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ABSTRACT

This manual was developed to train Peace Corps volunteers to teach vocational education in Tunisia, although it also has applications to the training of volunteers in other countries. The book is organized into four sections. The first section is an introduction that provides background information on the school system and the Peace Corps vocational education program in Tunisia. The second section, one of importance to volunteers working in various countries, concerns basic pedagogical skills. This section explains the fundamental principles of teaching a vocational subject, including lesson planning, teaching methods, and evaluation. In the third section, detailed Tunisia-specific information is given on school procedures, curriculum, discipline, grading, and forms. The final section is an appendix that covers additional information that a Tunisian vocational education volunteer would find useful. The manual is not self-teaching and is meant to be used in a classroom situation. (KC)

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Vocational Education Manual

A Handbook for Volunteers

Peace Corps
INFORMATION COLLECTION & EXCHANGE
REPRINT R-46

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Peace Corps

VOCATIONAL EDUCATION MANUAL

PEACE CORPS/TUNISIA

BY

HOWARD OPPER

Peace Corps
Information Collection and Exchange
Manual R-46

1979

September 1982

Acknowledgments

This manual is by no means the work of one single person. It is the accumulation of knowledge gathered from all Peace Corps/Tunisia Voc. Ed. Volunteers over the last four years. Recognition, therefore must go to all those volunteers who have helped build the Voc. Ed. program into its present state of successful credibility.

Special thanks also to Mr. Angus Macdonald of San Jose State University in California, who has been the pillar of the pedagogical formation of Tunisian Voc. Ed. Volunteers over the past five years.

A final thanks goes to the Peace Corps staff in Tunisia, especially to Mr. Fred Rosenzweig, whose unfailing devotion to the Voc. Ed. program has been a major contribution to the firm establishment of our presence in the Secondary Professional school system in Tunisia.

H.O.

TABLE OF CONTENTS

Introduction

SECTION I – Introductory Material

A. Education in Tunisia 1
B. The Technical School System 5
C. P.C. Tunisia: Vocational Education 8
D. Training 17

SECTION II – Pedagogy

A. Introduction 20
B. Human Relations in. 21
Education 22
C. Five Part Plus One Teaching Design 32
D. Teaching Methods: More Information on the Demonstration 50
E. Writing a Lesson Plan 53
F. How to begin a Project/ Theme in a Workshop 60
G. Critiquing a Technical Lesson 63

SECTION III – Tunisia Specific Job Information

A. Introduction 70
B. Your Job 70

1. The PCV in the school and the country 70
2. As an Employee of the Ministry of Education 71

– Duties (approximate chronological order) 72

C. The Official Program

1. Introduction 76
2. Translations of Programs 78

a. Metals 78
b. Woodworking 101
c. Plumbing-Heating 132
d. Auto-Mechanics 143

3. Some final notes on the official Program 176

D. Relations at school 176

1. Introduction 176
2. Administration 176
3. Colleagues 180
4. Students 181

E. Discipline 184

F. Grading 188

G. Testing 192

H. School Procedures 196

1. Student Notebooks 196
2. Handouts 197
3. Technical Teaching Aids 197
4. Ordering Supplies 199

I. School Forms 200

SECTION IV - Appendix

A. Conversion Tables 211

B. Classroom Commands in French 217

C. Tool Translations 218

D. Safety Lesson 221

E. Secondary Activities 222

F. Resources 226

G. Glossary 228

v.

Introduction

The Vocational Education program in Tunisia began in 1972. Since that time a great deal of valuable training materials have been written, revised, and refined. It has been our experience that training Vocational Education Volunteers is more difficult than most other groups. In the space of a relatively short training program, the trainees, who have rarely had any prior French, and who have usually no prior teaching experience, must become proficient enough in French to teach in the language, must acquire the necessary pedagogical skills, and must become familiar with the Tunisian vocational education system.

In order to assemble the training materials into a more usable form we have put together this training manual. It represents a collection of materials produced by various sources, including California State University in Los Angeles, Angus MacDonald, and various Tunisia Voc. Ed. Volunteers. These materials have now been edited, compiled, and organized.

The purpose of this training manual is, then, twofold:

1) to provide a training manual with essential information to aid Voc. Ed. trainees and trainers,

2) to put together information on training Voc. Ed. Volunteers which other Peace Corps countries with similar programs might find useful.

The applicability of this manual to other countries will depend primarily on the nature of the Vocational Education program in the country. In Tunisia the program has been a formal education one in which the Volunteers teach within a fairly well developed vocational education system under the Ministry of Education. This necessitates quite a bit of detailed information on school procedures, a case which may not be true in all countries. Much of the book is Tunisia-specific and therefore contains information which will probably not be specifically relevant. However, Peace Corps countries which are involved in loosely structured technical programs or in formal technical school programs that are somewhat lacking in programmatic direction might find a good deal of this information very helpful in creating new programs or in re-directing existing ones.

Structure of the Book

The book is organized into four sections:

1. The first section is an introduction which provides background information on the school system and the Peace Corps Voc. Ed. program in Tunisia.

2. The second concerns basic pedagogical skills. It is this section that will probably be of greatest use to others. It explains the fundamental principles of teaching a vocational subject including lesson-planning, teaching methods, and evaluation.

3. The third section contains detailed Tunisia-specific information on school procedures such as school relations, curriculum, discipline, grading, and school forms. This section might aid other countries in dealing with curriculum deficiencies and in offering concrete suggestions in designing a course.

4. The last section is an appendix which covers additional information that a Tunisia Voc. Ed. Volunteer would find useful. Some of this information will also be useful to others.

How to use the book

The book is meant to be used as a training guide. As is the case with any training manual, it is by no means complete and cannot be accepted as the final word. It is also not a self-teaching manual and must be presented creatively by the technical training staff. The trainees will, of course, have the manual to refer to during and after training, but reading it will not suffice. The technical training staff must not only present the material in the manual, but must develop practical exercises and a means of evaluating the learning of the material. There are undoubtedly many ways that this manual could be used by Voc. Ed. trainers.

It is Peace Corps Tunisia's hope that this manual will provide some useful information on training Vocational Education Volunteers for other countries. The format as well as some of the pedagogical information will be valuable to anyone who wants to develop a similar training tool. Primarily it has been our intention to provide a long needed tool for training Voc. Ed. Volunteers in Tunisia.

Fred Rosensweig
Assistant Director/Education
Peace Corps, Tunisia

1. INTRODUCTORY MATERIAL

A. Education in Tunisia

The School System

The education system in Tunisia today, administered centrally under the Ministry of National Education, is organized into a six year primary cycle (our equivalent of a grade school), and a secondary cycle (our junior and senior high school), that includes academic, technical, and vocational programs of varying lenghts. There is also a growing number of pre-schools, open to children aged 3 to 6.

Primary and secondary schools may be for boys exclusively, girls exclusively, or both. Since 1968, there has been an increasing emphasis on co-education, particularly at the primary level.

In the "long" secondary program, all students who enter into either the 7-year academic course or the 6-year technical course must complete a uniform 3-year first cycle before going on and specializing in one of a number of academic or technical fields in their last 3 or 4 years of the program. In the vocational secondary program (the one that involves us as voc. ed. teachers), students enter directly after primary school into a 3 or 4 year terminal program receiving training in one of a number of specialized skills.

Also offered at the secondary level are teacher training, agricultural education, and other training programs. In addition, training in various other trades is available in special training centers for primary school graduates.

Higher education is offered in the various university faculties, attached schools, and institutes of the University of Tunis, and in a number of other specialized institutions. A number of Tunisians are sent abroad, primarily to France, to continue their education at the higher level.

Ministries other than the Ministry of National Education (chiefly Agriculture, Youth, Sports, Social Affairs, and Public Health) have established their own specialized institutions. The government also provides schools for children who are handicapped.

The school system today pperates on a bilingual basis, with both French and Arabic as languages of instruction. At an early stage a decision was made to retain the large number of foreign (primarily French) teachers in the Tunisian schools, and, with them, French as a language of instruction. A large number of French nationals still teach at the secondary and higher levels, along with other foreigners of many different nationalities, including Bulgarians, Romanians, Russians, Belgians, and Czechoslovakians. It might be noted that as the number of qualified Tunisian teachers increases year by year, the number of foreign teachers is

diminishing at a similar rate.

During the fourth year of primary education students begin to learn French. In the fourth through the sixth years of primary school, the proportion of French instruction augments until by the end of the primary level, the students have a fairly solid background in French. At the secondary level, approximately one-half of the instruction is in French, the proportion varying with the program.

Generally, French is used for mathematics, science, technical subjects, and French and European languages and literature. Arabic is used in Islamic studies, Arabic language and literature, and the history and geography of Tunisia and the Arab World.

Although one of the educational goals is to "Arabize" the system by offering all instruction in the native language, Tunisia continues to rely on French, especially in the technical subjects, due to a lack of qualified host country teachers in this area, and also due to the fact that a standardized technical language simply does not as yet exist in Arabic. Thus, although Tunisian technical teachers often discipline and critique their students in Arabic, they continue to teach the bulk of the technical and theoretical material in French.

The academic school year, which is divided holidaily into two semesters, runs roughly from September 20 through June 30. These dates may vary somewhat, for example in the southern part of the country, where the weather is considerably better, school may begin to wind down in the beginning of June, and end on June 15. Students attend school mornings and afternoons, Monday through Friday, and often on Saturday morning, with variation dependent upon the particular program of study. Sunday is always a day of rest for both teachers and students, and along with this the teacher always has at least one other full day off, although this day does not necessarily fall on a Saturday or Monday. There is a total of approximately 45 vacation days during the school year, including a one week break toward the end of November, a two-week semester break near the end of January, and a one week spring break at the beginning of April.

The Ministry of National Education is responsible for all educational matters, including supervision and control of educational institutions. The Ministry determines operating procedures for all schools, and approves curriculums and textbooks. At the provincial level the "Délégués" (There are four) supervise the operation of the schools in their regions and report on educational matters to the Ministry of National Education.

Public education is free at every level. The Central Government provides funds for building, maintaining, and operating educational institutions. Funds for operation include teachers' salaries. Some local assistance is provided for school construction. The government also provides school supplies, clothing, and meals to children of the indigent.

