* and *lose-lose* methods.

Activity 6: The grapevine

Draw a section of grapevine along the line below. Read the passage below, then decide whether you think this term, 'the grapevine', is appropriate.



The grapevine

Much of the information in organisations is transmitted through unofficial channels. These messages comprise the informal communication system, often referred to as 'the grapevine'.

Activities in the formal system are pre-planned and systematic, and communication tends to be quite formal, planned and documented. Communication through the grapevine is the opposite. It is an interpersonal, unplanned, social kind of communication and may satisfy the social needs of employees. The grapevine is often more informative than the formal system, which may give only part of the story behind a resignation, for instance (while the grapevine provides the real reason, even when this cannot be guaranteed as true). Research has indicated that rumours actually occur relatively infrequently on the grapevine and that most of the information is fairly accurate. (Longnecker and Pringle:1984:467) Occasional rumours or errors may require corrective action by seniors. Whether or not this corrective action will be believed, of course, depends upon the sender's reputation for accuracy and honesty!

In conclusion, the grapevine is useful, but the information which is circulated through it cannot be proven, so should not be seen as 100% accurate. When in doubt, it would be better to use official channels to ensure that information is correct.

References

Longnecker, J. and Pringle, C. (1984) Management, 6th ed.. Columbus: Charles E. Merrill Publishing Company.

Stoner, A.F. and Wankel, C. (1986) Management, 3rd ed.. New Jersey: Prentice Hall.

Read



Communication case study I

Read through the following case study. Towards the end, you will notice two options for the way in which this scenario could end (labelled A and B).

Read both options and then answer the questions that follow.

In this case study, you will encounter the following characters: Max Zuma and Charlie Philander, laboratory operators and James Ambrose, chemist.

Read



It is 10:40 on a Wednesday morning. Max Zuma and Charlie Philander are busy running some tests when James Ambrose enters the laboratory. He looks at them and notices that they are working in the area where he had intended to work, but it is obviously too late to do anything about that, so he decides to say nothing. He looks at his watch and says, "Aren't you two going for tea? If you don't take it now you won't have a chance later, because I have to leave to go to the meeting at 11:00 and I don't know when I'll be back."

Max catches Charlie's eye, shrugs and says to James, "We will be leaving in a moment."

James says, "Okay, just remember what I said about the time I have to leave. You'll have to get back here by then – preferably at 10:55, in fact, as my lift will be wanting to leave at 11:00 sharp." He goes to the back of the laboratory to fetch his lab coat and safety glasses.

Max quickly switches off the apparatus with which he is working, gets up from his seat and leaves the laboratory. Charlie switches off the bunsen burner below a flask, removes a glass tube with which he has been stirring the mixture and puts it onto a piece of paper on the laboratory counter beside the burner. He too leaves the laboratory.

James re-enters the laboratory a few minutes later and is immediately aware of a strange smell that he cannot immediately identify. He goes over to the work area that Max and Charlie have just vacated and finds that Charlie has not taken care about where he has put the glass tube with which he was stirring the solvent. Faint wisps of smoke are rising from the sheet of paper on which the tube is lying and the brown mark indicates that burning is occurring.

With a sigh, James lifts the glass tube off the paper, runs water over both at the sink, then goes back to Max and Charlie's work area and does a check to ensure that nothing else is causing a danger.

He retrieves a report sheet from the shelves over the counter above his workspace and fills it in, as required by the laboratory whenever an accidental or careless mistake has occurred. Wondering what he is going to say to Charlie, he goes over to the counter and examines the small burn mark on the counter top.

While he is standing there with his hands on his hips, shaking his head, Max and Charlie walk back into the laboratory carrying their cups of tea. They see him standing there at their workplace with his back to them. They look at each other and raise their eyebrows. Max mouths a "What?" to Charlie. Charlie shrugs and walks into the laboratory.

Hearing them, James turns around. They can see he is frowning and Charlie immediately thinks, "He's cross about something." James is worried, because it does not seem that operators like Charlie and Max realise how serious the consequences of their actions can

be. He feels responsible for their mistakes and is not sure that he can get them to be more careful. This is the third time that Charlie in particular has done something careless in the laboratory. Up until now, there have been no serious consequences, but can he – or they – afford to wait until there are? He looks at his watch. He has five minutes.

(A)

He decides to invite them to sit down and talk to them again about the consequences of carelessness and irresponsibility in the laboratory. He says, "Bring your tea with you, and let's go and sit down in comfortable seats. I need to talk to you about something that I have noticed while you were out. Unfortunately, I do not have much time, so I will have to make it brief, but I believe it is important that we talk now.

While you were gone, I noticed that there was something burning in the lab. When I checked your workplace I found a glass tube lying on a piece of paper – where you work, Charlie. This is where the burning was happening. Obviously this situation was potentially very dangerous. If I had not been here, there could have been serious consequences. I need to be able to trust you to be very careful because I know you don't want to harm the laboratory or any of the other workers here. I would like to meet with you again at 9:00 tomorrow morning. Between now and then, can you please think of suggestions that we can consider to ensure that we don't accidentally do something that could be dangerous? I think if we put our heads together, we can come up with some solutions. I must go now. I look forward to our meeting tomorrow. Please finish your tea here. Goodbye."

(B)

James crosses his arms across his chest and stares at them in an accusing manner. He shakes his head at them and then, without explaining what he has noticed, he begins to lecture them about their carelessness and irresponsibility in the laboratory. They stand there holding their steaming cups of tea, eyeing James warily, but mostly looking away or down into their cups of tea. James begins: "I don't know why we employ you uneducated bunch. Really, one day you'll blow us all up! How can you put something reactive down on the counter and then leave the laboratory? Don't you know how dangerous these chemicals are? I have warned you about this before. What was not clear about my instruction? If I hadn't been here and noticed the burning, there could have been a fire. This is the last time I am going to warn you! Now, I have to go or I'll be late. You had better clean up your act." He does not give them a chance to respond, but turns and walks quickly out through the door.

