

Science

Grade 6

For Life

Basic Education

Teacher's Guide



Center for Educational Research and Development



National
Textbook

New Curricula

Republic of Lebanon
Ministry of Education and Higher Education



SCIENCE FOR LIFE

Teacher's Guide ■

Basic Education
Grade six

Educational Center for Research and development



National
Textbook

New Curricula



General Coordinator
Moustapha Yaghi

Proof reader
Samira Hammoud ■

SCIENCE FOR LIFE

Teacher's Guide

Basic Education

Grade Six

Majdi El Hajj (Coordinator)

Ismail Iskandarani

Brenda Ghazali

Ahmad Sbeity

Mohamad Daher

Sami Wehbeh

Educational Center for Research and development



■ **Documentary Research :** Iconographic Team, ECRD

Production and Distribution:



Printing: Chamas for Printing & Publishing s.a.l.

© **CRDP 2000, Sin-El-Fil, Lebanon, P.o.Box: 55264**

All Rights Reserved for ECRD

2012

The National Textbook Project

By issuing the textbooks for the third year of each educational cycle, the Educational Center for Research and Development will have completed the third and last installment of books called for by the New Curricula. We are placing these books in the hands of students with the great hope that we are moving, step by step, toward the goal of acquiring sound learning, using sophisticated educational means and up-to-date methodology that encourage and reinforce individual thinking and research, acquisition of skills, development of ethical and national attitudes, the feeling of national belonging as well as the feeling of belonging to humanity at large.

The on-going revolution in information, communication and educational-aids technology has undoubtedly limited the role of the textbook and lowered the rank it used so recently to occupy. However, in our society and in many other societies, the textbook remains the basic means of education, and it is our duty to exert our utmost effort and care to come up with the best product as to form and content. Yet we should not lose sight of the fact that the textbook is not sufficient by itself but should rather be used as a stepping stone to access other sources of information. What is important is to keep a clear vision and maintain the right course toward our objective. The means should not turn into the end and the student should always remain the focus of the learning/teaching process.

No one ignores or denies the fact that textbook writing requires very high academic and educational qualifications and very wide field experience. The authors committees undeniably possess such qualities. Yet the textbooks of the last two years contained some negative aspects. Such is the nature of human work, no matter how good the intentions or how great the effort extended. Here constructive criticism constitutes a real contribution to raising the standard of authorship, minimizing errors and filling gaps. We say that, with all due appreciation and respect to all those who have contributed to the success of this project.

The Educational Center for Research and Development is embarking this year on a process of evaluating the New Curricula and related textbooks, teacher training courses and student achievement. This is a natural and necessary step now that the new system has been put into effect. This process aims at identifying the curricular objectives that have been achieved as well as those that have not been achieved, with a view to proceeding with the positive aspects and correcting the negative ones.

As part of this correction process, we plan to review the versions that have been issued in order to secure good textbooks for our students, who always deserve the best.

March 13, 2000

President, Educational Center for
Research and Development

Nemer FRAYHA

INTRODUCTION

This teacher's guide, same as the student's textbook, includes six units: Living Things, Reproduction, Man and His Health, Man and His Environment, Matter and Energy, and Earth and the Universe. Each unit is divided into chapters and each chapter is divided into lessons.

For each lesson, the teachers are provided with the following: Title of the lesson, instructional objectives, background information, and answers to in-text questions. At the end of each chapter, the teachers will find answers to the exercises as presented in the student's textbook. Moreover, the last section of this book includes extra exercises and their answers.

To get the best out of the teacher's guide and the student's textbook, the following recommendations should be taken into consideration.

- Read each unit guide before starting to teach the unit, especially that some of the activities require prior preparation.
- Explain how to operate, use, or build certain instruments and models relating to a certain activity before having the students perform the activity.
- Photocopy some pages from the student's textbook and distribute them to the students for use whenever needed.
- Review the extra exercises section included at the end of this book and use each exercise at the appropriate time when dealing with the related topic.

The following is a list of skills and attitudes that must be or must continue to be developed at this level:

- Observing, inferring, comparing, distinguishing, classifying, communicating.
- Questioning, explaining, problem solving.
- Measuring, testing, experimenting, drawing conclusions.
- Using technical instructions, constructing models and simple science equipment.
- Planning experiments and executing them with control of variables.
- Predicting outcomes and comparing them with results of experiments or field observations.
- Carrying out simple research projects and taking relevant decisions.
- Practicing proper health and environmental habits.
- Developing self-confidence, honesty, and persistence in science activities.
- Developing a sense of beauty and love of nature.

It is hoped that this guide will be a helpful tool in the teachers' hands that provides them with background information about the topics and answers to many of the questions presented or posed in the textbook.

The Authors

TABLE OF CONTENTS

| | |
|---|-----------|
| Unit 1 Living Things | 9 |
| Chapter 1 : The cell. | 10 |
| Chapter 2 : From a cell to an Organism. | 13 |
| Unit 2 Reproduction | 17 |
| Chapter 1 : Types of Reproduction. | 18 |
| Chapter 2 : Sexual Reproduction in Animals. | 20 |
| Chapter 3 : Sexual Reproduction in Flowering Plants. | 25 |
| Chapter 4 : Asexual Reproduction. | 27 |
| Chapter 5 : Human's Role in Animal and Plant Reproduction | 29 |
| Unit 3 Man and his Health | 31 |
| Chapter 1 : Body Control. | 32 |
| Chapter 2 : Urinary System and Skin. | 37 |
| Chapter 3 : The Human Body: Coordination and Protection. | 41 |
| Unit 4 Man and his Environment | 44 |
| Chapter 1 : Ecosystems | 45 |
| Chapter 2 : Environment | 49 |
| Chapter 3 : Sustainable Development. | 55 |
| Unit 5 Matter and Energy | 61 |
| Chapter 1 : Chemical Compounds and Reactions | 62 |
| Chapter 2 : Work and Power | 67 |
| Chapter 3 : Machines and Devices | 71 |
| Chapter 4 : Energy | 76 |
| Unit 6 Earth and the Universe | 81 |
| Chapter 1 : Earth. | 82 |
| Chapter 2 : Moon and Earth. | 85 |
| Chapter 3 : Satellites and Space Ships. | 87 |
| Extra Exercises | 88 |