Tunisia's commitment to education has been underscored by its continuous significant financial support of education. At this time, the government spends approximately 25 % of its Gross National Product on education, an admirable figure for a third world nation. In addition to standard expenses (buildings, teachers, equipment, etc.), the Government offers a generous program of scholarship and financial assistance to needy students as a means of democratizing education.

For its educational efforts, Tunisia has received and continues to receive assistance from a number of foreign countries, particularly France. Soon after its independence in 1956, Tunisia entered into a cultural agreement with France to provide teachers for Tunisian schools (note once again that the number of French nationals teaching in the system is diminishing rapidly year by year, as Tunisian education strives for total independence. The technical and vocational education sectors are two of the few remaining programs that still rely heavily upon foreign teachers.

The United States has also aided Tunisian educational efforts. For example, the U.S. Agency for International Development (AID) has supported various projects in past years. It has given financial and technical assistance to agricultural education and has helped with school construction, school meals for children, and training Tunisians in U.S. institutions (principally in the fields of agriculture, business administration, economics, education, engineering, and science). Peace Corps volunteers continue to play a significant role in Tunisian education at the grass roots level as teachers.

The major areas in which Peace Corps teachers are involved are English and vocational education.

Ministère de l'Education Nationale

The Ministry is the governmental organization that has requested Peace Corps Teachers and to whom PCVs are directly responsible. The Minister and his staff are responsible for all curriculum and development throughout the country. The Assistant Director for Secondary Education who is in charge of all vocational and technical education in the country is Mr. Hamed Milka.

Regions:

The country is divided into four administrative regions. They are Tunis, Sousse, Béja, and Sfax. Each region is divided into delegations which are:

Béja: Béja, Jendouba, Siliana, Makthar, Le Kef, and Bizerte.

Sousse: Sousse, Monastir, Mahdia, Kairouan, Kasserine Ksar Hellal, El Djem, and Haffouz.

Sfax: Sfax, Gabès, Medenine, Gafsa, Kerkennah, Jerba and Tozeur.

Tunis: Tunis, Tunis-South, Nabeul.

Each region has a "délégué", or representative who is responsible for administrative decisions in his region. It's a good idea to get to know the délégué, at least by name.

Béja: Mr. Ahmed Jghami

Sousse: Mr. Mohamed Fayala

Sfax: Mr. Mohsen Ben Jmâa

Tunis: Mr. Moncef Louabid.

Inspectors: In each region there are inspectors for each discipline, including each technical field, who make routine observations and evaluations of all teachers within their discipline. Reports from the inspector are shared with the teacher and sent to the ministry. The status and salary of Tunisian teachers depends on the score they receive when they are inspected. Their impact on us as foreign teachers is not as great, and will be dealt with later on in this manual.

B. The Technical School System

After graduating from primary school at approximately age 13 or 14, the student passes into the secondary school system for programs that vary in length from three to seven years. The student's field of study is determined partly by choice, partly by his academic record, and partly by his strength and weaknesses in different subjects. Fields of study are in Arts, Sciences, and in technical education. Students in the Arts, Sciences, and Technical branches strive for the attainment of the Baccalaureate, a degree given to a selected number of students countrywide who are able to pass a rigid final examination at the end of their seven years of study.

The students that we teach as vocational education teachers in the Tunisian secondary system of education enter into a specific technical field of study, whose duration is much shorter than that of the Arts and Sciences students striving for the "Bac". The program that we are involved in is usually the three year program, at the end of which the students receive a "diplome professionel" or diploma in their particular field of professional study. These fields include auto-mechanics, metal construction, plumbing, woodworking, masonry, and electricity. Like the Arts and Sciences students, the students involved in the three year technical education program must also pass a final examination called the "brevet" in order to graduate, the difference being that their major exam, which comes at the end of the third year of study, is practical in nature, and intended to demonstrate their manual competence in their given field.

Technical students take from twelve hours of study in their specialty in their first year, to twenty-four hours in their third year. Most of this time is devoted to practical work in the atelier or workshop, under the close supervision of one or more teachers. Several hours a week are also devoted to "Technologie Générale" which is a formal classroom situation, during which time the teacher lectures to the students about the theoretical aspects of their specialty.

In addition to their specialized skill training in the secondary school system, all technical students take Arabic and French, civics, geography, history, mathematics, technical design, religion, and physical education. Students who complete this program, and successfully pass the final test in their technical subject, receive a vocational diploma (Diplome Professionnel). Although Peace Corps Volunteers have traditionally been involved in teaching in the three year cycle, it might be noted here that exceptional students who have graduated from the three year cycle may be permitted to continue their education in one of several ways. First, there are several schools around

the country that offer a fourth year of professional study in which the best students concentrate on the perfection of their field of study. Second, there are several students selected each year who are allowed to go on and complete the six-year "long" commercial or industrial secondary program. These few selected students will have the opportunity to go on to one of the higher education schools after completing their secondary program, such as the National School of Engineering.

To give an idea of the importance the Tunisian Government gives to educating its young, especially in technical fields, here are the latest figures released by the Ministry of Education:

Of all students graduating from the primary cycle (virtually all Tunisian children at least start out going to school), about 25% will enter into their first year in the secondary cycle. There are approximately 230,000 students involved in secondary schools throughout Tunisia, and 55,000 of them, roughly 25% are engaged in the three-year technical program. Of the remaining 175,000 students, who are in the "long" six or seven year cycle, approximately 29% participate in commercial or industrial programs. Some of these students, as previously stated, are graduates of the three-year technical program, who, because of high academic achievement, have been allowed to continue their studies.

There are 202 secondary schools in Tunisia that fall under the auspices of the Ministry of Education. Of these, 130 offer some form of technical program, which gives a good idea of the importance the government places on technical education. There are basically three types of secondary schools in which we as vocational education teachers might find ourselves working, although as the years go by, the distinctions between the three are becoming more and more subtle

1) Collège Secondaire Professionnel: a school devoted almost entirely to technical and professional three-year programs, that sometimes offer fourth year studies to exceptional students in given fields. These are quite often all boys schools, although there are some that are co-educational, and offer commercial courses of study in hairdressing, tailoring and weaving. All students who graduate from a C.S.P. receive a diploma in either technical or trade programs. It is our equivalent of a Technical Trade school.

2) Lycée Technique: In its earliest conception, the Ministry of Education established these schools to concern themselves exclusively with professional education programs,

both the short three or four-year program, or the long seven-year program courses of study included the technical trades (three or four years), and math and Sciences (seven-year program). Although it is still safe to say that these schools concern themselves primarily in these areas, there are a few that now offer programs in Arts and Letters. This is still rare, however, and even if the Lycée Technique does have students who are studying outside of the technical fields, the number is small and almost insignificant.

3) Lycée Mixte: The counterpart of the Lycée Technique, these schools are our equivalent of a normal junior and senior high school. More coeducational than the other two types of schools, the Lycée Mixte offers the broadest selection of courses of study. Arts and Letters (the "long" program) is generally the dominant area, although more and more these Lycées are opening up technical and trade sections in both the long and the short programs.

C. Peace Corps Tunisia: Vocational Education

As a Peace Corps Volunteer and a teacher of vocational education in Tunisia, you will be teaching a technical specialty in a foreign language (French), while living in a culture and environment completely different from that to which you are accustomed. This is not an impossible task, as witnessed by the ever growing number of voc. ed. volunteers who have successfully completed their service. It is not, however, an easy task. The Vocational Education Program is the most challenging program to work in as a Peace Corps Volunteer in Tunisia; but it is also the program that has the potential to give the highest rewards, since your students will be able to apply their knowledge directly in industry after graduation.

Background

Tunisia, like most underdeveloped countries, is faced with a critical unemployment problem. It is conservatively estimated that one out of four Tunisian males who are potentially productive workers are currently unemployed for essentially two reasons: they lack the basic skills which are necessary to work in industry, and industry itself is not sufficiently developed, partly because of the lack of skilled manpower.

Unemployment threatens to become an increasingly difficult problem to solve because of the changing age structure of the population. Better health care has decreased the infant mortality rate, thereby increasing the real growth rate of the population. The age structure of the population is now unbelievably biased towards the under-thirty age group (a universal problem in poor and Third World Countries), which puts an additional strain on the government to provide adequate training for Tunisian youth.

The change in technology in Tunisia has accelerated rapidly as modern industries are developed and factories are equipped with the newest machinery from Europe. Agriculture has become increasingly mechanized to the point where one out of two farmers in the five northern countries (Tunisia's heaviest agricultural producing area) now use Diesel tractors. The building industry is currently enjoying a boom period while recent discoveries of oil offer an attractive incentive to foreign investors to relocate their plants in Tunisia. Unfortunately, the demand for skilled labor outstrips the supply, and this imbalance threatens to slow the growth of industry which Tunisia so desparately needs to develop and use its best resources - people.

Structuring Tunisia's educational pattern to correspond to the overall plans for economic development have proven to be a task that has required continual evaluation and frequent reform measures. Often conflicts have occurred between publicly expressed goals and the means of implementation. Some cases in point are: universal primary education and the ability to provide the equipment; buildings and teachers to match an expanded system; the problem of consumer preference for the liberal arts as against government demands for skilled personnel in the sciences; agriculture, economics, and technical fields; and finally, the competition between "Arabization" and the use of French in primary, secondary and university curriculums. In view of all these difficulties, Tunisian officials have shown flexibility in revising and reworking original reforms.

An excellent example of the flexibility of the Tunisian educational system is in the field of Vocational Education. The emphasis on education has shifted from the liberal arts to technical education. Indeed, technical education now has the greatest priority in today's Tunisian school system, because there is a critical shortage of teachers while at the same time there is an active policy of expanding the curriculum of technical schools and programs. Because the teacher shortage exists, you as a PCV vocational education teacher, can help Tunisia bridge the gap between the need for qualified teachers, and the lack of host country nationals who can effectively fill these teaching positions.