Write



Discuss



Questions

1. Reading from the beginning of the passage, identify potential factors in this situation that could have contributed to the dangerous situation that occurred in the laboratory.
2. What could have been done differently?
3. Read (A) and suggest what the three men could suggest in the meeting the following morning in terms of communication to ensure better safety in the laboratory.
4. Read (B) and comment on the likely consequences of James's reaction. Contrast with his words and actions in (A).
5. Underline all examples of negative or hostile body language (non-verbal communication).

Communication case study 2

Exercise



Study this case study carefully; then, using essay form, comment on all situations, incidents, actions and/or words that contributed to the final negative situation between Thando Mtibe and Sam Riley.

In responding to this case study, remember to consider the possible effects of all these situations, incidents, actions and words on the people involved, as well as what alternative/s would have led to more effective communication. Conclude with some general suggestions about how communication in this workplace could be improved in future.

As part of your response, you may want to consider these questions:

- If you were in Thando's position, what would you do and why?
- In the above meeting with Thando, what does Sam's body language tell you about his mood? Suggest positive alternatives to his actions.
- Does communication in this organisation need to be reconsidered?

Your response to this case study should cover about 1½ to 2 pages, averaging 8 words per line.

The characters in this case study are Thando Mtibe, a recently graduated Analytical Chemist; Piet Phillips, Senior Chemist; Sam Riley and Xolile Sigwebu, Operators.

Thando Mtibe, a new employee of Sky Pharmaceuticals, has recently graduated from a local technikon with very good grades. It is only his third day of full-time employment and, by a number of means (being friendly, showing an interest, asking questions and observing work in progress), he has already learned a lot from the senior supervising chemist, Piet Phillips. He has also shown that he is an effective and lively communicator. Everyone that meets him is impressed by his professional interest in his work and his likeable personality.

Some of the employees who have worked at Sky for a long time have no formal qualifications. They have 'worked their way up' over a number of years after completing high school and have plenty of hands-on knowledge. Sam Riley, for example, is a fifty year-old operator who has worked at the pharmacy for twenty-six years. He is a very tall, large man who speaks only Afrikaans - he refuses to speak any other language, even though he understands English quite well. He does his job competently but has a short temper and does not tolerate criticism from anyone except the senior chemist. He jealously guards his chair in the staff tearoom and similarly protects his space in the laboratory. The other staff in the company find him uncooperative, certainly not open to learning anything new about developments in technology. As a result of Sam's attitude, they generally try to avoid direct contact with him, preferring to pass on information via other operators or via memos.

Occasionally, when problems arise, the chemists and operators hold joint meetings to overcome these problems. As an operator, Sam Riley has to attend these, but he is reluctant to participate and answers any questions in Afrikaans - so someone always has to translate his responses for others who do not speak or understand Afrikaans. Because of this, participants in the meetings have learned not to ask him for his opinion, nor to speak to him. The benefits of Sam's vast experience are therefore lost.

Nobody thinks to mention these details about Sam Riley to the new employee, Thando Mtibe, who, in the past two days, has not yet been formally introduced to many of the staff, including Sam.

On Tuesday, Piet Phillips informs Thando that he has to leave the company unexpectedly to attend an urgent meeting with a business associate. He does not tell Thando exactly what he should do, but suggests that he makes a round of the laboratories to familiarise himself with the various functions of the labs and the kind of equipment used in each. He asks Thando to make notes so that they can discuss any queries when he (Piet) returns.

After checking that he has a notebook and a pen, Thando begins his rounds. The first operator, Xolile Sigwebu, is courteous and politely show Thando what he is doing and answers several questions. Thando moves on to where Sam is working. As he approaches Sam, he can see that Sam's face is grim, as if he is angry. What Thando does not know is that Sam has already experienced some difficulties with the test he is running - he is in no mood for a new face and conversation.

Thando decides not to be put off by Sam's facial expression and, with his usual confidence and friendliness, he walks up to Sam and extends his hand for a friendly greeting, saying as he does so, "Good morning, I am Thando Mtibe, a new employee.

In response to this, Sam nods, barely glances at Thando, and grunts in an uninterested voice, 'Môre' (Morning), before going back to the work over which he is bent.

Thando, who does not easily take offence, asks Sam, if he (Sam) could assist him by explaining what he is doing and how he measures the results.

Avoiding eye contact with Thando, Sam again responds in Afrikaans: 'Jammer, ek het nie nou tyd nie, ek is besig met probleme wat ek moet uitsorteer.' (Sorry, I don't have time now, I am busy with problems that I must solve.)

Thando clearly does not have any idea what Sam has just said. He frowns in confusion and says politely and hesitantly, 'I...I am sorry, but I don't ...don't understand Afrikaans. Would you mind speaking English?'

Sam's face turns red and he clenches his jaw. He stands up to his full height and looks down on the much shorter Thando. He speaks slowly, emphasising each word as if he is punching the air in front of Thando's nose. As he continues, his voice gets louder: 'Ek praat nie Engels nie, en ek is moeg vir al die nuwe *softies* wat hier kom direk van die kolleg – julle dink julle weet alles en maak net meer werk vir ons. Nou, as jy nie omgee nie, ek het werk om to doen.' (I don't speak English, and I am tired of all the new *softies* who come here directly from college – you all think that you know everything and just make more work for us. Now, if you don't mind, I have work to do.) Sam then turns away again and leaves Thando standing there, as much in the dark as before. Xolile Sigwebu, the other operator, understands Afrikaans. He is standing nearby and takes pity on Thando. He walks over and leads Thando away, before explaining what Sam has just said. Thando's good mood vanishes. If this is how he is going to be treated by seasoned employees, how will he ever cope? He does not know what to do.

