

TECHNOLOGY SPECIMEN

Grade 5 - Basic Education

PROJECT & REALISATION



Republic of Lebanon

Ministry of National Education, Youth and Sports

TECHNOLOGY

Basic Education

Grade Five



National
Textbook

National Center for Educational Research and Development

New Curricula



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TECHNOLOGY



Basic Education

Grade Five

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The National Textbook Project

This is the second installment of textbooks completed by the Center as part of a three-stage effort to produce the 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 and modern learning, using sophisticated educational means and up-to-date methodology that encourage and reinforce individual thinking and research, the acquisition of skills, the 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 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 qualifications and qualities, yet last year's textbooks did contain some faults and gaps which were duly pointed out by researchers in many articles, and, indeed, we have benefited from some of them. Such is the nature of human work, no matter how good the intentions or how great the effort exerted.

Constructive criticism is a real contribution to raising the standard of authorship, minimizing errors and filling gaps. We only hope that criticism will always be objective and motivated by a desire to enhance educational reform in order to achieve better products.

A favorite adage handed down from our old scholars: "He who criticizes you is as helpful as a co-author". Let all criticism directed at the Center be of this caliber.

In closing, we hope that we all will have benefited from our experience and that the textbooks of the third and final stage be closer to realizing our hopes and more beneficial to our students. We are now preparing ourselves to assess the parts so far achieved of the new curricula and to assure that our educational movement is proceeding on the right track for achieving the best results.

June 2, 1999

**President, National Center for Educational
Research and Development**

Nemer FRAYHA

PREFACE

As part of the New Curriculum, *Technology as a discipline* is the first attempt to translate knowledge into practical application. Throughout this course, students are exposed to the latest technological developments that will guide them to choose the right profession.

The suggested projects integrate knowledge and skills of many disciplines.

The book consists of worksheets prepared for individual or group use. The suggested technological devices are familiar and common to the students. Each project consists of a set of activities designed for assembling innovated or ready-made objects.

These projects will gain more meaning through field trips to specific sites and exposure to lectures and demonstrations conducted by specialists in the field.

1- General Objectives

Technology education reflects its interdisciplinary aspect. It is carried out in accordance with the educational reform plan and is aimed at achieving the following objectives:

- Exploitation of specialized knowledge through concrete applications.
- the interrelationships existing between analysis, conception, application and the use of a technological device or product.
- The comprehension of the technological phenomenon in its evolutionary context.
- Learning about the diversity of producing organizations and the relations that exist between technical progress and the economic and social developments.
- Familiarization with the various technological applications especially those concerned with the daily human needs.
- The choice and the implementation of relevant technological solutions under existing constraints.
- Enhancing civic education:
 - * by developing critical attitude concerning the various forms of commercial communications.
 - * by helping the individual to become a well-informed consumer.
 - * by appreciating the value of the sophisticated handicrafts.
- Extensive familiarity with technological vocabulary.
- Adherence to prevention and safety rules.
- Rational use of materials and equipment.
- Development of creativity.

2- Specific objectives

Technology education at the primary cycle level is aimed at achieving the following objectives which enable students to:

- Face concrete situations.
- Apply technological ideas using intellectual capacities.
- Initiate a technological way of thinking and experimenting: Conceiving, manufacturing, transforming and utilizing.
- Develop skills and aptitudes: objectivity, precision, creativity, sense of invention, working in groups.
- Recognize social, historical and ethical dimensions of technology.
- Explore new situations.

3- Technical application

The aim of this discipline is to help develop the skill of making technological devices which relate theory to practical applications.

All topics involved have a socio-economic implication and are related to the following fields.

1- Food Industry and Agronomy:

This topic familiarizes the student with the techniques of food production, applicable safety measures and market studies.

Field trips are planned to reinforce knowledge and industrial applications.

2- Electricity and Magnetism:

Models and labeled illustrations are used to make technological devices in accordance with applicable rules and standards as well as conforming with specifications (CdCF). Certain devices are set up to demonstrate the effect of magnets.

3- Mechanics:

Models and labeled illustrations are used as templates to make mechanical objects out of metals, non-metallic and synthetic materials.