The Vocational Education Teacher

As a Peace Corps Volunteer, you will most probably teach the first, second, or third year terminal classes in the three-year "short program". You will be assisted by at least one Tunisian counterpart, and possibly by another foreign teacher (French, Bulgarian, Romanian), and will share the same shop as your colleagues. The use of a team approach is an effective way to teach since it eases the teacher/student ratio while allowing a feedback and reinforcement process to take place between the teachers and the students. This method, which is widely used, is particularly helpful to first-year Peace Corps Volunteers who must still perfect their knowledge of French and of teaching methods.

Your colleagues will vary from being three-year trade school graduates to engineers. Their expertise and grasp of theoretical principles will range from excellent to average, depending on their technical background and years of experience in their fields. Your first job as a Volunteer will be establishing a rapport with your colleagues which will permit a mutual ex-

change of information and ideas to take place. Don't expect to be welcomed with open arms at your school - you will have to work hard to earn credibility and the respect of the Tunisians with whom you will be working. You will need to be receptive to new solutions to old problems. Patience and persistence, in delicate balance, are the ways to effect changes as a Peace Corps Volunteer.

The physical facilities provided for technical/vocational programs may vary from modern, well lighted and spacious shops to those found in less favored rural areas which are small, have old equipment and poor ventilation and lighting. The tools and equipment may vary equally, from very modern to inadequate both in quality and quantity. The change in emphasis in Tunisia favoring technical education is fairly recent, and it will take time to furnish the technical schools with all new equipment and supplies.

As recognized by the ministry of Education, the import and transfer of various skills is seen as a difficult, slow process, even for brighter students. Therefore, the instructor is required to limit the length of his lessons and to present the essential laws and theories with direct application by the students. Exercises and experimental demonstrations should be conducted in conjunction with these lessons as much as possible. The instructor must choose carefully the various tools and proper technological equipment, keeping in mind training the students in a manner that will enable them to learn to solve potential problems by themselves. As was stated by a prominent technical educator in Tunisia: "Our technical schools aim not just to form the hands (mechanical skills), but also the mind; not just workers but thinkers, analyzers, people who can take something apart, see what makes it run, and put it back together." There is more to teaching a technical skill than creating a monkey see, monkey do type of worker.

Your Job Description

You will find later on in this manual precise translations of your program as written by the ministry of Education. This section, then, will serve to give you a general idea of what you might be expected to teach. The positions in which Peace Corps Volunteers have traditionally been placed here in Tunisia are:

- metal working
- plumbing and heating
- auto-mechanics
- woodworking/cabinet making.

These positions have been chosen because of their importance to the development of Tunisia, the lack of host country nationals to fill these positions, and the continuing need to help train and up-grade the skills of co-workers and counterparts.

Certain aspects of being a Vocational Education teacher in Tunisia are common to all the technical fields:

The main aspect of your job is teaching. You will be teaching junior and senior high school aged students who have had little or no prior exposure to the technical field. You will not be training craftsmen or using all the fine points of your trade. On the contrary, you will be initiating students to a trade in a classroom (shop) situation.

You should make every effort possible to improve the physical conditions of the shop, maintenance of machines, and the employment of sound safety practices. It is in these areas that you can have great impact on both your students and your colleagues. It can greatly enhance your credibility, and be something you should be constantly striving to accomplish in order to make a more lasting contribution.

Finally, some of the difficulties you will encounter are also common to all the specialties. Although the situation varies from school to school, many Voc. Ed. Volunteers have serious discipline problems, overcrowded shops, and a lack of equipment and supplies. The discipline problems are somewhat inevitable for the first few months, but as you become more familiar with Tunisian students, the situation will improve. The question of overcrowded shops is the result of an expanding school enrollment that has grown faster than new facilities. This is not true in all schools, but your teaching must take it into account. Finally, the lack of equipment and supplies, although it is not always the case, must be considered in planning lessons. Supplies are not as readily available as in the U.S., and accordingly you must be as creative as possible in using what is available.

The general job descriptions are as follows:

Metal Working

In order to obtain his diploma, the student is expected to understand principles of metal working and apply these principles in the solution of problems in his trade. The student must be able to work with iron and steel in rough and finished form and be able to work with all the materials and tools of his profession.

Iron and steel are used widely in the construction and furniture industry in Tunisaa. Shop work emphasizes projects using angle and bar stock and stresses practical experience in furniture making and iron work for the building industry. Metal working consists heavily of arc and gas welding and most projects require basic tube and sheet metal work.

In first year metal working shop, the student is taught how to use hand tools such as hammers, saws, and files, while studying the care, safety and maintenance in using these tools. Students work on projects that teach them the principles of tapping, threading, bending, riveting, and soldering metal. Such projects include dust pans, tool boxes and key racks. Students are also taught spot welding techniques.

Second year complements the first year by introducing the differences in dealing with various metals, especially aluminium and other alloys. Whereas first year primarily presents different tools and their uses, second year stresses processes such as oxy-acetylene welding, arc welding, pipe bending, bending with heat, and use of the forge.

In the third and terminal year the students learn how to cut metal with a torch, and how to grind metal. They also construct furniture, door frames and other fittings.

The Volunteer will teach in the shop, demonstrating to the students the correct use of tools and materials used in the trade. He will be supervised by the shop director (Chef des Travaux), who supervises all the other technical specialties at the same time, and will be expected to follow the same regulations that apply to his fellow Tunisian colleagues.

Classes will usually be in four or five hour segments. First year students take 12 hours of shop and one hour of classroom theory per week. Second year students take 18 hours of shop and two hours of theory, and third year students 22 shop hours, and up to four hours of theory. Class size generally numbers around forty, with twelve to fifteen students per teacher. You will be expected to teach from 22 to 28 hours per week.

Plumbing - Heating

In order to obtain his diploma, the student is expected to understand the principles of plumbing and

heating and apply these principles to the solutions and problems of the trade. The student must be able to install plumbing and heating systems and be able to work with all the materials and tools of his profession.

The plumbing and heating trade in Tunisia utilizes different materials and methods of working than those used in the U.S. The major difference and most noticeable is the use of lead pipe for handling intake water systems as well as drains. Much of the work of fitting and bending pipe is still done by careful working of the lead pipe by hand. Pipe bending for steel and copper pipe is done by the sand and torch method since tools are very scarce and very expensive. Most plumbers use only the very basic tools such as pliers, screwdrivers, hammers, and gas torches. Also, most fittings for joining pipes are made by the plumber himself. For example, a plumber in Tunisia would weld two pipes together, rather than using a tee joint.

Heating units are not of the forced air type, but are heated forced water systems (radiators). Most hot water systems in Tunisia are direct gas heated transfer rather than the reservoir type, and require a great deal of safety precautions.

In his first year, the student learns how to straighten, level "lip join", and bend lead pipe. The course includes instructions in the principles of soldering and different soldering techniques to seal joints and elbows. The principles of oxy-acetylene welding, brazing, lead burning and wiping will be taught. Shop instruction coincides with lectures presented on the metallurgical properties of lead, zinc, copper, bronze, cast iron, and steel. Cutting and threading of steel pipe is also taught in the first year.

For the second year students, the teacher instructs the installation of plumbing and heating fixtures such as toilets, bidets, sinks, and radiators. As in the first year, students will be expected to know the theory as well as the practical application of all tools and materials related to his work.

Third year shop work entails the completion of different sanitary and heating units by the student, while being supervised by the shop teacher. Students will complete projects using lead, steel and copper pipe, constructed from blueprints and using techniques in joining, bending, and threading for the three types of pipe.

The major emphasis in the plumbing and heating course is on practical application of principles in the shop. Thus, the first year students study only 4 hours a week of design and one hour of theoretical principles. In second year, the students are required to take 4 hours a week of design and one and a half hours of theory. Third year students take an additional half hour of theory, and 4 hours of design. This is above and beyond the hours of formal shop class.

The volunteer will teach in the shop, demonstrating to the students the correct use of tools and materials used in his trade. Like all other specialties, his immediate supervisor is the shop director (Chef des Travaux). He will be expected to follow the same regulations as his Tunisian colleagues, such as teaching a minimum of 22 hours a week.

Auto-Mechanics

In order to obtain his diploma, the student is expected to understand the principles of automotive repair and service, and apply these principles in the solution of problems in his trade. He will learn to examine defective cars, in order to ascertain the nature and location of defects and repair or replace the defective parts. The student must be skilled in all areas of auto-mechanics and be able to work with all the materials and tools of his profession.

Auto-mechanics in Tunisia, although basically similar to the U.S., have some differences. Since parts are expensive and hard to find, there is a stress on rebuilding and adjusting rather than on removal and replacement. Tires are also demounted by hand since modern equipment is generally not available. Another difference is that gaskets are made by hand. One difficulty that auto-mechanics Volunteers sometimes face is the necessity to teach some basic oxy-acetylene and arc welding. Other metal work includes some basic sheet metal work, tapping, and dyeing.

In the first year course you will teach basic hand tool use, parts identification, basic electricity, suspension systems, and brakes. In addition, you will teach head and valve removal and rectification, and tire repair.

The second year will complement the first by studying in more detail the various components of an automobile, and will introduce different makes and systems. For

instance, the student will study carburators made by Zenith, Solex and Weber, and become familiar with the repair and maintenance of them. It should be noted that all vehicles in Tunisia are European models with the French Peugeot and Renault, and the Italian Fiat being the most popular makes of car.

Third year concentrates on the study of transmissions, differentials, clutches, steering mechanisms, and electrical trouble shooting.

Classes will be in four, five, or eight hour increments. First year students take 12 hours of shop, second year 16 hours, and third year students 22 hours. Class size is generally small, with each teacher being responsible for from 12 - 15 students at a time. As with the other specialties, you will be expected to teach a minimum of 22 hours per week, and comport yourself in the same manner as your Tunisian counterparts.

Woodworking

In order to obtain his diploma, the student is expected to understand the principles of woodworking and apply these principles in the solution of problems of his trade. He must be able to work with different types of wood and also be able to work with all the materials and tools of his profession.

Woodworking in Tunisia is not carpentry, since houses are built with stones, bricks, and masonry work. A woodworking teacher will make mostly doors, windows, and small furniture such as tables, chairs, and closets. The most common wood joints used in Tunisia include tongue and groove, lap, scarf, dovetail, and mortise and tenon.