Letters

Much of business communication happens through the medium of the business letter. Unlike personal letters, business letters are short and to the point. Business letters are often written on company letterheads, which means that you don't have to write the address. If you do not use a letterhead, use the standard format of the letter, with your address at the top right hand side and the addressee's address below this at the left hand side. You may write the date at the left hand margin.

Contents of a business letter

Follow this arrangement of contents when writing a letter or memo (each section does not necessarily refer to a single paragraph):

Section 1: Give background/describe situation.

Section 2: Give more details of situation/explain effects.

Section 3: State the reason/s for the situation, what action you have taken, and what is required.

Section 4: End off by striking a positive note, establishing good relations.

An alternative ending for a letter is Yours faithfully, which is more formal/business-like than 'yours sincerely'.

Activity 7: Jumbled up letter

Below is a jumbled up business letter. Try to sort out the different parts and then write down the correct order of the numbered sections.

1. I realise that this situation may be unavoidable for you, but it has created problems for us. I shall explain.
2. Tel. (0243) 768 4321
Fax: (0243) 768 4333
3. SKY PHARMACEUTICALS
4. Should you have any queries about this matter, please contact me. I look forward to continuing our cordial business relationship.
5. We order our solvent in 1 litre bottles because the pump fittings installed at various places throughout the company are specially designed to fit these 1 litre bottles. The fittings do not, unfortunately, accommodate the bigger bottles and, as a result, we cannot use them without first having to decant their contents into the smaller bottles. While this is possible, I am sure that you can understand that it is time-consuming and therefore impractical for anything but our most immediate needs.
6. 44 Fleet Road
HIGHBURY
8642

7. We have adapted to this situation in the short-term, but we urgently need the correct bottles. For this reason, I request that you consider as urgent our current order of 100x1 litre bottles of the usual solvent and organise a special delivery for us as soon as the next consignment of 1 litre bottles of solvent arrives.

8. Yours sincerely
D. MANN
LES MANAGER

9. Dear Mr Bavuma

10. Mr G. Bavuma
The Manager
Durwent Laboratory Suppliers
P.O. Box 8745
EAST LONDON
5200

11. 3 March 2000

12. During his visit to your refinery last week, our company representative was informed that our latest order would have to be sent back to you because instead of the 1litre bottles of solvent which we had ordered, only 2 litre bottles were sent.

13. OUR ORDER

Memoranda

A memorandum is used for internal communication within an organisation. At the end of the memo, the sender should merely sign or initial the document. There should not be any repetition of information provided earlier.

Activity 8: Jumbled memo

The memorandum below has been jumbled up. Try to sort out the different parts and then write down the correct order of the numbered sections.

1. To: All staff
2. Date: 3 February 2000
3. Planning will work on the preliminary economics for the revamp of the No. 1 Laboratory.
4. The results should be available by 21 February 2000 as requested by Mr C. Celso.
5. SUBJECT: MINUTES OF MEETING ON LAB REVAMP PLANS
6. SKY PHARMACEUTICALS
7. As decided at the meeting of 29 January 2000,
8. During the No. 1 Laboratory revamp, work shifts will also have to be accommodated in the other laboratories. While this will be inconvenient, staff will be kept informed of arrangements in good time.
9. From: J. Ndwandwa
10. The Finance Dept will complete the detailed economic analysis for the No. 2 Laboratory Revamp in anticipation of that happening in the next phase of our plans. The director will use post-audit figures, as supplied in November 1999. The finalised revamp costs for Laboratory 1 will also be used in developing the base case for the No. 2 revamp economics.
11.
12. If you have any comments or queries about the above, please contact me.
13. Memorandum
14. CC: C. Edwards; P. Sigobo

Applying for employment

When you apply for a job you will need to have a Curriculum Vitae, which explains your skills and qualifications. But you will also need to write a covering letter that you post or deliver together with your Curriculum Vitae.

Please study the standard application letter below. As you see, it has been written in the same style as a formal business letter.

Tel.: (021)552 8765
Cell:0823985633

8 Fortune Avenue
BELLVILLE
7530

28 September 1999

Mr K. Brandt
Manager
Sky Pharmaceuticals
P.O.Box 1267
CAPE TOWN
8000

Dear Mr Brandt

APPLICATION FOR POSITION OF ANALYTICAL CHEMIST

I am applying for the position of Analytical Chemist as advertised in The Argus of 12 September 1999.

A copy of my Curriculum Vitae which provides all the necessary details of my qualifications and experience, as well as the names, addresses and telephone numbers of references, has been enclosed.

I am extremely interested in this position, as it will give me the opportunity to put my knowledge and skills into practice.

An interview would be appreciated. I can be reached at either of the above telephone numbers.

I look forward to hearing from you.

Yours faithfully

*S*Mazema

S. Mazema

*A good CV should get you a job interview,
but your oral presentation skills will get you the job!*

The Curriculum Vitae

The Curriculum Vitae or CV explains your qualifications and experience. Employers receive many CV's so make sure that your CV takes no longer than 10 minutes to read. Be concise, objective and credible. The CV should be written in note form, clearly set out under appropriate headings and subheadings. Number these decimally. A CV will normally begin with a cover page with only these words 'Curriculum Vitae' on it. Then you list the information that you want the prospective employer to know about. There are many templates on MS Word that can help you to produce a smart, business-like CV. You should explore these.

CURRICULUM VITAE

1. PERSONAL DETAILS

Name: *[Surname first, then first and second names]*

Date of birth: *[preferably full: 30 March 1965]*

ID no.:

Address: *[Block, leave line open before and after]*

Present work address:

Tel. no./nos.:

Marital status:

No. of dependants:

Home language:

Other language/s:

State of health:

Driver's licence:

Nationality:

2. QUALIFICATIONS

[The order of these may be reversed, starting with most recent qualification/s.]

