Physics

Secondary Education

Second Year Sciences Section

Center for Educational Research and Development

National Textbook

New Curricula

Republic of Lebanon

Ministry of National Education, Youth and Sports

PHYSICS

Secondary Education

Second Year

Sciences Section

Center for Educational Research and Development

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General Coordinator
Moustapha Yaghi

Translators
Ali Haidar
Nassim Haidar

PHYSICS

Secondary Education
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Sciences Section

Elias Chalouhy (Coordinator)
Ali Haidar
Nassim Haidar
Mouhammad Issa

Center for Educational Research and Development
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The National Textbook Project

The Center for Educational Research and Development (CERD) has embarked on an extensive workshop for assessing and developing the educational framework and curricula which have been placed into effect more than three years ago. With full realization of the fact that the educational cycle must continue normally through its components, and until the development process attains its aspired objectives, we are placing in the hands of students, teachers and directors of public schools, this corrected version of textbooks issued by CERD as part of the National Textbook Series.

This version is an interim stage incorporating the corrected typographical and linguistic errors discovered by CERD specialists as well as teachers and students through their daily dealings with the books. The process of assessment and development of the framework and curricula will take into consideration all the comments that have been made, or will be made, in this regard.

It is expected that once the curricula are developed and aligned with the general and specific objectives set for them, the textbooks will be realigned with the new curricular and framework requirements, including tying the content of a course to the number of teaching hours set for it during the school year, taking into consideration vertical alignment within the same course as well as the horizontal alignment with the rest of the courses.

I take this opportunity to invite all school administrators, teachers and students and all officials concerned in public and private schools alike, to promptly send their comments on these curricula and books as their contribution to enrichment of this momentous national process.

This workshop, which was launched under the kind sponsorship of His Excellency the Minister of Education and Higher Education in implementation of Decree No. 10227 embodying the educational curricula and their objectives, fits in with CERD's proclaimed new motto "Together We Build Through Education".

It is our earnest desire to see this national, all-inclusive workshop attracting the greatest amount of interest and participation to define the safest and soundest educational options that directly affect our children, as we vow to continually modernize education and develop its ways and means to keep abreast of modern developments and progress in science and technology.

Dr. Leila MALEEHA
President CERD

Preface

Conforming to the new curriculum of physics, this book preserves the spirit of last year's book (first secondary), while taking into consideration, at the same time, the scientific orientation of the students and their capacity to learn.

The book is made up of five units of several chapters each. Each unit starts with an introduction accompanied by an illustrative figure intended to trigger the curiosity of the student.

Each chapter is presented according to the following structure:

- A front page of a figure related to the subject, together with a list of the objectives of the chapter.
- An introduction intended to draw the attention of the student to the contents of the chapter and their applications in real life.
- A rigorously presented "course" where the *concepts*, *models*, and *laws* are introduced progressively, and are applied to practical situations.

Experiments are described and analyzed in full detail in order to familiarize the student with the scientific method. These experiments have already being carried out by the authors, and the set ups are generally photographed. Reflection questions and solved problems are enclosed in the course with the aim to help the student in acquiring scientific knowledge.

- A highlighted summary terminates each chapter. It lists the main ideas that the student should memorize.
- The exercises which conclude each chapter are classified, according to the level of difficulty, into three categories named: " Test your knowledge", "Apply your knowledge" , and "Problems". These allow the student to check his knowledge and apply the scientific method to new situations.

Many brief historical surveys and notes are included in order to make the student aware of the nature and the evolution of the laws of physics.

The level of mathematics is kept at acceptable level,and is simplified and reduced as much as possible in order not to mask the underlying physical concepts and ideas.

This book is accompanied by a "Teacher Guide" which, we hope, helps the teacher in accomplishing his job.

Our aim was always to provide our dear students and fellow teachers with a useful and pleasant tool, due to the clarity of the course, the rigour of the contents, the authenticity of the experimentation, and the variety of the exercises.

All remarks, critique, and suggestions from our colleagues are gratefully welcomed, and will be taken into consideration.

The authors

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