SKILLS FOR LEARNING
Reading Projects: Science

International Edition
Nelson University of Malaya Press
# Contents

**Foreword**

**Part One: Basic study skills**

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Using symbols, abbreviations and equations (1)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Using symbols, abbreviations and equations (2)</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Using word parts</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Using flow diagrams</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>Learning about graphs</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>Using flow charts</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>Using tables</td>
<td>35</td>
</tr>
<tr>
<td>8</td>
<td>Classifying information</td>
<td>42</td>
</tr>
<tr>
<td>9</td>
<td>Outlining</td>
<td>52</td>
</tr>
<tr>
<td>10</td>
<td>Notetaking</td>
<td>62</td>
</tr>
<tr>
<td>11</td>
<td>Understanding bibliographies</td>
<td>66</td>
</tr>
<tr>
<td>12</td>
<td>Using parts of a book (1)</td>
<td>70</td>
</tr>
<tr>
<td>13</td>
<td>Using parts of a book (2)</td>
<td>73</td>
</tr>
<tr>
<td>14</td>
<td>Using cross-references (1)</td>
<td>88</td>
</tr>
<tr>
<td>15</td>
<td>Using cross-references (2)</td>
<td>99</td>
</tr>
</tbody>
</table>
Part Two: Integration and consolidation of basic study skills

16 Geology (1) 120
17 Chemistry (1) 123
18 Biology (1) 125
19 Ecology (1) 128
20 Physics (1) 140
21 Biology (2) 142
22 Ecology (2) 145
23 Geology (2) 150
24 Physics (2) 152
25 Chemistry (2) 157

Part Three: Guided research

26 Biology (3) 160
27 Physics (3) 167
28 Ecology (3) 173
29 Chemistry (3) 184
30 Geology (3) 188

Part Four: Independent research

31–40 Researching a topic 201
Appendices 203
Acknowledgements 210
Lesson 3
Using word parts

Many scientific words are built up with word parts whose meanings are fixed. Knowing these word parts and knowing how to break up a word into meaningful parts can often help you to understand and remember difficult scientific terms. In this lesson you will get an opportunity to become familiar with some of the most common word parts in science.

Activity A

Deduce the meanings of the word parts (1)

Here are four texts. Certain word parts are given in italics. Deduce the meanings of the word parts in italics and then fill in the blanks in the texts that follow. Refer to Appendix 3 if you have any difficulty.

Text A

For the human organism, the basic set of chromosomes is 23. This is often referred to as the haploid or monoploid, number (from the Greek, haploëides = single or monos = single). This is the number found in a human sperm or egg. (The haploid number of chromosomes is often designated by the letter $n$).

But a human body cell has two complete sets of chromosomes. Therefore it is said to be diploid (from the Greek $di$ = 2). The double set of chromosomes can be designated as $2n$. A cell that has three sets of chromosomes is said to be $3n$ or triploid (from the Greek $tri$ = 3). A cell with 4 sets is $4n$ or tetraploid and so on.

Text B

Unicellular organisms are organisms with only one cell. This cell performs all functions. In multicellular organisms, however, different cells are adapted for different activities.

Text C

In protozoan animals, the parent body divides up into more or less equal parts, and thus ends its own existence as a single individual. When the fission is into two daughter organisms only, the process is simple, or binary fission. When there is repeated division of the nucleus before the cytoplasm divides to form new animals, the process is called multiple fission.
Lesson 3

Text D

A polygon of four sides is called a quadrilateral. (The prefix 'quad' means four, and the word 'lateral' refers to side. Thus the word really means 'four sides'). If a triangle were named after its three sides, it might be called a 'trilateral'. Moreover, a quadrilateral can also be named after the angles, and called a 'quadrangle'.

A polygon of five sides is called a pentagon. A hexagon has six sides; a heptagon has seven sides; an octagon has eight sides and a decagon has ten sides.

1 Polysaccharides are compounds whose molecules are built from many simple sugar units. If two sugar units link together, the resulting compound is called a _______. A _______ consists of one sugar unit.

2 There are a number of devices that make use of the thermionic effect to conduct an electric current through a high-vacuum tube. Such tubes are made with 2, 3, 4, 5, etc. electrodes, and are referred to as diodes. _______ , _______ and _______ respectively.

3 Structures of some boron hydrides:
   a  Pentaborane -9, B₅H₉;
   b  ________-11, B₁₀H₁₁;
   c  ________, B₁₀H₁₄

4 Among euploids, a monoploid organism has just one genome per nucleus. A _______ has three genomes per nucleus, a _______ four, a _______ six, an _______ eight, and so on. Multiple genomes, including three or more sets of chromosomes per nucleus (in other words, triploids and above), are frequently designated by the term _______.
Deduce the meanings of the word parts (2)

Below you are given a number of texts containing some very common word parts. You are also given the meanings of the word parts in jumbled order.

Study the texts carefully and then match each word part with its meaning.