2.1 SCHOOL

Senior Certificate, Year

Name of school, town/city and province

2.1.1 *Subjects: [Block list, SG or HG, distinctions]*

2.2 TERTIARY

Tertiary qualification:..... Year:.....

Name of institution:.....

2.2.1 Major and other subjects

[If you have more than one tertiary qualification, list separately and number accordingly]

3. EXPERIENCE

[You may swap the order of these, beginning with the most recent employment and then going back to the first]

3.1 First job details: name of position held, when, where.
responsibilities, answering to whom
reasons for leaving

[Reasons for leaving - you may state that these are confidential, but that you would be willing to discuss them during an interview.]

3.2 Next job and so on until...

3.3 Most recent or present job.

[Most details should be given here, including fringe benefits, salary. Description, accurate but concise, of current job, whom you report to and who reports to you. Responsibilities, special contributions to the organisation.]

4. OTHER INTERESTS AND ACHIEVEMENTS

4.1 SCHOOL

4.2 TERTIARY

4.3 PRESENT

[List briefly in each case. Include membership of professional bodies, sports, hobbies, awards, leadership roles, extra-mural activities]

5. REFERENCES

5.1 Name of professional reference *[Include person's title or your relationship with him/her]*
Address, Tel. no./nos.

5.2 Name of personal reference *[Family not acceptable; usually a person who has known you for some time, has some moral standing in the community, e.g. a minister, doctor]*

5.2 Other *[Perhaps a second one of either of the above types of reference]*

Meetings



A meeting may be described as a gathering of (two or more) people, by prior notice, to discuss and decide upon matters of mutual interest. It is important for all employers and employees to know about meetings. They provide important opportunities for a variety of purposes – solving problems, generating ideas, organising events and monitoring situations.

When you have finished working through this chapter, you should have a good understanding of some of the kinds of meetings and associated documents that you may encounter in the workplace, as well as the procedure of meetings.

Let us look at the legal requirements of meetings.

I. Legality

Meetings must be held in accordance with the constitution and regulations of an organisation. Amongst other requirements, this means that:

- meetings must be properly constituted: there must be an elected chairperson and a quorum; and
- meetings should be properly convened: members should have been notified of details of the meeting a suitable number of days beforehand. Details of the nature of the meeting would include the type of meeting, the venue, the date and the time of the meeting.

Next, we shall consider how different kinds of meetings may have varying levels of formality.

2. Kinds of meetings: formality

Depending on their purpose, meetings may vary considerably in formality. A rule of thumb is that the more important the concerns of the meeting, the more formal it will be. Formality affects the way the meeting has been constituted and other aspects like the wording of the notice and the first few items on the agenda. The more formal the meeting, the more vital it is that it follows accepted conventional procedure and rules (e.g. notice, agenda, minutes, a chairperson).

Advantages of the formalities

The proceedings run smoothly, according to agreed procedure; later disputes are unlikely because of strict adherence to rules of constitution. However, many meetings in which the atmosphere is very casual also incorporate these elements.

Meetings may also be classified according to who attends them. The most obvious distinction is between private and public meetings.

3. Kinds of meetings: private meetings

Private meetings are for members only. Non-members may attend but not vote. Members receive individual notification. Private meetings are held by organisations such as clubs, societies, companies with limited liabilities, and school boards. Private meetings may be known as 'command' meetings: there are few rules, if any; there is no written agenda; the 'chairperson' is anyone who has convened the meeting for a purpose, e.g. to discuss an urgent matter and take a decision on it.

Advantages of private meetings

These meetings are often more productive as people are more likely to speak out in these less formal circumstances; and they can be called at short notice.

4. Kinds of meetings: public meetings

These meetings may be attended by any interested people. Meetings, such as those held by political parties, are advertised via radio, newspaper and placards.

Meetings can also be classified according to who attends them and when they are held. For example, any general meeting is for the general (total) membership of an organisation, while the word *annual* indicates that the

meeting is held once per year. Thus an Annual General Meeting is a meeting for all members held once per annum. Examples of other kinds of meetings: a *congress*, attended by member delegates, often from branches throughout a country; a *committee* meeting is for elected members only (elected at an AGM) and is not always open to observers.

There are different kinds of committees, e.g. an executive committee, ad hoc committee, and sub-committees. In a company, the Executive committee comprises two or more directors; in a social organisation, the Executive includes a chairperson, a vice-chairperson, a secretary, a treasurer and two or more other members.

Executive committee members in social organisations do not act independently: unless mandated to do otherwise, they make recommendations to the general membership.

5. Office-bearers, their roles and duties

Let us now look at the people who hold office and what they do.

Chairperson

The chairperson should have a pleasant personality; should be strong, dynamic, able to command respect; should be a fluent public speaker; a quick thinker; her personal opinion should never bring pressure on others at meetings. She is elected by the general membership at AGM for a period of office specified in the constitution. The chair's responsibilities means that she receives and submits motions; is responsible for proper constitution of meetings (i.e. that meetings are run according to constitution); presides over meetings; guides meetings according to agenda; determines the purpose of meetings; maintains good order; encourages open, relevant discussion, then summarises points at intervals; announces resolutions and guides action; may be entitled to a casting vote in cases of deadlock (if specified in the constitution); declares meetings open or closed at a proper time; ensures the recording of proceedings.

Secretary

This person should be well-organised, methodical, conscientious. The secretary's tasks: records members' details; handles correspondence; looks after finances if no treasurer. Before a meeting, she compiles the notice and agenda with the chairperson; posts these to members, along with the minutes of the last meeting, within a reasonable time before the meeting; prepares venue - arranges refreshments, seating, lighting etc. During the meeting the

secretary takes minutes, ensures relevant documents and copies are available. After the meeting the secretary ensures that the venue is tidy (hires cleaners if necessary) and writes out the minutes in a formal way.

