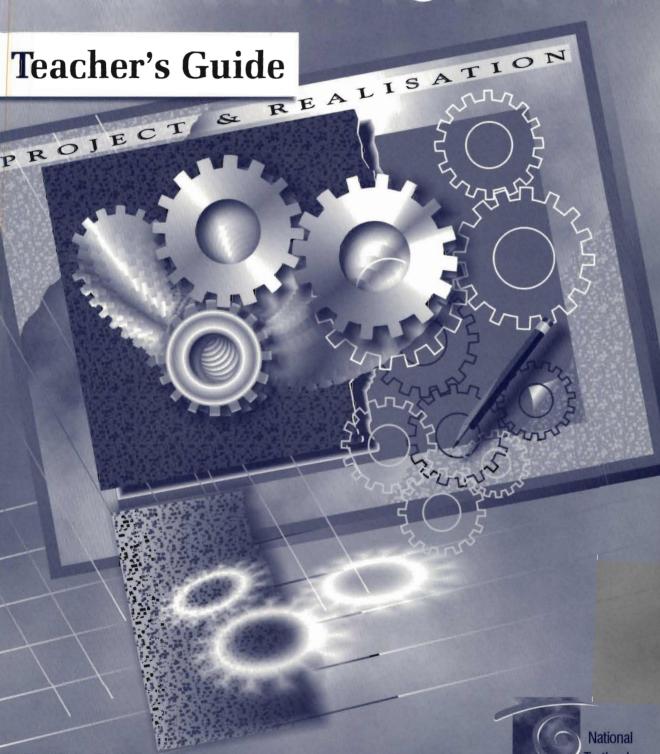
TECHNOLOGY Grade 5 - Basic Education



ational Center for Educational Research and Development

New Curricula

Republic of Lebanon

Ministry of National Education, Youth and Sports

TECHNOLOGY

Teacher's Guide

Basic Education

Grade Five



New Curricula

General Coordinator **Assaad YOUNES**

TECHNOLOGY

Teacher's Guide

Basic EducationGrade Five

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National Center for Educational Research and Development
Lebanese Publishers Company s.a.r.l.

Illustrations: Graphics Team ■ NCERD

Artistic and Technical Preparation: Technical Team ■ L.P.C. **Edition and Distribution:** Lebanese Publishers Company s.a.r.l.

Tel: 01/277414

Printing: Heidelberg - Lebanon

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First Published 1999

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.

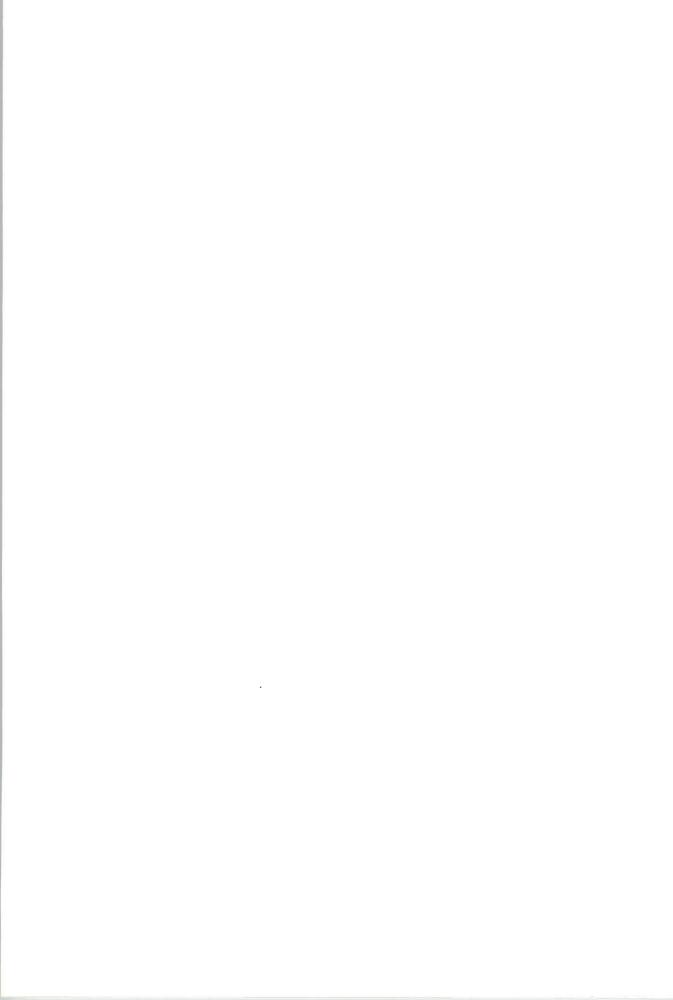
A favorite adage handed down from our old scholars: "He who criticizes you is as helpful as a co-author". Let all criticism directed at the Center be of this caliber.