4- Other techniques:

All devices are imitations of real products. The purpose of such constructions is to acquaint the student with the skills of conceiving, constructing and applying knowledge. Field trips and models are used as means to reinforce industrial applications.

5- Preparing models:

Each model is first illustrated and then constructed or realized, such as habitats for plants and animals.

4- Educational objectives

1- Methodology:

Details of manual work are presented in the worksheets. Worksheets cover the following processes:

- Comparing the appropriate methods.
- Choosing the appropriate methods.
- Taking proper decisions.
- Making the object.

2- Procedure:

- Gathering information on the project.
- Sorting out the information.
- Choosing the object.
- Applying prerequisite knowledge to make the object.

3- Exploration:

- Each construction follows a set of given instructions.
- Efficient use of time and space.
- Safety measures to be followed.
- Estimate cost to be calculated.

4- Communication:

Students will be asked to:

- Share information.
- Enhance their knowledge, skills and projection into the future.
- Find out ways to improve production.

5- Integration

Applied technology is not only restricted to manual work but also relates to various disciplines:

- Studying needs.
- Following operational steps.
- Studying the market.
- Estimating the cost of production.

* Vocabulary:

- Written expression
- Correct language

* Apply and become aware of scientific issues and their impact on the environment. Develop mathematical logic through:

- reasoning
- numerical presentation

* Enhance civic education through:

- Critical thinking
- Group work
- Assuming full responsibility for the work done.

6- Space and equipment allocated to the teaching of technology

Technology sessions can take place in a classroom provided that it can accommodate such activities.

An average area of 2.7m² per student is necessary (for a class of 18 students). Closets (at least two) and shelves are also required for storage.

The ideal situation would be to have a 100m² open area to accommodate 2x18 students with appropriate furniture and equipment (refer to the norms and standards of architectural program. General teaching, Lebanon 1997, and to the lists of furniture and equipment).

7- Safety measures

Safety measures are set to minimize the risk of accidents.

Work conditions must conform safety norms and standards.

The risk of electrocution is discussed in a separate worksheet. All other worksheets include sets of safety measures to be adopted. For added safety, each project is accompanied with a list of possible sources of risk for students to be aware of.

8- Evaluation

The evaluation of activities is based on knowledge and skills. The acquired skills are measured and can be evaluated as follows:

Criteria	Indicators	Note %
▼ Scientific approach	▼ Clear, comprehensible with correct application.	10
▼ Quality of Product	▼ Correct shape, easy rotation, no friction at the joints.	50
▼ Presentation	▼ Neat, attractive, good finishing	20
▼ Marketing	▼ Well studied in a given economic context.	10
▼ Innovation	▼ Personal initiative.	10
		100

Feedback is collected at the end of each cycle and used to make improvement.

Table No 1

Scope and sequence
(2nd Primary cycle)