Treasurer

The treasurer is in charge of the financial well-being of the organisation. The treasurer prepares the budget and collaborates with the secretary to provide members with the annual financial report.

6. Meeting documentation

In this section, we shall examine the kinds and purpose of documents involved in meetings.

Notice

This is the document which informs members of details of the next meeting. It should be sent out 7-10 clear days before a normal meeting, or 21 clear days before an AGM. In informal cases, members may be notified orally, either by telephone or in person. Written notices may appear as advertisements in a newspaper, or as circular letters, or memoranda.

The notice should include the name of the organisation, the address, tel. no. of the secretary, the date of the notice, the kind of meeting, the venue, and the date and time of the meeting. All notices should be signed by the secretary.

Agenda

This is a list of business to be discussed at a meeting in the order in which they will be dealt with. Hence the agenda is also called an order paper. Items are expressed in note form. The agenda usually accompanies the notice so as to inform members what will be discussed at the meeting.

Certain regular items occur on an agenda. These are usually in a specific position on the agenda: Item 1 is usually Opening and welcome (unless a quorum is required, in which case item 1 is Attendance register or Constitution of the Meeting). Then Apologies, followed by Minutes of previous meeting and Matters arising. Item 6 is often Correspondence. General is usually the second last item before Closing. (Examine the examples below.)

If a proposal appears in writing on an agenda, it is referred to as a motion. Verbatim motions should always be written as positive statements, structured as follows: 'That...(something be done)...' The names of proposer and seconder should follow such motions. (e.g. 'That a new book of rules be

compiled by the senior management staff.' Proposer: S. Smith; Seconder: B. Bikitsha.)

Below is an example of a formal combined notice and agenda - formal in a block heading format.

**The South African Chemical Institute
Western Cape Division**

Notice is hereby given that the 56th Annual General Meeting will be held in the boardroom in the Dept of Analytical Chemistry at the University of Cape Town on Friday 24 April 1998 at 19:00. Your attendance will be appreciated.

A copy of the minutes of the 55th Annual General Meeting is enclosed.

H. Moss

H. Moss (Ms)
SECRETARY

14 Kenyon Crescent
RONDEBOSCH EAST
7800

Tel. no.: (021) 877 965

14 April 2001

Agenda

1. Attendance register
2. Apologies
3. Opening and welcome
4. Minutes of 55th AGM
5. Matters arising from the minutes
6. Honorary membership
7. Annual report and accounts
8. Election of council members
9. Election of auditors and legal advisers
10. Awards for 2000
11. Closing

Below is an example of an informal notice and agenda, using a letter format. Such a notice and agenda may be used in informal and social circumstances, such as in the case of a staff association or sports club.

**Sky Pharmaceuticals
Staff club**

Tel. no. : 877 9865

14 Kenyon Crescent
RONDEBOSCH EAST
7800

14 April 2001

Dear Member

The next Monthly General Meeting of members will be held in the Clubhouse Lounge on Friday 24 April 2000 at 19:00. Your attendance will be appreciated.

A copy of the minutes of the last meeting is enclosed.

Yours sincerely

H. Moss

H. Moss (Ms)
SECRETARY

Agenda

1. Opening and welcome
2. Attendance register
3. Apologies
4. Minutes of previous meeting
5. Matters arising
6. Correspondence
7. Decision on donations
8. Visit by guest speaker, Mr Worrall, from USA
9. Committee on club security
10. General
11. Closing

Note

Please note that the block heading format may also be used for an informal notice, but a letter format is not usually used for a formal notice.

7. Minutes

This document is a summary record of discussions and resolutions taken at the last meeting. They are written in the past tense. They should be clear, accurate, concise and impartial. As a rule, items should be minuted according to the order of items on the agenda, except in the case of *present* and *apologies* which appear at the beginning of the minutes.

Once accepted, minutes cannot be changed, except with the permission of members of a meeting. They are then considered a legal record and may be referred to later if there is a dispute about decisions which were taken.

Although *the minutes* refers to one document, minutes are actually items within the document (hence the plural *minutes*). Each item is a minute, so a particular item is referred to in singular form: 'Ladies and Gentlemen, please note that item 7, Appointment of new secretary, is not going to be discussed today as the appointment has had to be delayed.' Or 'Ladies and Gentlemen, please refer to minute 9.'

Ideally, minutes of the previous meeting are sent to members with the notice and agenda of the next meeting so as to allow members time to read them before the next meeting. (If circulated before a meeting, while writing the minutes of that meeting, the secretary records this fact as follows: 'The minutes of the previous meeting were taken as read.')

When the minutes have been accepted by members as a true record of the previous meeting, they are signed by the chairperson.

8. Different kinds of minutes

There are three basic types of minutes, which are described below:

Action minutes

Action minutes have a right hand margin in which appear the names of people who are responsible for completing specific tasks before the next meeting. The names serve as a reminder to these people.

Narrative minutes

These minutes tell the story of what happened during a meeting. While these tend to have the advantage of being an accurate reflection of what happened, they may be quite lengthy. For this reason, resolution minutes are often preferred

Resolution minutes

Resolution minutes record very little other than resolutions taken at meetings. Obviously, their disadvantage is that they may not give the reader a clear picture of what actually happened at a meeting, e.g. disputes or problems.

Please examine this example of minutes.

**THE SOUTH AFRICAN CHEMICAL INSTITUTE
WESTERN CAPE DIVISION**

MINUTES of the 56TH Annual General Meeting which was held in the boardroom in the Dept of Analytical Chemistry at the University of Cape Town on Friday 24 April 2000 at 19:00.