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.	100

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

Table No 1

Scope and sequence (2nd Primary cycle)

Preparation of foodstuffs: (ice-cream) Preparation of foodstuffs: (ice-cream) 2 periods - Preparation of foodstuffs: (ice-cream) 2 periods - Setting up circuits: - Electricity and Magnetism - Setting up circuits: - Electricity and Magnetism - Setting up circuits: - Electricity and Magnetism - Setting up circuits: - Lighting a doll house making a torch, games with a magnet (cas that run without an engine, mag- netic thester), compass Basic principles of safety. - Simple machines: - Making puppers and a jumping jack Constructing roundabout. - Simple machines: - Making puppers and a jumping jack Constructing roundabout. - Simple machines: - Transmission and transformation of movement - Transmission and transformation of movement - Transmission and transformation of movement - Transmission of movement by a chain - Making a plumb line and a spirit level. - Making a plumb line and a spirit level. - Making an apparatum and reptiles farm - Making a camera into a projector - Constructing bridges with different materials a monteoffier, a parachute, a solar panel Making stalactites - Converyusta Tack photos without a camera Making a terrarium - Making a terrarium - Making a camera into a projector - Constructing bridges with different materials a monteoffier, a parachute, a solar panel Making a terrarium and reptiles farm - Making a terrarium - Making a micro to heat up things Converyusta Tack photos without a camera Making a parier to heat up things Converyusta Tack photos without a camera Was part of the led of transport - Converyusta Tack photos without a camera Using a mirror to heat up things.	Themes		Contents	新 京馬馬 30 美 3 美
Constructing of the constructing of the constructing and purpose and a jumping jack. Constructing roundabout. Constructing a materials	Themes	Grade 4	Grade 5	Grade 6
Setting up circuits: Leletrical games. Lighting a doll house. making: a torch, games with a magnet teast that run without an engine, magnetic theater), compass. Basic principles of safety. 10 periods - Simple Machines: . Making puppets and a jumping jack Constructing roundabout. - Simple machines: . Making puppets and a jumping jack Constructing a Roberval's balance and Steelyard Constructing a winch and a windmill (salt extraction) Constructing a winch and a windmill (salt extraction) Constructing a plumb line and a spirit level. - Making small boats with various materials - Constructing airplane and houses with various materials - Onstructing airplane and houses with various materials - Making fancy packages Paper products: boxes, badges, stars, masks, envelops, relief maps, kites. - Speriods - Making recycled paper, pottery with clay, certain musical instruments. - Making small boats with various materials - Making an aquarium and reptiles fam - Making an incubator - Making an aquarium and reptiles fam - Making an incubator - Constructing bridges with different making a termarium and making an incubator - Constructing bridges with different making a termarium and reptiles fam - Making smalles to mix colors - Making stalactites - Constructing bridges with different making a termarial a projector - Kaleidoscope - Making stalactites - Constructing bridges with different making a termarial and projector of Kaleidoscope - Making stalactites - Constructing bridges with different making a termarial and projector of Kaleidoscope - Making stalactites - Constructing bridges with different making a termarial and projector of Kaleidoscope - Making stalactites - Constructing bridges with different making a termarial and projector of Kaleidoscope - Making stalactites - Constructing an alternation of movement of		(ice-cream)	(Chips, biscuits, chocolate cookies). - Reading carefully the consumer's labels.	(cheese) - Pruning and grafting - Drop system irrigation
- Simple Machines: Making puppets and a jumping jack. Constructing roundabout. - Simple machines: - Transmission and transformation of movement. 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. - Making small boats with various materials - Constructing a wind sock with various materials - Making fancy packages Paper products: boxes, badges, stars, masks, envelops, relief maps, kites. - Making recycled paper, pottery with clay, certain musical instruments. - Making a camera - Making a tamera - Making a telephone Grow crystals Tansmission and transformation of movement - Transmission and transformation of movement - Making an anemometer - Making an anemometer - Making an anemometer - Making an anemometer - Making an incubator - Making a camera into a projector - Making a telephone - Grow crystals Tansmission and transformation of movement - Making a terarium - Making an anemometer - Making an anemometer - Transmission and transformation of movement by a chain - Transmi	and	- 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.	- Realization of simple circuits:	- Realization of simple circuits: . Constructing an alternator, making an elevator, a simple electrical engine.
Mechanics Making puppets and a jumping jack. Constructing roundabout. Mechanics Mechanics A periods A periods A periods Making a plumb line and a spirit level. Making an anemometer A periods Making an apumb line and a spirit level. Making an apumb line and a spirit level. A periods Making an apumb line and a spirit level. Making fancy packages. Paper products: boxes, badges, stars, masks, envelops, relief maps, kites. A periods Making a camera Making stalactites Making stalactites Means of Means of Making a pippets and a jumping jack. Constructing levers. Instruments with cogwheels. Constructing a winch and a windmill (salt extraction). Constructing a wind sock. Making a plumb line and a spirit level. Making an aquarium and reptiles farm Making an incubator Making an incubator A periods Making an incubator A periods A peri				
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materials - Constructing airplane and houses with various materials - Making fancy packages Paper products: boxes, badges, stars, masks, envelops, relief maps, kites. 8 periods - Making recycled paper, pottery with clay, certain musical instruments. Other Techniques 6 periods 6 periods - Constructing bridges with different materials: a montgolfier, a parachute, a solar panel Making spindles to mix colors - Making stalactites 6 periods 8 periods 6 periods - Ealeidoscope - Making spindles to mix colors - Making stalactites 1 periods 1 periods Familiarization with the technological aspects in the field of transport (Subways, Highspeed train, Eurotunnel,		4 periods	8 periods	4 periods
- Making recycled paper, pottery with clay, certain musical instruments. Other Techniques - Making recycled paper, pottery with clay, certain musical instruments. - Kaleidoscope - Making a camera - Making spindles to mix colors - Making stalactites - Making stalactites - 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. - Transforming a camera into a projectory 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. - Transforming a camera into a projectory 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.		materials - Constructing airplane and houses with various materials - Making fancy packages Paper products: boxes, badges, stars,	- Making an aquarium and reptiles farm	
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6 periods Familiarization with the technological aspects in the field of transport (Subways, Highspeed train, Eurotunnel,	the same of the sa		tor - Kaleidoscope - Making a camera - Making spindles to mix colors - Making stalactites	materials: a montgolfier, a parachute, a solar panel. - Making a telephone. - Grow crystals. - Take photos without a camera.
Means of aspects in the field of transport (Subways, Highspeed train, Eurotunnel,		6 periods	8 periods	
Transport Cable cars). 2 periods	Means of Transport			aspects in the field of transport (Subways, Highspeed train, Eurotunnel, Cable cars).
Total periods 30 periods 30 periods 30 periods	Total periods	30 periods	30 periods	