Most of the wood used in Tunisia is soft, with pine being the most common. Particle board is also frequently used; and occasionally some hardwood. Finishing furniture with Formica tops is quite common.

The first year consists mostly of manual exercises with hand tools, and use of some basic machines. Essentially, students work with the basic hand tools, and they work on simple practical projects.

In the second year, students work mostly with machines. Those most commonly used here include jointers, planers, shapers, table saws. Although the

theory and use of some of these machines may be touched upon during the first year, the second year emphasizes their complete utilization, and students make more complicated projects. Safety precautions, of course must be strictly emphasized.

The third year also consists mostly of work with machines. All work is preceded by a study of the fabrication, either by individual study, or with the help and advice of the teacher. The projects consist of advanced furniture contruction including elaborate doors and windows of European design.

Again, the Volunteer will teach in the shop under the supervision of the shop director (the same man who supervises all specialties), and is expected to follow the rules and regulations that apply to his colleagues.

Classes are usually in 4 and 6 hour segments. First year students take 12 hours of shop, second year 16, and third year students 22 hours. Class size is the same as in the other specialties, and you will be expected to teach from 22 to 28 hours per week.

A Note on Language Skills

All instruction on the secondary technical level is done in French, following the guidelines of the Tunisian Ministry of Education, and the Tunisian government's maintenance of its bilingual policies (French and Arabic). This is especially true in the technical education field that has traditionally leaned heavily on the French language, due to a lack of a standardized technical language in Arabic. All the staff members, including your colleagues, are fluent in French. Students speak the language also, but oftentimes they are weak in grammar and sentence composition. This can work to the Volunteer's advantage, especially at the outset, as you too will make mistakes that will fortunately pass by the students. Knowledge of English usually ranges from poor to non-existent. In addition to teaching your students in French, you will have to converse with your colleagues and school administration about school procedures, teaching ideas, discipline problems, and other related subjects.

The course manuals for each trade are extremely specific and are in French. All instructors are required to follow them, understand the directions and subjects thoroughly, and impact this knowledge in the French medium. Complete French to English translations of these syllabi will be found later on in this manual.

D. A Volunteer's Responsibility

A Peace Corps Volunteer in Tunisia is not just a person offering a skill that has been requested by a host ministry or agency. A Volunteer is also a person living in Tunisian society and largely on Tunisian terms. Just as we expect foreigners in America to behave on American terms and obey American laws and rules, Tunisians will have similar expectations of you. Tunisians expect certain norms of behavior in dress and conduct; you won't be free to act or do as you please. In fact, a Volunteer finds himself living under a double set of restrictions: those his own conscience and upbringing have given him and those he will find in Tunisian society and conscience. Adjustments and living can be difficult. There is little glamor for most Peace Corps Volunteers, either in the job or in living in Tunisia, where the Volunteer's life style is less comfortable than what one generally has experienced in the past. You must come prepared for two years of a modest life style.

You will, however, gain valuable professional experience and personal growth. You will have the opportunity to learn about another culture and see your own society through the perspective of another culture. The cross-cultural experience will be intense and challenging; but it will be one of the great rewards of your Peace Corps experience. Regardless of your technical competence, you must be able to develop a rapport with Tunisians at all levels if you are to succeed. It is difficult to separate your professional success from your cross-cultural success. Interpersonal skills, sensitivity, understanding, and persistence are all necessary qualities in having a successful Volunteer experience.

Training

Your pre-service training will have three components: language, pedagogy, and cross-culture. Traditionally, all training takes place in-country, and will last from between 10 and 13 weeks. The first month or so will concentrate most heavily on language training and some basic pedagogy. During the last few weeks, the pedagogy program will gear up, and there will be a practise teaching phase where you will actually be teaching technical lessons to Tunisian students in typical shop situations. Technical language and cross-culture will also occupy more and more time as the training period goes into its final stages.

1. You will have an absolute minimum of 250 hours of French instruction. Your teachers will be Tunisian nationals, some of whom are actual French teachers

during the school year, and others who, like yourselves, are teachers of vocational education, and experts in their field. The language program will aim at preparing you to present a lesson in French in your field. This requires giving you a sound grammatical base (conversational French), the technical vocabulary of your specialty (technical French), and a lot of practice in the kinds of situations you will face as a Volunteer, both in and out of school. Peace Corps language training offers no miracles, but it offers you optimum conditions to make progress: small classes, an oral method, and an intensive program. The focus will be on speaking, although you will receive some instruction in reading and writing.

2. The pedagogical program will consist of an orientation to the school system and teaching situation in Tunisia and training in Vocational Education teaching methodology. You will be taught how to teach a technical subject. This will involve learning how to assess student needs, formulate teaching objectives, develop teaching aids, plan and implement a lesson, and evaluate your teaching.

   Tunisia-specific teaching information will be emphasized during the training program. By the end of training, and with the use of this manual, you will learn how to keep necessary instructional and administrative records and how to use the curriculum and syllabi provided by the Ministry of Education. You will participate in a practise teaching phase, lasting from two to three weeks during which time you will prepare and deliver several lessons, in workshops, to Tunisian students of approximately the same age and background as those you will be teaching during the regular school year. You will be assisted in the preparation and delivery of these lessons by the Technical Coordinator and the volunteer staff. By the end of training, you should have a clear idea of what is expected of you in your job.

3. The training program will devote a great deal of time and attention to providing you with a sensitivity to Tunisian culture. Many of these cross-cultural activities will be built into language and technical training since it is indeed true that being a teacher in Tunisia and speaking a foreign language are definite cross-cultural experiences.

   There will be also talks on various aspects of Tunisian culture such as family life, Islam, and the role of women as well as small group sessions in which you can discuss your reactions to Tunisian culture. You will be exposed to as many aspects of Tunisia culture as possible and to the many ways that Volunteers have adapted to Tunisia.

During the Tunisia portion of the training program, there will be a 4 or 5 day break in which you can visit your site.

The goals of the training program are to prepare the individual for the Volunteer job described earlier. Each of the components is behaviourally stated so that you can monitor your progress on a regular basis and review them with members of the training staff. Although the final decision on qualification is made by the Country Director, no such decision should come as a surprise or without discussion between the trainee and the training staff.

In addition to pre-service training, you will also have in-service training activites. These will consist of two program conferences per year, site visits by your program manager, and Ministry sponsored seminars. Your ongoing language training will be with tutors. During training you will be given guidance on how to use a language tutor in order to structure your own language learning: Language is essential and pre-service training has as its main objective the ability to teach a lesson in French. Most of your language learning, however, will go on after the training program and your willingness to put yourself in a Tunisian milieu will greatly improve your chances of learning French. There will be an in-service language program during the April school vacation. Your training, in short, does not end after your summer training program. It will continue throughout your two years as a Volunteer.

II. PEDAGOGY

A. Introduction

This section of the manual deals with teaching-specifically, teaching a technical subject. It must be stated from the outset that there are as many different styles of teaching as there are teachers. Everyone has his own individual style, and from this comes a teacher's own unique form of lesson preparation and delivery.

Yet there are certain basic truths about teaching and education in general. Most Voc. Ed. Volunteers enter Tunisia with little or no previous teaching experience. Although we have all been students in a fixed school system for many years, and are aware of who was a "good" teacher, and who was a "bad" teacher, we are perhaps subconsciously unaware of exactly what goes into becoming an effective teacher. This instructor-training part of the program is designed to do just that. You will be given the opportunity to:

1. Learn what goes into the making of a good lesson plan;

2. Learn about and use sound teaching techniques and methods of instruction;

3. Practice and develop your own teaching skills;

4. Check on your progress by giving lessons in front of your peers, the pedagogy coordinator, staff volunteers, and finally, at the end of the training program, by giving technical lessons to Tunisian students. All these lessons will be given in the shops in order to give you a feel for "the real thing". In addition, you will observe several model lessons given by first and second year Voc. Ed. Volunteers, in order to observe and critique their methodology first-hand.

Special thanks for this section, especially for the section on human relations and the "Five Part Plus One" teaching design go to Mr. Angus Mac Donald, and the staff of California State University in Los Angeles.

A. Human Relations in Education

General

Whenever a teacher is asked, "What do you teach"? he will usually answer: "English", "Auto Mechanics", "Metal Working", or some other subject. Most teachers are subject specialties; and because they spend so much time gaining their expertise in their speciality, they fail to recognize the most important element in Teaching--the human element. In essence, a teacher primarily teaches students. These students are almost infinitely more complex than any subject matter, yet in most teacher preparation programs much less time is spent developing "people teachers" than "subject teachers". No learning takes place in an educational setting until a student is taught something. It follows then that a teacher should be much more "people oriented" and less "subject oriented" in his profession.

A Peace Corps Volunteer should be even more "people oriented" than most teachers since he has an unusual position to maintain in his relations with people, more specifically, Tunisians. He may be working with other instructors and is under the direction of the Chef de Travaux. This means that he should strive to maintain good human relations with these different groups of people, as well as the different individuals in each group, in order to properly perform his duties and be an asset to himself and to the organization he represents: the Peace Corps.

The Peace Corps Instructor has the basic responsibility of accomplishing results through his own efforts and the efforts of the Tunisians with whom he works. He may be an expert technician, he may be an expert on audio-visual aids; but if he is not skilled in the art of getting along with people, his ability to reach or maintain maximum efficiency and develop satisfaction in his job will suffer. The inability to get along with people will also bring adverse criticism to not only himself, but to the organization he represents, the Peace Corps.

1. Conditions for Good Human Relations in Education

A. Putting yourself over (Selling yourself)

a. You will get along with people to the extent that you succeed in putting yourself over to them.

b. The only thing the PCV has to sell is himself and his ability.

Some Devices Useful in Putting Yourself Over:

1. Become an extrovert
2. It's how you say it
3. Be persuasive, but not dictatorial
4. Be careful with promises
5. Be able to listen as well as talk intelligently
6. Be neat in appearance
7. Respect opinions
8. Handle criticism objectively by giving and taking
9. Look at the brighter side of a bad situation
10. Be optimistic
11. Go out of your way to help students
12. Forgive and forget.