Present

Prof. B. Mazima (President)
Prof. L. Ellen (Outgoing President)
Dr N. Elworthy (Outgoing Executive Treasurer)
Dr M. Jenner (Incoming Executive Treasurer)

In addition, there were 53 members present, according to the attendance register.

Apologies

D. Pole, J. Croft, L. Mazema, P. Lorenzo and T.Smit

1. Opening and welcome

Prof. Maxima welcomed all present and thanked them for their interest and enthusiasm.

2. Minutes of 55th AGM

These were taken as read. They were accepted unanimously.

3. *Matters arising from the minutes*

There were no matters arising.

4. *Honorary membership*

There was no Honorary Membership.

5. *Annual report and accounts*

The Annual Report of the Council and the Financial Statements for the year ended 30 June 1999 were tabled at the meeting.

5.1 Prof. Mazima informed everyone that all reports concerning Divisions and Subject Sections were in the Annual Report, together with complete Financial Statements.

5.2 The Outgoing Executive Treasurer, Dr Elworthy, was called upon to address the gathering. He referred the meeting to page 3 of the Financial Statements. A loan of R35 000 from the Kwazulu Natal Section had been made, but a deficit of R15 000 remained. Page 4 of the Financial Statements reflect funds at the Sections. However, Dr Elworthy pointed out that a few Sections had not sent their Balance Sheets in time for the publication of the Financial Statements. The latter were duly approved and accepted by members.

5.3 Prof. Mazima informed members that, in future, the institute would be driven by Subject Divisions and that the Local Sections would be disbanded. A copy of the proposed Constitution had been circulated to all members beforehand. Following a discussion of each item during which changes were made, the Constitution was approved and adopted. Council would operate under the new Office Bearers and Division Chairman in future. The next Council meeting would be convened in February 2001.

5.4 Prof. Mazima advised members of the following Divisions and their Chairman:

Analytical:	Dr N. Cord	ChromSA:	Mrs J. Pringle
Molecular Spec.:	Prof. F. Mell	Physical:	Prof. N. Ngubane
SAAMS:	Mr H. Wellson	Env.:	Dr U. Hibane
Electrochem.	Dr C. Croudace	Inorg.:	Dr G. Roodt

6. *Declaration of Council for 2000/2001 Session*

The Council members listed below were elected to serve as Office Bearers from July 2000 to July 2001:

President:	Prof. B. Mazima
Vice-President:	Dr P. Muir
Immediate Past-President:	Prof. L. Jenkins
Executive Secretary:	Dr L. Gonya
Executive Treasurer:	Dr M. Jenner

Officers who report:

Publications: Mr D. Bonkolo (SA Chemistry Journal)
 Dr F. Hertz (Chemistry Views)

Education: Prof. T. Booth

Publicity: Dr G. Tobi

Safety: Mr L. Fillies

7. *Election of Auditors and Legal Advisors*

7.1 Auditors

On behalf of Council, Mr John Mohr was re-appointed as the Institute's auditors for the 2000/2001 session.

7.2 Legal Advisors

On behalf of Council, Ms J. Rubidge was re-appointed as the Institute's legal advisor for the 2000/2001 session.

8. *Awards for 2000*

The Chairman of the Awards Committee, Prof. Mazima, announced the names of the recipients of the awards which had been made by Council earlier in the day:

The Gold Medal of the Institute 2000:	Prof. I. Allen
AECI Medal 2000:	Still to be made
Raikes Medal 2000:	Dr S. Nando
The Hendrik van Eck Medal 2000:	No award
The Chemical Education Medal 2000:	Prof. N. Ngubane
Sasol Post-graduate Medal 2000:	H. Lynch
	J. Hammer
	W. Baker
The Mischa Mrost for 2000:	R. Nel
The Industrial Chemistry Medal 2000:	No award

9. *Closing*

The meeting closed at 21:05.

.....
 CHAIRMAN

.....
 DATE

Note

After the name of the organisation, there is a paragraph beginning with the word MINUTES typed in upper case. The information in this section is based on the information in the notice. Notice how the minutes here are based on the earlier notice information (kind of meeting, time, date, venue). Compare the numbered subheadings in the minutes with the numbered items in the agenda. All the items on the agenda appear in the minutes, although the numbers may not be the same: Present and Apologies are not always numbered and appear first, irrespective of where they appear on the agenda. Also note that Attendance Register tends to be called 'Present' in the minutes.

Report writing

One of the most important forms of workplace communication is the report. Employees are often required to write reports on something they were asked to do or to find out about. For this reason it is important that you become familiar with how to read and write reports.

Case study

Please read this case study, which concerns Pedro, the main character.

Pedro was a senior student in the Analytical Chemistry Department at the Peninsula Technikon. He had found a holiday job at a pharmaceutical company in Cape Town, and was working very conscientiously in the hope of being appointed permanently once he had obtained his degree. He liked the work and got on very well with all the other employees.

One day the Quality Assurance Manager of the laboratory, Mr Modise, called Pedro to his office.

'You seem to be quite bright, young man,' Mr Modise said to Pedro. 'I would like you to help me with an investigation into something that has been bothering me lately. You might as well write up what you discover. As you are not a permanent employee, I think you will have a fresh, objective approach to the situation. These are your terms of reference, in other words, the background to what you should investigate, and your exact brief is as follows: we have been experiencing an increasing number of accidents in our Main Laboratory. I want to know why. The accidents have not been very serious, but I'm worried about the situation. It seems to indicate that something is wrong, and I believe we should try to do something about it.'

You will be relieved of most of your other duties for the next two weeks and I shall inform the staff that I have instructed you to undertake this investigation in the Main Laboratory. Today is 17 July. I want a report from you before the end of the month on the reasons why so many accidents have occurred in the



Main Laboratory. See whether you can also make some suggestions as to how to prevent them in future. Don't ask the staff for suggestions at this stage. I want to do that myself later, once I have your report.'