Table No 2
Acquired Competences (Primary cycle)

Theme	Ability	Competence (skills)			
Theme		Grade 4	Grade 5	Grade 6	
	Sort, select,	- Choose, determine measure and mix food.	- Choose, determine mea- sure and mix food.	-	
Food	Analyse	-	- Read a label of produc- tion	-	
and Agronomy	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	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.	
Magnetism	Sort, select	-	- Know-how to select the components of an electromagnet.	- Know-how to select some constituants of an electrical device.	
Mechanics	Realize	- Design and construct a simple mechanical object.	- Verify a scientific notion - Realize a model	- Design and construct tech- nological objects.	
Making Models	Shape	- Express ideas by means of sketches and schemes.	- Express ideas by making models and habitat of ani- mals and plants	-	
Various Techniques	Realize	- Elaborate a project of manufacturing.	- Elaborate a project in the domain of optics and real- ize 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:	06
		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 inetaine rulei, 300 viiiii 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	
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	ODC 6	02
E 11	Set of 6 screwdrivers	OBC 6	01 02
E 12 E 13	Set of 6 clamps Hammer	300g, with claw	01
E 14	Plastic sheet	Soog, with claw	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	u (int	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	01
		Power: 600W	
D.0-		Source: 220V	
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 equipement, C: consumable

Ref	Name	Type / Characteristics	Quantity
C 01	Electrical accessories	Set of: 6 x plugs	02
		6 x battery holders	
		6 x crocodile clips	
		6 x sockets	
		24 x bulbs, 3V	
		12 x bulb holders	
- 00		10 x electric motor (toy)	
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	01
		1400 x 800mm, solid wood	
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

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