B. Others will like you to the extent that you accord them recognized success.

a. One of the greatest satisfactions of the human ego is to be a recognized success.

b. Ignoring a person, especially a student, is tantamount to hostility on you part toward that person, from his point of view.

Some formsof Personal Recognition are:

1. Memory of name and title
2. Tolerance
3. Sympathy
4. Pat on the back
5. Inclusion in the group

6. Praise or favorable mention

7. Interest

8. Doing unsolicited favors

9. Being polite

10. Eye contact

11. Listen sympathetically.

C. You can improve your relations with others through your personal growth.

a. Man's social and emotional maturing never ends.

b. Getting along with people is 90% in your own hands, or if you don't get along, it is 90% your fault.

Some of the Factors of Personal Growth are:

1. Your assets and liabilities

2. Emotional maturity

3. Degree of dominance

4. Ability to handle criticism

5. Self control. Keeping your cool

6. Overcoming of handicaps

7. Ignoring malicious ridicule

8. Accepting the good gratefully, and the bad stoically.

9. Controlled reaction to repugnant behavior

10. Forgive and forget.

2. " WHY" of Good Human Relations in Education

Good Relations are Important to the P.C. Vocational Education Program Because it:

1. Promotes good P. C. image
2. Eliminates unjust criticism of PCVs on the job
3. Enhances the chance for the expansion of the P.C. Voc. Ed. Program
4. Aids in the elimination of unfair criticism of the Peace Corps
5. Develops a trust in the effectiveness of the P.C. Voc. Ed. Program in Tunisia.
6. Preprograms students for learning.

Why do PCVs Apply Themselves to Their Work?

1. Desire for recognition and respect
2. Cultural or religious ethic - work or giving
3. Security
4. Self-fulfillment: "I can do it"
5. Challenge
6. Price of a cultural and emotional experience
7. Stave off boredom.

These desires and motives are common to all individuals but they are not each present to the same extent. For example, recognition and respect means more to some, security more to others. It is important for the Volunteer to know and recognize individual differences. Because of these differences his relations with each individual must be handled in a different manner. By close observations and tactful handling of his human relations problems a Volunteer can become a valuable asset to both the Tunisian Educational System and the Peace Corps Program in Tunisia. "Cooperation and request" don't just happen. They stem from understanding, constant study, and proper appreciation of the factors that cause individuals to act and behave differently.

Factors which Cause Individuals to Act and Behave Differently:

1. Attitudes -- social and materialistic
2. Personality -- emotion, biases
3. Ability -- physical, mental
4. Aptitude, capacity for learning
5. Skills
6. Value system
7. Character
8. Interest
9. Social adjustment
10. Education
11. Experience
12. Maturity -- emotional, mental, physical
13. Physical differences
14. Age.

The factors (in the preceding section) of difference work both ways. The people around you are not only different from you, you are different from them.

One very important factor that we have listed is attitudes. An individual's attitude will usually determine his degree of cooperativeness and team work. The instructor cannot "make over" attitudes, but he can be aware of them and work patiently in correcting the cause of undesirable ones, including his own.

Some Conditions that could Affect Attitudes:

1. Physical
   - lack of sleep
   - nervousness
   - fatigue
   - pressure, worry
   - hangover

2. Work problems

   - supervision
   - tools and equipment
   - work facilities
   - rules and regulations
   - paper work
   - students
   - co-workers

3. Living conditions

   - housing
   - food, etc.

4. Lack of self confidence

5. Financial worries.

3. Results of Good Human Relations in Education

Indications of Good Human Relations are:

1. Attendance -- student and teacher
2. Cooperation
3. Interest in studies or teaching
4. Low drop-out rate
5. High morale
6. Friendliness
7. Mutual respect
8. Consideration
9. Achievement.

4. Poor Human Relations in Education

It is agreed that good human relations are necessary for the proper performance of a Peace Corps instructor. Let's turn the coin now, and analyze what makes for poor human relations.

Some Common Practices which make for poor Human Relations are:

1. Ordering instead of leading
2. Ignoring individuality
3. Passing the buck
4. Favoritism
5. Narrow mindedness

6. Lack of courtesy
7. "Big shot" and "Expert" attitudes
8. Conflicting assignments, evaluation, criteria
9. Over-emotionalizing petty incidents
10. Broken or modified promises
11. "Harsh words"
12. Sarcasm
13. Improper criticism
14. Delusions of grandure
15. Unreasonable demands
16. Unjust punishment .

The instructor should ever be on the alert to spot any one of these adverse indications because it is a danger signal and must be spotted quickly so that he can begin to take actions to correct the underlying cause. He may not be able to change the person or persons, if other than himself, who are causing the conflict, but he can change his own relations with the persons or person so as to overcome the effects of the conflict. The instructor is the one who must "sell" himself to the group he works with, not the group to the instructor.

Some Indications of Poor Human Relations are:

1. Discipline problems, rules violations
2. Insubordination
3. Dissension
4. Lack of interest
5. Dissatisfaction
6. Loafing
7. Discourtesy
8. Suspension
9. Resentment
10. Petty, constant complaints
11. Polarization and isolation.

5. Qualities of a Good Peace Corps Instructor

A good Peace Corps instructor is one, who through his ability and daily actions, so earns the confidence and respect of those around him, that they will seek his assistance and follow his advice and decisions.

Let's examine this statement closely for herein lie the basic principles of leadership. Confidence and respect must be earned by every day working at it. No position can demand it. Now let's examine some of the qualities a

good Peace Corps Instructor should strive to acquire or improve.

Some Qualities of a Good Voc. Ed. PCV

1. Technical abilities.
   a. Improve and update skills
   b. Adopt new techniques, ideas, and developments
   c. Utilize technical schools, technical publications, and other communication within the field of study.
   d. Seek help from experts in the field.

2. Leadership ability
   a. Plan
   b. Delegate
   c. Train
   d. Set objectives and implement their attainment.
   e. Establish good communications
   f. Make sure objectives are met, job carried out properly.

3. Patience
   a. Don't lose your cool
   b. Investigate, not jump to conclusions
   c. Treat new ground with caution
   d. Explain for understanding
   e. Recognize peoples' assets and failings.
   f. Operate under assumption that there is more than one way to do it.
   g. "When in Rome, do as the Romans do".

4. Decisiveness (have decided)
   a. Studies and evaluates decisions
   b. Is not afraid to make decisions
   c. Follows through
   d. Corrects bad decisions promptly
   e. Admits error, does not pass the buck
   f. Profits by good and bad experience
   g. Admits uncertainty.
   h. Does not vacillate

5. Resourcefulness (find a way)
   a. Seeks out new ideas
   b. Is not afraid to direct from custom or tradition
   c. Seeks out hidden abilities in others
   d. Communicates with others to find ideas.

e. Asks advice of others
f. Promotes creativeness in self and others.

6. Courtesy (amenities and common recognition)
   a. Treat others as you would have them treat you
   b. Respect feelings
   c. Courtesy is a good dampener for anger
   d. Smile
   e. Control voice volume

7. Integrity (count on me)
   a. Be consistent
   b. Be fair, no favorites
   c. Don't gossip
   d. Be professional in all personnel matters.

8. Loyalty (depend on me)
   a. Stands by associates and has faith in them
   b. Optimistic with people
   c. People are good until proven otherwise
   d. Squelches petty gossip
   e. Gives the benefit of doubt
   f. Never uses sarcasm or ridicule
   g. Is sparing with criticism
   h. Lets bygones be bygones.

We have discussed the qualities of a good Peace Corps instructor which can be developed by applying them to the little things that are done every day. By this application he can build up habits of conduct that will be an asset to him both on and off the job. Each individual must study his weak points and work diligently to correct them. This is not easy, due to the fact that it isn't easy to recognize one's own shortcomings. Their existence may come as a shock and it will be difficult to reconcile himself to the fact that some of his habits are badly in need of complete overhauling.

It will take frequency, honest appraisal and study of his daily actions to be able to recognize these weaknesses and overcome them. The job belongs solely to the person himself and any suggestions or assistance he gets from others should be appreciated and used.

SUMMARY

The following chart summarizes some "Dos and Don'ts" of human relations:

DO	DON'T
1. Wear neat clean clothes	2. Become sloppy or develop unclean habits
2. Keep clean physically	2. Try to "Boss"
3. Be tolerant of others	3. Develop attitudes of "So what the....."
4. Recognize others' ideas	4. "Pass the Buck"
5. Be able to lead	5. Take all the glory
6. Be able to follow	6. Use harsh words or profanity
7. Develop confidence and respect	7. Become dictatorial or domineering
8. Have patience	8. Become "Big I"
9. Develop resourcefulness	9. Give orders to your counterpart
10. Give praise where due	10. Indulge in political discussions
11. Be courteous to all people	11. Make unreasonable demands
12. Strive to use proper language	12. Make an excessive display of emotions
13. Steer clear of controversial issues	13. Be too critical
14. Keep promises	14. Spread petty gossip
15. Try to remember names and titles.	15. Be discourteous
16. Be sympathetic of others' feelings	16. Become too satisfied with yourself
17. Be able to listen as well as talk	17. Try to be lone wolf
18. Look at the brighter side of the picture	18. Break promises
19. Become one of the group	19. Make promises you never intent to keep
20. Remember you have no authority over your counterpart	20. Become the center of conflict
21. Recognize the difference of individuals	21. Lose the desire to get ahead

22. Be reasonable with request	22. Monopolize conversation
23. Try to sell yourself	23. Feel sorry for yourself
24. Recognize and correct your own weaknesses	24. Disregard the differences between individuals
25. Assume responsibilities	25. Lose pride in self or in the organization.
26. Grow and develop emotionally	
27. Be on the job	
28. Be cooperative	
29. Develop pride in self and organization.	

CONCLUSION

A Peace Corps instructor who is striving to get ahead must always bear in mind that he is a salesman selling himself, his ideas, and his abilities. To do this he must gain and retain the confidence and respect of the people he works for and the people he works with. In order to gain this respect and confidence he must not only have the required technical knowledge, but must also build up the qualities in his personality make up, such as tact, loyalty, patience, and resourcefulness, in other words, the overall ability to get along with people.