<table>
<thead>
<tr>
<th>Word parts</th>
<th>Meanings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inter</td>
<td>a on or over</td>
</tr>
<tr>
<td>2 epi</td>
<td>b within</td>
</tr>
<tr>
<td>3 meso</td>
<td>c between</td>
</tr>
<tr>
<td>4 homo</td>
<td>d not</td>
</tr>
<tr>
<td>5 intra</td>
<td>e middle</td>
</tr>
<tr>
<td>6 extra</td>
<td>f small</td>
</tr>
<tr>
<td>7 sub</td>
<td>g below</td>
</tr>
<tr>
<td>8 micro</td>
<td>h similar</td>
</tr>
<tr>
<td>9 hypo</td>
<td>i too much or above</td>
</tr>
<tr>
<td>10 phyte</td>
<td>j outside</td>
</tr>
<tr>
<td>11 a or non</td>
<td>k under or inadequate</td>
</tr>
<tr>
<td>12 hyper</td>
<td>l plant</td>
</tr>
</tbody>
</table>

Text A

A leaf is covered by a single layer of cells called the epidermis which forms the ‘skin’ of the leaf. Between the upper and lower epidermis is the mesophyll. Under the upper epidermis there is a layer of regularly arranged cells containing green coloured bodies called chloroplasts. This is called the palisade mesophyll layer, and it receives more sunlight than the other mesophyll cells. Between the upper epidermis and the lower epidermis, is the spongy mesophyll, so called because the cells composing it have large intercommunicating air spaces between them. These are called the intercellular air spaces.

Cross-section of a green leaf
Text B
The principle of homology is used in classifying the approximately 350,000 species of plants that are known to exist on earth. This means that the taxonomist groups plants according to similarity of structure and pattern of development. In the system that will be followed in this book, the plant kingdom is divided into two great subkingdoms – the thallophytes and the embryophytes.

Text C
The fundamental unit of life is the cell. It is the smallest unit that fulfils all the requirements of a living system. A cell is built of many smaller parts, but these subcellular parts cannot by themselves be considered living systems. Only when the microscopic parts are organized and integrated into a specific pattern – the living cell – do they carry out all the functions of life.

Text D
In the condition known as hypothyroidism, an inadequate amount of thyroid hormone is secreted. The patient has a slow pulse and low blood pressure; he is apt to be drowsy; his mental processes are slow. In hyperthyroidism, the thyroid is unduly active. (The sufferer is nervous, excessively energetic and tends to have insomnia. His pulse is very rapid; he is apt to perspire freely.) This condition may be relieved by the removal of most of the thyroid, leaving only enough to maintain the normal functioning of the gland.

Text E
Where digestion occurs in such a tract (where the regions of digestive changes are the stomach and duodenum), it takes place outside the lining of cells; the enzymes are secreted into the lumen or cavity. The process is called extra-cellular digestion, in contrast with intra-cellular digestion, where food materials are taken in by the cells and digested internally.

Text F
There are some plants and animals, and possibly parts of all plants and animals which do not consist of cells. The commonest of these may be called a non-cellular or acellular body and is typified by many of the protozoa and lower algae.
Activity C

Deduce the meanings of the word parts (3)

Below is a fully labelled cross-section of a coconut and an incomplete text. Certain word parts in the labels are given in italics and a list of words is given in the margin.

Deduce the meanings of the word parts in italics and then complete the text by filling in the blanks with the correct words from the margin.

Cross-section of a coconut

below
surrounding
middle
covering
inner
innermost

The pericarp is the ovary wall (1) _______ the fruit and this may be dry or fleshy, fibrous or stony. There are three distinct layers to the pericarp in a coconut. The (2) _______ part of the coconut contains the milk which is liquid endosperm while the edible coconut meat is solid endosperm. The endocarp is the (3) _______ layer of the fruit wall surrounding the coconut meat and this is a stony layer. The mesocarp is the (4) _______ layer of the pericarp and it is thick and fibrous. The exocarp which is the (5) _______ layer of the pericarp is thin and hard.

Activity D

Fill in the correct word parts

Here are four incomplete texts.

Complete the texts by filling in the blanks with the correct word parts. Refer to Appendix 3 if you have any difficulty.

Text A

An unusual decrease of glucose in the blood affects the body functions and leads to a condition known as _______-glycemia. A condition in which there is an excess of
glucose, i.e. 120 to 140 mg per 100 ml of blood, is called _______-glycemia.

Text B

Competition is often alluded to in discussions of ecology. There is _______ specific competition, between the members of a population, and _______ specific competition, between members of different populations.

Text C

In wheat, each genome in einkorn consists of 7 members; in other words, the basic chromosome number (n) is 7. Somatic cells of einkorn have the _______ ploid (2n) number, 14. Thus, durum, with 28 chromosomes, may be thought of as a _______ ploid (4n), and bread wheat with 42, as a _______ ploid (6n).

Text D

The skin is made up of two principal parts—an outer layer of thelial cells called the _______ dermis, and an inner layer of connective tissues called the dermis. This inner layer is attached to another underlying layer of connective tissue called the _______ cutaneous layer.

Text E

There are many kinds of parasites in the world. Some of them never enter the body of the host but live on the external surface. Such parasites are known as _______ parasites. In contrast, the _______ parasites are internal in the sense that the final stage of their life cycle is spent inside the body of the host organism.