

# Physics

Basic Education  
Grade Seven

REVISED  
EDITION



Center for Educational Research and Development



National  
Textbook

New CURRICULUM

# Republic of Lebanon

Ministry of Education and Higher Education



## PHYSICS



**Basic Education**

Grade Seven

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National  
Textbook

**New Curricula**

General Coordinator  
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The translation into English of this book was reviewed  
and corrected by faculty members at the American  
University of Beirut.

# PHYSICS

**Basic Education**

Grade Seven

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# Together We Build Through Education!

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

# Introduction

In conformity with the general objectives of teaching physical science in the intermediate level, the authors aim in this text book to guide the student to a scientific attitude based on observation, on experimental initiation, and on practicing the use of some measuring instruments. The student is guided through observation and interpretation of the physical phenomena within her (his) reach.

The seventh grade book is divided into two parts. The first part includes nine chapters dealing with the study of matter. The second part includes six chapters dealing with the study of electricity and magnetism.

All these chapters have the same structure:

- ➔ A page introducing the chapter and includes a photo illustrated by a short comment. On this same page, the objectives of the chapter are listed.
- ➔ Three or four pages, fully illustrated, presenting the activities in an interesting form that motivates reasoning, observing, and interpreting. Most of these activities can be performed easily by students themselves.
- ➔ A concept summary of the main ideas in the chapter.
- ➔ One or two pages of exercises that serve to evaluate the achievement of the learning objectives assigned by the details of the program.

We hope that this textbook adequately conveys our vivid conception of physics. We also hope that this textbook can introduce the student to experimentation and to respond positively to the requirements of the contemporary world.

**The Authors.**





# FIRST PART

## MATTER

### Chapter 1:

#### Solids and Liquids:

- 1- The shape.
- 2- The free surface.
- 3- Pulverized solids.
- Concept review.
- Exercises.

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### Chapter 2:

#### Volume:

- 1- Units of measurement of volume.
- 2- Volume of a liquid.
- 3- Volume of a solid.
- 4- Estimation of the volume of a body.
- Concept review.
- Exercises.

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### Chapter 3:

#### Mass and Density:

- 1- Units of mass.
- 2- Measurement of mass.
- 3- Density and relative density.
- Concept review.
- Exercises.

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### Chapter 4:

#### Gaseous state:

- 1- Matter in the gaseous state.
- 2- Gases have volume.
- 3- Gases have mass.
- 4- Gases are fluids.
- Concept review.
- Exercises.

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### Chapter 5:

#### Gas pressure:

- 1- Air exerts pressure.
- 2- Gases exert pressure.

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- 3- Units of pressure.
- 4- Measurement of the pressure of a gas.
- Concept review.
- Exercises.

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### Chapter 6:

#### Constitution of matter:

- 1- A particle model of matter.
- 2- Diffusion.
- 3- The incompressibility of liquids and solids.
- Concept review.
- Exercises.

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### Chapter 7:

#### Transfer of heat:

- 1- Temperature.
- 2- Heat.
- 3- Heat transfer.
- Concept review.
- Exercises.

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### Chapter 8:

#### Change of state:

- 1- Fusion and solidification.
- 2- Boiling and condensation.
- 3- Difference between evaporation and boiling.
- 4- Water vapor in air.
- 5- Change of volume during the change of state.
- Concept review.
- Exercises.

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### Chapter 9:

#### Expansion:

- 1- Expansion of solids.
- 2- Expansion of liquids.
- 3- Expansion of gases.
- Concept review.
- Exercises.

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# SECOND PART

## ELECTRICITY

### Chapter 10:

#### Electric circuit:

- 1- Incandescent lamp.
- 2- Electric dry cell.
- 3- Electric circuit.
- 4- Conductors and insulators.
- 5- Adaptation of a lamp and a dry cell.
- Concept review.
- Exercises.

### Chapter 11:

#### Electric measurements:

- 1- The electric current.
- 2- The measurement of voltage.
- Concept review.
- Exercises.

### Chapter 12:

#### Grouping of lamps and cells:

- 1- Grouping of lamps in series.
- 2- Grouping of lamps in parallel.
- 3- Grouping of dry cells in series.
- Concept review.
- Exercises.

### Chapter 13:

#### Electric safety:

- 1- Protection of individuals.
- 2- Protection of installations.
- Concept review.
- Exercises.

### Chapter 14:

#### Magnets:

- 1- What is a magnet?
- 2- Poles of a magnet.
- 3- Magnetization of a magnet.
- 4- The earth is a huge magnet.
- Concept review.
- Exercises.

### Chapter 15:

#### Coils:

- 1- The coil.
- 2- The alternator.
- 3- The electric motor.
- Concept review.
- Exercises.

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