C. Five Part Plus One Teaching Design

1.0 Preparation - Plan For Instruction

- 1.1 Estimate the training situation
- 1.2 Select and organizesubject matter
- 1.3 Make lesson plan
- 1.4 Rehearse the lesson
- 1.5 Make final check

2.0 Motivation - Interest in Learning-Initial and Ongoing

- 2.1 To show a need
- 2.2 Develop intent to learn
- 2.3 Maintain interest
- 2.4 Encourage early success
- 2.5 Give recognition and credit
- 2.6 Avoid embarassments, bad feelings and emotional situations -- they retard learning
- 2.7 Have student compete with himself
- 2.8 Use praise and reproof or reward and punishment when essential.

3.0 Communication - Tell and Show

- 3.1 Introduction, explanation of lesson objectives (see 7.0; 11.0; 12.0)
- 3.2 Modified lecture, demonstration, discussion
- 3.3 Method to meet student and subject needs
- 3.4 Learning aids to meet student and subject needs

4.0 Participation - Do - Reinforcement as soon as possible (see 8.0; 9.0)

- 4.1 Group performance
- 4.2 Independent practice

4.3 Teacher supervises students

4.4 Group practice

5.0 Evaluation - Check on instruction and learning

5.1 Oral tests (see 14.1; 15.0)

5.2 Written tests

5.3 Performance tests

5.4 Observation

6.0 Review - Or critique

6.1 Clear up student questions

6.2 Summarize the lesson

6.3 Re-emphasize the important points

6.4 Correct errors made in application and examination stage

6.5 Make assignments for next class or laboratory.

PEDAGOGICAL EXPERTISE

Why; How to; of 5 + 1 Teaching Design

7.0 Have an Objective. Tell student what he is to learn

- 7.1 Have student understand what is expected of him
- 7.2 Present each unit as part of a whole
- 7.3 Objectives should be observable

8.0 Doing - The Activity

- 8.1 Plan for student activity
- 8.2 Allow students much time for practice
- 8.3 Ask questions
- 8.4 Use problem situations
- 8.5 Be resourceful

9.0 Experience should be genuine

- 9.1 Teach about reality and not the unreal situation
- 9.2 Have frequent reviews for class, especially with difficult lessons
- 9.3 Use the experiences of class members to enforce teaching
- 9.4 Lower level of abstraction

10.0 Appreciations - Students are learning all the time

- 10.1 Teach the person - not just the subject (see 1)
- 10.2 Set a good example for your students
- 10.3 Build good attitudes, habits, skills and understandings about their work and related tasks.

11.0 Introduction of Lessons is needed to

11.1 Establish contact and rapport with students and class

11.2 Gain attention of class

11.3 Arouse and stimulate interest in subject

11.4 Outline and clarify subject matter or trade

12.0 The introduction should include

12.1 Objectives of lesson (things to be learned)

12.2 Reasons for learning (importance of job)

12.3 Standards expected

12.4 Procedure or procedures to follow

12.5 Review of previous instruction and instruction related to topic at hand

13.0 Suggestions when addressing class

13.1 Look and talk to class conversationally -- avoid talking down to class and show interest in students. They are human.

13.2 Check your appearance. Watch your posture. Make your movements and gestures correct.

13.3 Avoid distractions -- stay with your subject or topic

13.4 Present instructions forcefully and with enthusiasm

13.5 Change your voice-pitch inflections -- it creates interest

13.6 Talk loud and clear -- don't shout or whisper

13.7 Speak the language your students will understand

13.8 Avoid making excuses -- be positive. Your teaching will be more effective

14.0 Questions and Questionings -- Ask questions which :

- 14.1 Have a specific purpose
- 14.2 Are clear and concise
- 14.3 Emphasize one point at a time
- 14.4 Require definite answers
- 14.5 Which do not encourage guessing
- 14.6 Are related to How to do it and Why it is being done

15.0 Procedure in Asking Questions

- 15.1 Ask the question
- 15.2 Pause after question
- 15.3 Call on individual student for answer
- 15.4 Recognize and evaluate student's response

16.0 Suggestions for Classroom Management

- 16.1 Before meeting class check on seating arrangement, lighting, ventilation, instructional materials, equipment, training aids, safety precautions
- 16.2 Have students understand objectives of lesson
- 16.3 Present lesson forcibly and with animation
- 16.4 Be attentive to class reactions -- keep control of class
- 16.5 Keep inattentive students on alert by directing questions to them
- 16.6 Question class in general frequently. Recognize correct answers. Correct incorrect answers.
- 16.7 Avoid arguments in class and students wasting time
- 16.8 Handle discipline and problem students in private when possible
- 16.9 Illustrate major points or difficult concepts with teaching aids

17.0 Using training aids

17.1 Select the aid which best does the job
17.2 Prepare for using the aid
17.3 Explain what aid should clarify
17.4 Keep aids stored and covered when not in use
17.5 Aid should be visible to all learners
17.6 Instruct to class -- not to teaching aid
17.7 Use a pointer
17.8 Display or show aid to best advantage

18.0 How to use Chalkboard

18.1 Have all necessary equipment at chalkboard
18.2 Check lighting and glare
18.3 Keep chalkboard clean
18.4 Plan work carefully in advance
18.5 Keep presentations simple and brief
18.6 Print and draw on enlarged scale
18.7 Use colored chalk for variety and emphasis
18.8 Don't crowd your work -- keep it simple
18.9 Erase unnecessary material

19.0 Planning and Giving Demonstrations

19.1 Plan the details of the demonstration
19.2 Arrange tools and materials properly so all can see
19.3 Follow a written lesson plan
19.4 Demonstrate only one lesson at a time
19.5 Show how and explain how at the same time
19.6 Stress and emphasize SAFETY
19.7 Use visual aid material where possible
19.8 Question frequently -- have students review verbally your performance

19.9 Emphasize essential points in demonstration

19.10 Set a high standard for students to follow

19.11 Summarize at close of demonstration

19.12 Have students practise immediately

20.0 Conducting Practical Work

20.1 Give detailed directions to students

20.2 Be sure students know How and Why

20.3 Outline standards to be attained

20.4 Allow sufficient time to attain standards

20.5 Instruction is primary -- production secondary

20.6 Supervise practice carefully and often

20.7 Correct mistakes -- praise good work

20.8 Teach each step thoroughly before moving to another step

20.9 Re-teach and re-demonstrate, if necessary

20.10 Stress speed and accuracy only after understanding

20.11 Make applications of experience realistic

20.12 Ask leading questions

20.13 Encourage slow learners

20.14 Check on observance of good safety practice

20.15 Have good students help poorer ones

20.16 Have students evaluate their own work

20.17 Rotate students from one job to another

21.0 How to conduct a Critique - Close applications with critique

21.1 State the objective of the lesson or problem

21.2 Review procedures employed

21.3 Evaluate strong points and suggest needed improvement

21.4 Control group discussions

21.5 Summarize

TEACHING METHODS

A. Attributes of an Instructor

There are many factors in determining the effectiveness of an instructor. It may be the amount of sleep he had the night before, his appearance, his knowledge, or his attitude toward the students. Effective instruction is the sum of all the attributes. Some of the common attributes are as follows:

1. Knowledge of Subject

Knowledge is the most important ingredient in training and without it the instructor has nothing to offer. Generally, he must know the subject material to a greater extent than he hopes to present to the class. The instructor is not born with the knowledge. However, training and preparation should make him an expert on the subject. Knowledge of the subject is often the difference between a confident and a non-confident instructor.

2. Appearance

The instructor must dress in character and in keeping with the training situation. Remember he has a professional status to maintain and he must still be able to show the students "how to do it" in a real job situation. "When in a Tunisian school, dress as a Tunisian Teacher".

3. Speech

Voice, grammar, and vocal variety are positive factors in the instructor's presentation. A student who cannot hear or understand the instructor could just as well have skipped class.

With vocal variety the instructor can insert life into his presentation. He can give it movement, inflect seriousness, lightness and magnitude, and in general prevent a dull and uninteresting presentation. Good speech compounded with knowledge of the subject is a hard-to-beat combination. Remember, profanity is never in good taste.

4. Preparation

Generally speaking the better the preparation the better the instruction. This is the time during which the instructor can plan his attack, his examples, work out problems, determine student needs and motives and do it at

his own leisure and pace. To make a presentation without preparation is like asking a student to sail the oceans without charts, maps, and a plan for the voyage. You can be sure he will be lost. Remember, preparation includes course charts, syllabi, lesson plans, training projects and examinations and training aids.

5. Attitudes

Students say they like teachers who are "sympathetic" and can "explain things well". Obviously the instructor must recognize individual differences and assume a positive attitude in regard to the students' ability to learn. The instructor must also maintain a positive attitude towards the school and subject matter if he expects the students to be receptive. The golden rule is as applicable in this instance as it is in other situations. Remember that it is the instructor's responsibility to teach rather than to condemn. Avoid frequent use of personal references (first person); however, do refer to real situations.

6. Gesture

Gestures, like vocal variety, can be used to reinforce verbal expressions. Gestures can indicate size, rate, importance, boundaries, direction, attitude desired, and an untold number of expressions which can give life and zest to a presentation. Just a word of caution - don't overdo it.

7. Language

This is a special attribute for a Peace Corps Instructor in Tunisia, that is, striving for expertise in language facility. Although communication can be achieved in many different ways, to wit, non-verbal language, "pidgin", etc., nevertheless, verbal abstractions have been the mainstay of formal education since its inception and except for rare applications it has proven to be the most efficient method for the transmission of knowledge yet devised by man. The level of attainment in language facility by the Peace Corps Instructor in Tunisia is the best predictor of his success on the job but, indeed, not the only one.

B. General Factors

1. Timing
2. Correlation of material to previous and forthcoming presentations
3. Questioning techniques
4. Blackboard work
5. Writing and grading examinations
6. Review of subject matter
7. Application and knowledge of training aids
8. Knowledge of human behavior and the psychology of education
9. Physical fitness
10. Professional interest in the job
11. Follow-on training and a program of self-improvement
12. Patience
13. Confidence
14. Control of class
15. Modesty
16. Sense of humor - but be careful with this one. Remember - you are the teacher, and must conduct yourself accordingly.