Themes	Contents		
	Grade 4	Grade 5	Grade 6
Food and Agronomy	<ul style="list-style-type: none"> -Preparation of foodstuffs: (ice-cream ...) <p style="text-align: right;">2 periods</p>	<ul style="list-style-type: none"> - Preparation of foodstuffs: (Chips, biscuits, chocolate cookies). - Reading carefully the consumer's labels. <p style="text-align: right;">6 periods</p>	<ul style="list-style-type: none"> - Preparation of foodstuffs: (cheese ...) - Pruning and grafting - Drop system irrigation <p style="text-align: right;">6 periods</p>
Electricity and Magnetism	<ul style="list-style-type: none"> - Setting up circuits: . Electrical games. . Lighting a doll house. . making: a torch, games with a magnet (cars that run without an engine, magnetic theater), compass. . Basic principles of safety. <p style="text-align: right;">10 periods</p>	<ul style="list-style-type: none"> - Realization of simple circuits: - Making an electromagnet. <p style="text-align: right;">2 periods</p>	<ul style="list-style-type: none"> - Realization of simple circuits: . Constructing an alternator, making an elevator, a simple electrical engine. . Producing electricity (wind + dynamo) <p style="text-align: right;">6 periods</p>
Mechanics	<ul style="list-style-type: none"> - Simple Machines: . Making puppets and a jumping jack. . Constructing roundabout. <p style="text-align: right;">4 periods</p>	<ul style="list-style-type: none"> - Simple machines: - Transmission and transformation of movement. . Constructing levers. . Instruments with cogwheels. . Constructing a Roberval's balance and Steelyard. . Constructing a winch and a windmill (salt extraction). . Constructing a wind sock. . Making a plumb line and a spirit level. <p style="text-align: right;">8 periods</p>	<ul style="list-style-type: none"> - Simple machines - Transmission and transformation of movement - Transmission of movement by a chain - Making an anemometer <p style="text-align: right;">4 periods</p>
Constructing Models	<ul style="list-style-type: none"> - Making small boats with various materials - Constructing airplane and houses with various materials - Making fancy packages. - Paper products: boxes, badges, stars, masks, envelops, relief maps, kites. <p style="text-align: right;">8 periods</p>	<ul style="list-style-type: none"> - Making a terrarium - Making an aquarium and reptiles farm - Making an incubator <p style="text-align: right;">6 periods</p>	
Other Techniques	<ul style="list-style-type: none"> - Making recycled paper, pottery with clay, certain musical instruments. <p style="text-align: right;">6 periods</p>	<ul style="list-style-type: none"> - Transforming a camera into a projector - Kaleidoscope - Making a camera - Making spindles to mix colors - Making stalactites <p style="text-align: right;">8 periods</p>	<ul style="list-style-type: none"> - Constructing bridges with different materials: a montgolfier, a parachute, a solar panel. - Making a telephone. - Grow crystals. - Take photos without a camera. - Using a mirror to heat up things. <p style="text-align: right;">12 periods</p>
Means of Transport			<p>Familiarization with the technological aspects in the field of transport (Subways, Highspeed train, Eurotunnel, Cable cars).</p> <p style="text-align: right;">2 periods</p>
Total periods	30 periods	30 periods	30 periods

Table No 2

Acquired Competences (Primary cycle)

Theme	Ability	Competence (skills)		
		Grade 4	Grade 5	Grade 6
Food and Agronomy	Sort, select,	- Choose, determine measure and mix food.	- Choose, determine measure and mix food.	-
	Analyse	-	- Read a label of production	-
	Realize	- Prepare a food product.	- Prepare a food product	- Apply techniques used in dairy production - Apply some techniques of transplantation and agricultural irrigation.
Electricity and Magnetism	Realize, execute	- Dismount and remount different elements of a simple technical object. - Apply basic rules of safety	- Make an electro-magnet.	- Make some electric devices in current use.
	Sort, select	-	- Know-how to select the components of an electromagnet.	- Know-how to select some constituents of an electrical device.
Mechanics	Realize	- Design and construct a simple mechanical object.	- Verify a scientific notion - Realize a model	- Design and construct technological objects.
Making Models	Shape	- Express ideas by means of sketches and schemes.	- Express ideas by making models and habitat of animals and plants	-
Various Techniques	Realize	- Elaborate a project of manufacturing.	- Elaborate a project in the domain of optics and realize it.	- Know-how to use adequate materials while constructing simple objects - Apply modern techniques in manufacturing.
	Sort, select	-	-	- Make a model of a simple technical object.
Means of Transport	Familiarize himself	-	-	- Know-how to use means of transport in our modern life.

List of Tools and Equipments (Technology Workshop)

Level: **Intermediate** / Place: **Technology workshop** / Capacity: **18 students**