'Oh! I think I can tell you already what caused some of the mishaps. The other day I saw ...'

Pedro's eager exclamation was interrupted rather sternly by Mr Modise: 'Young man, I have also *seen* some of the accidents. I don't want you jumping to conclusions. I require a well-planned, systematic investigation. I want you first to tell me exactly how you did your investigation, that is, the methods or procedure that you used in order to get information about the situation and practices in the Main Laboratory. Only then may you tell me what you saw, or heard, or even tasted or smelled! I shall be most interested in such findings. Also, of course, you must draw your conclusions from these findings, by carefully assessing everything you found and then giving your considered opinion on the matter! No *jumping* to conclusions!

'Sorry, Mr Modise. Of course you are right. I remember my Communication lecturer saying the same, and it does make a lot of sense. I really look forward to writing this report. You did say I might make some recommendations?'

'Certainly you may suggest ways in which we might be able to reduce the number of accidents, but, of course, you can only do that once you have clear findings and logical conclusions drawn from the findings. Of course, for relevant findings you need to use the best procedure to obtain your information, remember?'

So, your first task will be to sit down and write the *Terms of reference* for your report, then think about all the ways in which you can get information about the accidents that have occurred, as well as those that might occur during your period of research.'

'I shall have to spend some time observing the office staff at work, won't I, Mr Modise?'

'I should think so, yes, Pedro! You will also have to get their views on the situation, you know. They are the ones who actually had the accidents, or who witnessed them.'

'Oh yes, of course. I must think carefully about all the possible ways in which I can get relevant information. I think I'd like to start thinking about that straightaway, if you don't mind, Mr Modise.'

'Fine, Pedro. I can see you're really enthusiastic about the investigation - that's good! Just a few bits of advice before you go: when you think about methods of procedure, remember the three main types, namely, getting information yourself through personal observation and inspection; then, getting information from other people; and, finally, getting information from other sources, such as books, earlier reports, expert opinion, and so forth.'

'Ah, thanks, Mr Modise - that is very helpful. I also remember my Communication lecturer stressing that the findings must flow logically from the procedure, and that there should not be any findings for which we did not describe a method of procedure. Obviously the conclusions should be the logical outcome of the findings, and it would be stupid to make a recommendation for which there was no finding of something wrong! These different headings really make it easy for one to know how to structure one's report.'



'I think you have the right idea, Pedro. Just remain objective and impartial throughout your investigation, and also write your report without using emotional language. Remember that a report requires a clear, concise style, and make it readable by having headings, sub-headings and numbering.'

'Mr Modise, I am so excited about this investigation now – I wish it were tomorrow already, because now it is time to go home! Thank you very much for giving me this opportunity, and for your excellent advice – you will get a really professional report.'

Pedro could not wait until the next day to start working on his investigation. When he got home he immediately looked for the Communication file which he had compiled in his first year. He sat down at his desk and looked at the notes on report writing. Then he read through the report on the Technikon library which he had written as an assignment, and for which he had obtained 75%. He felt a surge of pride – it was really good! He could almost not believe that he had actually written it, but he knew he had. Of course, there had been several drafts before the final one, but he could see now that all the revisions had paid off. So had the final editing, which had taken him quite a long time, because he had sat with a dictionary to check his spelling, and had also carefully monitored tenses and concord. He knew he would be just as careful with the report that he would write for Mr Modise, not only because he wanted to make a good impression, but also because he realised now that having written something really well does make one feel good!

Trying very hard to remember everything he had learned about reports, Pedro started to write:

Report on accidents at Sky Pharmaceuticals, Cape Town
Report on the accidents in the Main Laboratory

Terms of reference

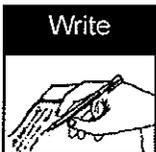
~~Mr Modise asked me, Pedro Casey, on 17 July 2000, to investigate the increasing~~

On 17 July 2000 Mr P. Modise, Quality Assurance Manager of the Laboratories of Sky Pharmaceuticals, requested Pedro Casey, a senior Analytical Chemistry student, to investigate and report on the increasing number of accidents that had been taking place in the Main Laboratory. Although the accidents had not been serious, there was cause for concern because there were so many about of their frequency. An investigation was necessary to determine the reason(s) for the accidents, so that, where possible, measures could be suggested to prevent them from recurring.

_____ /

‘Ah! That was easy,’ Pedro thought. ‘It’s simply the instructions Mr Modise gave me. I just had to supply all the details and the scope of the investigation. Maybe I can still add that he wants the report by the end of July.’

Then Pedro realised that he could write no further that evening. He had thinking, planning and preparation to do before he could really undertake his investigation. Nevertheless, he had made a start. ‘Tomorrow is another day!’ he said, and picked up the phone to invite his girlfriend to have a steakburger at the Spur.



Activity 9: Planning a report

1. There are five sections of a schematic report. These sections help you to structure your information logically. Go over Pedro's case study and then try and write down - in a logical order - the five sections of a schematic report.
2. Team up with a partner. Discuss what you think Pedro had to think about, plan and prepare before he could undertake his investigation. Make notes of your ideas so that you can share them with the rest of the class.
3. What did Mr Modise mean when he said Pedro was likely to have an 'objective approach' to the investigation? Which word/idea is linked to this later in the story?
4. Which of the three methods of procedure mentioned by Mr Modise do you think Pedro should use in his investigation? Give a reason for your answer.

The final version

Let us look at the final draft of Pedro's report, which he typed after a thorough investigation and careful collection of facts. He made sure that he was presenting this information as clearly and logically as he could, and, finally, he edited his report for language usage to make sure that he was not making unnecessary grammar, spelling or punctuation errors.