C. Principles of Learning

The sum and substance of all that we learn, we perceive through our senses. The best known of these are:

Sight	(Visual)
Hearing	(Auditory)
Touch	(Tactual)
Smell	(Gustatory)
Appreciation	(Aesthetic)
Strain	(Kinestetic)

An example of how these senses are used in learning can readily be imagined when we recall our knowledge of an apple. We know of its size, shape, color, fragrance; texture, taste, and appeal entirely through our senses. It becomes apparent that learning is enhanced when more than one sense and the dominant sense is used for learning.

These senses are a means of perceiving a stimulus, and our activity, both physical and mental; is a response to stimulation. The learning process is a process of learning to respond to a stimulus.

D. Laws of Learning

1. Law of Readiness

Students learn best when they are ready to learn; that is, when they are ready to respond to a stimulus. This is when they feel sufficient motivation to feel a need for learning.

2. Law of Association

Students learn easily when the new subject material is tied in to the material previously learned. They make use of a part of the old to understand the new. An example of this principle is to relate the escaping air of a toy balloon to a rocket motor. This is the Law of Association.

3. Law of Frequency

Students can readily recall and remember things which occur most frequently, i.e., they remember best when we repeat a learning activity. It is easy to recall how to drive a car, or write, because these are the things that are continuously practices (learned). It might be more difficult for some to recall how to fly a plane if the instruction was limited to one practice lesson.

4. Law of Recency - (Law of Effect) -

Students recall best the things which have most recently appealed to their senses. This is called the Law of Recency. Yesterday's events are more readily recalled than last year's. Students learn best when the learning is accompanied by the greatest satisfaction or the greatest annoyance. Keep in mind that reward is more effective than punishment.

Elements of this principle are now being applied to the realm of automated teaching devices and schemes. This is sometimes called the Law of Effect.

The law of effect has been somewhat modified to embrace the Stimulus-Thinking-Response (S-T-R) theory, in which the mind upon receiving a stimulus, can decide to respond differently. It can even decide to recall a painful situation

In order to achieve a particular goal or reward. The function of the mind in the S-T-R theory is that it can receive parts of raw data and relate them to a whole situation which has far more significance than the separate items. This theory is attributed to Gestalt and points up an important facet in learning, i.e., learning is more efficient when the learner is helped to relate individual parts to the whole system. The "carburator" is much more meaningful when it is related to the whole. "The Gestalt theory is an important concept".

E. Learn By Doing

One of the most significant principles of learning is one advocated by John Dewey which stipulates that one learns best by doing. This means that learning is an active, and not a passive process. In this case, the student must participate if he is to learn. The instructor could plan his lesson accordingly and enlist the student in the activity. This can be done by making use of the discussion method of instruction, problem solving situations, and practical exercices. Remember to give the student an opportunity to put to practice the substance of the material that you preach. It is only by doing that he can be expected to become proficient in the task.

F. Methods of Instruction

1. General

The Method of Instruction denotes an instructor's plan of attack or an approach to the training task. It is the vehicle utilized by the instructor to communicate his ideas to the students. Because all learning starts with stimulation of the senses, the instructor must reconcile the learning process with a method of instruction.

It is generally accepted in training, that the percentage of knowledge the individual gains through his various senses is as follows:

sight	75 %
hearing	13 %
touch	6 %
smell	3 %
taste	
other	3 %

However, it does not follow that the individual should learn Morse Code by smell or the fragrance of a flower by sight, but rather that the most appropriate of a multiple number of senses which relate to the activity should be used. To practice this technique, the instructor must select and apply the various methods of instruction which have the greatest appeal to the specific training situation. The most common methods of instruction are:

Lecture
Demonstration
Discussion
Performance (Practical Exercise)

2. The Lecture Method

The lecture method is a verbal method and is considered as a telling activity rather than a verbal barrage. It is the most abstract and non-participative, so it is the least effective method of learning for educationally handicapped students.

a. Some of the Advantages of the Lecture Method are:

1. Can be given to large groups
2. Can cover many ideas in a short time
3. Can be used to provide an introduction to complex operations
4. Provide motivation
5. Give direction to a particular learning activity
6. Give emphasis to a subject or review a lesson.

b. Limitations

1. Inhibits student participation
2. Can be monotonous because it appeals to only one sense
3. It is apt to center around the instructor instead of the student
4. Student may not hear or understand the instructor
5. The pace may be too fast.

c. Some Points to Watch

1. Be prepared
2. Outline your lesson on the chalkboard for the student to follow or have a handout.
3. Set a pace the students can follow, talk to the students, check your results by asking questions.

   Use imagery to appeal to the students's previous experience.
4. Itemize key points on the chalkboard
5. Use charts, graphs, slides and other appropriate aids.
6. Stay on the track and watch your timing
7. Provide the students with printed matter
8. Give the students an opportunity to apply your information. This can be done by permitting the students to summarize the lesson or by problem-solving practice
9. Keep in mind that covering the subject is not the same as teaching

3. The Demonstration Method

The demonstration method is a visual approach to the student's mind. It is the picture that is worth a thousand words and which appeals to the most dominant sense. The demonstration also requires telling, and in this respect, the preceding information on the lecture method applies to the demonstration.

The demonstration is generally used whenever the equipment is in limited supply, expensive, large, or presents a serious hazard.

The demonstration is ess ntially a show, can be very effective, especially if the student becomes a part of the act.

a. Some of the Advantages of the Demonstration are:

1. Gives substance to words
2. Easier for the students to see a point
3. Serves as a natural progression of ideas

4. Economical and can be presented to a large group (not recommended)
5. Time saver
6. Maintains interest by appealing to more than one sense
7. Student actually sees what he will be expected to do and know

b. Limitations

1. Proneness to be centered about the instructor
2. Students cannot always see what is going on
3. Appears to take more time than lecture; however, the student can gain a more precise understanding in a shorter time
4. Is ineffective if not followed immediately by student practice

c. Points to Watch

1. Dry-run all questionable demonstrations
2. Watch your step. There is a proneness to to become involved in the telling aspects and losing sight of the practical
3. The demonstrations should be simple, yet realistic. Avoid unrealistic situations which may lend to building false concepts
4. If the demonstration fails during the class period, don't give up but show the students how to solve the difficulty. Obviously you should not be guessing in this area, but must use a logical approach to the demonstration
5. Don't forget application. Show the students what you are doing, then ask them to do the same

4. The Discussion Method

The discussion method of instruction is a planned and controlled dialogue based on a series of questions and

answers. The discussion method is usually used with groups who have prior knowledge or experience with the subject matter and can individually and collectively contribute to the dialogue.

The discussion must be well planned to achieve training objectives. The planning involves preparation of specific questions which can be presented in a logical order to solve the problem at hand.

In the discussion method, the instructor acts as the discussion leader rather than the lecturer. It is his responsibility to prepare related materials, keep the discussion on track, mediate differences, assure participation, and summarize ideas. Obviously in this method he would be experienced in the subject and be able to contribute to the discussion.

Knowledge of the individuals' (students') background is significant in preparing for a discussion as it is in other methods of instruction.

a. Advantages

1. The discussion forms a pool of information for a composite understanding
2. Promotes analytical thinking and problem solving approach to learning
3. Students continuously participate

b. <u>Limitations</u>

1. Difficult to control and time
2. Need special groups for participation
3. Instructor must have more experience and background
4. Tendency to ramble and get off the track

c. Things to Watch For:

1. Establish an atmosphere for participation. Encourage statements and answers to questions. Don't condemn or criticize individuals presentation, praise individuals for their contributions
2. Don't be taken-in by false assumptions or conclusions

3. Prepare and plan leading questions
4. Always summarize a conference

5. The Performance Method

The performance method of instruction is a method of learning by doing. It is designed to develop specific skills and as such can be likened to an On the Job Training Program.

The performance method is not a student solo, but a situation in which he can apply the information he has heard and seen to a practical exercise under the guidance of an expert. As the student performs and becomes proficient, the instructor can gradually reduce and withdraw his assistance. In this method, under the guidance of the instructor, trial and error methods can be eliminated and only the good job habits need be developed.

a. Advantages

1. The student practices the actual task he will be required to perform on the job
2. The instructor can make an objective evaluation of the students' ability to do the job
3. The student can learn to work as a team member
4. Develops student confidence
5. Information is usually retained for longer periods of time.

b. Disadvantages

1. The instructor is limited to a smaller number of students than in other methods of instruction
2. Requires additional instruciton effort to evaluate performance
3. Usually requires a larger training area
4. Requires equipment and materials for each student or student team

G. Conclusions

It should be recognized that no one lesson (course subject) should be necessarily limited to one method of instruction. It can very well be that the instructor might employ all methods in a particular lesson. As an example, he can tell them, show them, discuss the material with them, and then have them apply the information in a job-like situation (performance method of instruction).

It should be remembered that a student learns best when he practices and learns under a realistic situation. This can be compared to learning to play golf. The practice on the actual golf course or a driving range is much more effective than the practice on the beach or on the lawn in the back yard. After all, the game is usually played on the golf course and that is where the particular skill is required.

Because of the need to be realistic in training, the performance method of instruction is usually the most effective. Keep in mind that before the student can be expected to perform he should receive verbal instruction and, when appropriate, a demonstration on "how to do it". As a consequence, the instructor can be expected to use more than one method to cover a particular lesson. Some final points to watch:

- Instruction should be student centered. Emphasize student learning by student doing
- Start with the students' present knowledge and develop further understanding in successive steps
- Student should be mentally active in every lesson
- Subject matter must be meaningful to students
- Feel personally responsible for the progress of each student.

MORE INFORMATION ON THE DEMONSTRATION METHOD

In instruction, a demonstration is showing and describing how operations or skills are performed, how something works, or how a job can be done.

The demonstration is important because it provides the trainee with a clear mental image of what the instructor is trying to get across, since seeing and hearing are more effective than just hearing. Although it is essentially visual, it can provide other sensory experiences such as taste, touch, or smell.