Ref	Name	Type / Characteristics	Quantity
E 01	Crocodile vernier caliper	Set 1/10, 1/20, stainless steel	03
E 02	Pliers	Set: black, red, yellow	01
E 03	Paper cutter (guillotine)	Paper, plastic, transparent sheet, 2mm - 300mm	01
E 04	Toolbox	Metallic or plastic with drawers containing: 1 x cutting pliers with stripping edge 1 x universal pliers with stripping edge 1 x set of 5 screwdrivers, OBC 5 1 x professional multi purpose scissors 1 x iron solder, 30 watts max., support 1 x protractor 1 x compass 1 x metallic ruler, 300 vmm 1 x center punch 1 x set of 3 limes for wood work 1 x set of 3 limes for metal work 1 x cutter with retractable blade, 6.5 mm 1 x carpenter saw 1 x hammer 250 g with a claw 1 x stripping pliers for wire ends 1 x metallic meter, tape 2 - 3 m 1 x screwdriver test, long nose 1 x mechanic saw with 5 blades	06
E 05	Diamond cutter	Ordinary type	01
E 06	Blade cutter	Retractable, 18 mm	02
E 07	Square	200 x 300 mm	02
E 08	Square set		01
E 09	Working bench	Rotational base	06
E 10	Suction vice		02
E 11	Set of 6 screwdrivers	OBC 6	01
E 12	Set of 6 clamps		02
E 13	Hammer	300g, with claw	01
E 14	Plastic sheet		02
E 15	Sander	200W, 220V	01
E 16	Multimeter	VOM	02
E 17	Drill	13mm with support, 220V	01
E 18	Punch	Made of steel	01
E 19	Forceps		01
E 20	Glue gun		02
E 21	Hacksaw		02
E 22	Garden sheers	To cut branches	01
E 23	Hot plate	220V, 1000 watts approx.	01
E 24	Ribbon saw	Section: 30 x 100mm Power: 600W Source: 220V	01
E 25	Air compressor	50 liters, 220V	01
E 26	Grinding machine	Ø 150mm, 220V	01
E 27	Parallel sides vice	125mm, turnable base	06
E 28	Termocling-film machine	300mm side 3mm thickness	01
E 29	Jigsaw	6 blades to cut wood, plastic or metal	01
E 30	Stabilizer	24V - 30V, 5 A	02

M: mobile, E: individual equipment, C: consumable

Ref	Name	Type / Characteristics	Quantity
C 01	Electrical accessories	Set of: 6 x plugs 6 x battery holders 6 x crocodile clips 6 x sockets 24 x bulbs, 3V 12 x bulb holders 10 x electric motor (toy)	02
C 02	Paper clips	Box (100 pieces)	02
C 03	Solder	100g, 10/10e	02
C 04	Cables (wires)	3 colors	03
C 05	Cardboard	Porous and normal, 400g	-
C 06	Pins	Box	01
C 07	PVC glue	225mL tube with a piston	06
C 08	Plexiglass glue	100g tube	02
C 09	Capillary film	200 x 300mm (package)	01
C 10	Drill	Set: Ø 0.8 - 1 - 1.2 - 1.5 - 2mm	02
C 11	HSS drill	Set of 9 drills	01
C 12	Cutting blades	Set: 6.5 and 18mm	02
C 13	Sawing blades	Set of 10 and a saw	02
C 14	Degraving liquid	1L bottle	01
C 15	Moulding material	1kg plastic bag	12
C 16	Colored polystyrene	330 x 290mm, 2mm thickness, set of 4 colors	04
C 17	Adhesive ribbon	Roll with support	02
C 18	Solvent	1L bottle	01
M 01	Kit	Saw and ribbon, drill, grinder 1400 x 800mm, solid wood	01
M 02	Closet	To accomodate tools, bits and pieces	01
M 03	Trolley	Boards and maps	02
M 04	Working area	Wooden board, 1100 x 550mm	09
M 05	Shelves	To hold tools and drawers	03
M 06	Stool	Wooden	18

TABLE OF CONTENTS

INTRODUCTION

1 - General Objectives	7
2 - Specific Objectives	8
3 - Technical Domains/Fields	9
4 - Educational Objectives	10
5 - Integration	10
6 - Space and Equipment Allocated to the Teaching of Technology.....	11
7 - Safety Measures	11
8 - Evaluation	12

Theme 1. FOOD AND AGRONOMY

1 - Chips	17
2 - Pancake	21
3 - Cookies (truffle shape)	23
4 - Product labels	25

Theme 2. ELECTRICITY AND MAGNETISM

1 - Electromagnets	29
--------------------------	----

Theme 3. MECHANICS

1 - Levers	33
2 - Gears	43
3 - Balance	51
4 - Windmill	57
5 - Leveling tool	61
6 - Wind cone	65

Theme 4. VARIOUS TECHNIQUES

1 - Simple camera	67
2 - Transforming a camera into a projector	75
3 - Kaleidoscope	79
4 - Mixing of colors	85

Theme 5. REALIZATION OF MODELS

1 - Herbarium	89
2 - Aquarium	93
3 - Terrarium/Paladarium	99
4 - Incubator	105