Report on the accidents in the Main Laboratory of Sky Pharmaceuticals in Cape Town

1 Terms of reference

On 17 July 2000 Mr P. Modise, Quality Assurance Manager of the above-mentioned company, requested Pedro Casey, a senior Analytical Chemistry student, to investigate and report on the increasing number of accidents that had been taking place in the Main Laboratory. Although the accidents had not been serious, there was cause for concern about their frequency. An investigation was necessary to determine the reason(s) for the accidents, so that, where possible, measures could be suggested to prevent them.

2 Procedure

2.1 Personal observation

During the period 15-24 July unannounced visits were made to the Main Laboratory. During these visits the layout, equipment and arrangement of this area, as well as the practices of the staff, were noted. There were twelve visits in total.

2.2 Questionnaires

Questionnaires were distributed to all members of the laboratory staff. Staff were asked about their involvement in or witnessing of accidents in the laboratory during the past six months. (See Appendix A for questionnaire.)

2.3 Interviews

2.3.1 Six staff members who had been involved in minor accidents were selected at random and interviewed. They were asked to describe what had happened to cause their particular accident.

2.3.2 Four other staff members, who had indicated that they had witnessed some accidents in the laboratory, were also interviewed. They were asked to describe what they had seen when the accidents occurred.

3 Findings

3.1 Observation of laboratory and staff practices

3.1.1 The Main Laboratory staff consist of 19 members. Only the Quality Assurance Manager and the Senior Chemist have their own offices. 15 staff members share one large open-plan workspace.

3.1.2 Work space is rather cramped, especially in the section where the staff have to fetch supplies. The width of the aisles between work benches is sometimes only 1m.

3.1.3 Stools often obstruct these aisles, even when workers are not there.

3.1.4 Staff sometimes clutter the worktops with equipment that is not being used at the time.

3.1.5 Files are stored on top of cupboards; sometimes they are stacked in high piles.

3.1.6 The fixed matting around the emergency shower area is loose on the edge nearest the aisle.

3.1.7 Because the staff have to share the workspace and much of the equipment, there is often movement of people and equipment from one workspace to another.

3.1.8 The floor area around the water dispenser is often wet, because people spill liquid when their cups are full.

3.2 *Accidents witnessed during observation period*

3.2.1 On nine occasions during the observation period, staff members injured themselves as a result of the narrow aisles. The injuries were minor, and only in two instances did the staff members request the First Aid box to treat the injury. The persons involved in five other instances did not treat their injuries, but - on request, two days after their respective accidents - revealed that they had bruise marks as a result of stumbling into stools in the aisle.

3.2.2 The wet area in front of the drinks dispenser caused a staff member to slip, fall and dislocate a vertebra. This resulted in a two-week absence from work, which included some days in hospital.

3.3 *Questionnaires*

3.3.1 In general the members of staff did not rate their work environment as 'hazardous', although they were aware of the increasing number of small accidents.

3.3.2 Ten staff members indicated that they had been involved in minor accidents in the area during the past year. These included the following:

- a severe cut on the wrist from a broken glass flask after stumbling over a stool and falling onto the flask on the worktop;
- a twisted ankle from slipping on the loose piece of matting at the emergency shower;
- a knee injury after slipping on water near the drinks dispenser;
- slight concussion from the impact of a stack of files sliding down onto the person's head;
- bruises and gashes from knocking against stools in the narrow aisles (several instances).

3.3.3 Staff blamed the cramped conditions, the loose matting, the slippery floor in front of the drinks dispenser, and the enforced sharing and transporting of equipment for their accidents.

3.4 *Interviews*

3.4.1 The staff members interviewed named the same conditions as mentioned in 3.3.3 as the causes of their accidents. Most of them were of the opinion that the danger zones needed urgent attention.

3.4.2 The witnesses to accidents confirmed the statements of the victims of accidents and named the same factors as causing accidents. One person added the negligent behaviour of staff members themselves as a factor contributing to the accident rate, for example carelessness in leaving equipment too near the edge of worktops, a disregard for spilt beverages, and the inconsiderate piling up of files on top of cupboards.

4 Conclusions

4.1 Although the laboratory staff do not see their workplace as being the cause of an unusually large number of accidents, the incidence of small accidents is unacceptably high. It is evident, furthermore, that those who have been involved in accidents feel the need for an improvement of the working environment.

4.2 The staff have identified the major areas of concern, and these are substantiated by what was witnessed during the observation period of this investigation: the cramped environment, the loose matting, the transfer of equipment, the file stacks and the slippery area in front of the drinks dispenser.

4.3 Within the cramped conditions, practices such as leaving stools in the middle of aisles, and stacking heavy files on high surfaces become extremely dangerous.

4.4 Although the accidents so far cannot be termed 'major', some of them have been serious enough to require medical attention, and involved absence from work. It is clear that the situation needs urgent attention to prevent the occurrence not only of more small accidents, but also of really serious ones.

5 Recommendations

5.1 The working space for laboratory staff should be expanded without delay, as many of the minor accidents are a direct result of the cramped conditions.

5.2 These staff should be alerted to the fact that leaving unused equipment on and near the edge of workplaces, especially when unattended, can cause accidents, even in more spacious work surroundings.

5.3 The loose matting at the emergency shower should be fixed immediately. If a different floor cover is required, it should be fitted.

5.5 A long counter with shelves against each of the two walls flanking the entrance should be provided for files that are in use.

5.6 The purchase of more equipment for the staff should receive urgent attention.

5.7 A non-slip rubber mat should be placed in front of the drinks dispenser and dispensable 'saucers' be made available to prevent drinks spilling onto the floor.

5.8 Staff should be encouraged and reminded to bear their own safety in mind. Posters on the wall in strategic places may contribute to awareness.

P. Casey

P. Casey

Senior Analytical Chemistry student

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