Demonstrations are used by the instructor for the following purposes:

1. To show and explain how a skill is performed
2. To show and explain the proper sequence of steps involved in doing a job (an example: to show a trainee how to set up a machine for a given operation)
3. To show and explain how a mathematical problem is solved (an example: to demonstrate how a formula is used and worked)
4. To illustrate that a scientific principle works (often) called the teacher experiment; in the teaching of gear ratios, for example, to devise a set-up to use actual gear trains to show that calculated gear ratios work)
5. To show the relationship of parts (an example: to disassemble and assemble a machine or tool to show how the parts work together)
6. To show and explain how a process takes place (substitute procedures and materials often used; an example: to make use of paper towels as a substitute for pulp in demonstrating how paper is made).

Demonstration of Skills

When a demonstration involves a mechanical skill, it is important that the instructor realize that the demonstration can only show the trainee how the skill is performed. Difficult mechanical (motor) skills must be practiced by the trainee. A person could watch a typist for a long period of time without learning to type. He could learn the proper procedures and techniques from the observation, but he would have to practice to acquire the skill.

Other important factors in teaching motor skills by means of the demonstration are:

1. Practice by the trainee should follow as soon as possible after the demonstration.

2. Proper and realistic instruction is necessary.

3 The student must know what he is expected to learn.

4. The trainee must know when he has learned it.

5. The skill must be performed correctly by the trainee. Work habits are hard to change.

6. Difficult skills are best learned with a series of short practice sessions rather than a few long ones.

Steps in a Good Demonstration

The following steps are essential for a good demonstration. The instructor should:

1. Make a written outline of the step-by-step procedures to be followed.

2. Gather together all of the materials needed and arrange them so that they are accessible.

3. Make a "dry run" - be sure that he can perform the demonstration effectively.

4. Tailor the demonstration to the time available, but do not cut it down to the point where it does not do the job.

5. Be sure that the trainee understands what he is expected to learn as a result of the demonstration.

6. Prepare a brief outline of the demonstration in the form of a simple chart, hand-out sheet, or blackboard outline to help the trainee follow the demonstration.

7. Explain new terms ahead of time and have the trainee see them in writing.

8. Make sure that all the trainees can see and hear (this is more important for a group demonstration than for individual instruction).

9. Protect students from hazards that might exist. Provide for protective devices such as goggles and clothing.

10. Relate the demonstration to things the trainee already know.

11. Stress important points.

12. Encourage appropriate questions.

13. Avoid interruptions.

14. Limit remarks to those essential to the performance of the demonstration.

15. Repeat all or part if necessary.

Form -A-

E. WRITING A LESSON PLAN

Lesson Title	Use this space to write a descriptive title for the lesson
Lesson Objectives	During the evaluation step, each student will show that he can: Use this space to list the lesson objectives. Include, if appropriate, the conditions under which the objective must be met and the level of performance required
Motivation	Use this space to describe what you will do to arouse interest in this lesson
Assignments	Use this space to indicate the nature of the assignments and/or other learning activities that will involve the students in participation step activities that are appropriate for <u>each</u> of the objectives listed above Be sure to include reading assignments
Evaluation	Use this space to describe the evaluation used to determine if <u>each</u> student has met the above lesson objectives. Attach copies of tests, rating scales, and other appropriate materials to this lesson plan
Materials	Use this space to list the materials, equipment, tools, supplies, instruments, teaching aids, instruction sheets, and other items needed for the lesson. Attach appropriate items to this lesson plan

FORM -A- Concrete Example

Lesson Title	How to clean and adjust spark plugs
Lesson Objectives	During the evaluation step, each student will show that he can 1. Describe the performance advantages of clean plugs 2. Name and describe the parts of a spark plug 3. Clean and gap plugs to proper engine specs 4. Test the cleaned and adjusted plug
Motivation	Run an engine with a set of dirty plugs and repeat the performance with a set of clean plugs Emphasize the differences in performance
Assignments	Read: Brown. The Modern Automotive Engine, pgs 11-36 1. Direct students to put information and procedures in course notebooks 2. Class drill on Objectives 1 and 2 3. Each student clean and gap and test at least four dirty plugs
Evaluation	1. Pencil and paper test on Objective 1 2. Identification test for Objective 2 3. Performance test for Objectives 3 and 4
Materials	John Brown's chart on the spark plug Two sets of plugs for the motivation step Plugs for the assignment and performance test Tools and supplies for the demonstration/tests

Form -B-

Use this column for notes that will guide your activities during the lesson	Use this column to outline the major points of the content of the lesson

Lesson Plan Form B is used to provide a format for a set of notes that can be used during the class-front part of the lesson.

The left-hand column is used to show the point, at which, actions, used to supplement the lesson presentation, take place. These include the distribution of materials, the use of the chalk board, the use of instructional materials; and the itemized list of materials for a demonstration.

The outline, in the right hand column, is more effective when each major point is started by an action word, as shown below.

(sample entries for this column)	(Sample entries for this column)
Write title on the chalkboard	Announce the title of the lesson
Refer to Form A	Explain the lesson objectives (You might want to list them here)
Pass out the assignment sheet	Explain the lesson assignment
Show the chart of the spark plug	Describe the parts of the spark plug 1. (You would list the 2. appropriate spark plug 3. parts here)
List the tools, materials and other items needed for the demonstration here	Demonstrate how the plug is cleaned 1. (List the step-by-step 2. procedure for the 3. demonstration here)
Include solutions to sample problems here	Show how to calculate board feet 1. (List the steps here) 2.

FORM - B - Concrete Example

Use this column for notes that will guide your activities during the lesson	Use this column to outline the major points of the content of the lesson
Write the lesson title on the chalkboard	Announce the lesson title "How to clean and adjust spark plugs"
Refer to list in Form A	Explain the lesson objectives
One set of dirty plugs in the engine. One set of clean plugs	Demonstrate the performance differences of dirty and clean plugs on a test engine
(A written assignment sheet would be a good idea)	Explain the lesson assignments
Refer to Form A	
Refer students to textbook	Explain the performance advantages of clean plugs 1. Mileage 2. Performance 3. Wear
Show spark plug chart	Explain the construction of a spark plug (Without the chart you would list the appropriate information here)
	Conduct class drill on the above topics (With some classes you might want to check the notebooks at this point)
Materials for the demonstration Shop manual, dirty plugs Test Unit, Gauge	Demonstrate how to clean and gap plugs 1. (List the appropriate step-by-step procedure here)
Handout practice plug sets	Review the shop assignments Announce the details for the tests

Form -A-

Lesson Title	
Lesson Objectives	During the evaluation step, each student will show that he can:
Motivation	
Assignment	
Evaluation	
Materials	

Form -B-

Use this column for notes that will guide your activities during the lesson	Use this column to outline the major points of the content of the lesson.

Worksheet for Writing Performance-Type Lesson Objectives

Each student will be able to: (A description of what is to be accomplished)

Conditions under which he is expected to perform: (how it will be done)

Levels of accuracy or levels of performance required: (how much how well)

F. How to Begin a Project/Theme in a Workshop

As the school year progresses, so too does the complexity of the lessons that we must teach. More and more of these lessons and the subsequent tasks that the students are to perform take up much more than one or two four-hour blocks of time. This demands a project or series of exercises in which the student is expected to perform certain new tasks that, when pieced together, form a finished product which combines all of his newly acquired skills. This successful transfer of knowledge and skill can be demonstrated only by the student's ability to complete a project within given tolerances determined beforehand by the teacher.

It is necessary at the outset of such a project to give a "Lancement d'Exercise." This is not a step by step procedure given to the students for every phase of the project, but rather an "overview" of what you as the teacher will expect them to learn.

This overview is a generalized explanation and/or demonstration whose purpose is, for the most part, motivational. The specifics of the different tasks that the student must master can come later on, and be broken down into single task components, to be taught as the project progresses. The use of the overview, then, is to let the students see beforehand exactly what the fruits of their labor will be. Handled with proper execution, the teacher can use the overwiew as a motivational introduction to a complex theme, the idea being that he will procede from general to specific information as the lesson progresses.

In preparing this overview, and the specific lessons that will follow it, there are several things that the teacher can do to facilitate the transfer of knowledge from himself to his students:

Prepare, beforehand, the following:

1. The choice of the project and the objectives of the exercise.

2. Any drawings, designs, and visual aids, making sure that they are concise, logical, and understandable.

3. If a project is to be made, prepare a finished product before giving the lesson, to use for demonstration purposes, and as a guideline for step-by-step procedures. Don't forget that if the students can see before them what they will be expected to accomplish, then they will be much more willing to learn the separate tasks that will be required in order to produce a finished product.

If it is impossible to prepare a model, then it is advisable to at least provide the students with a schematic of the finished project. When this method is used, the teacher should be prepared to make the project in parallel with the students, performing the tasks right along with them from beginning to end. This is very important in demonstrating the proper method to perform each particular task.

4. Establish the existence of all necessary tools, machines, and materials. Have everything in working order and ready to be distributed, so that there will be no question as to where each student or group of students is to be positioned when the work begins.

5. Go through a dry run, if possible, of any demonstrations that are to be done:

6. Prepare the overview as an introduction to the subject matter that has already been laid out in steps one through five. Remember that this is only an introduction to the theme, and should thus be used to give the students a general understanding of what is to be learned.

Now, let's apply this process to a concrete example:

A teacher of metal construction finds that among his responsibilities for a certain class the official program demands that the student learn cutting, filing, riveting, and the bending of sheet metal. Rather than teach these processes in a haphazard (and thus boring) sequence, he decides to plan out a project that will incorporate all the Ministry's requirements into a single finished product that will reflect the student's understanding and working ability in the above mentioned subjects. This project need not be elaborate, but it must be utilitarian. Let's call the project a small tool box, with a closing top held together by riveted hinges.

Before he even starts the overview, the teacher should show the tool box to the students. Let them see it and handle it. Most important of all, tell them that they themselves will be constructing that very same tool box. This gives the students a much greater incentive to learn separate tasks, for they can see that there will be a concrete and imaginative result at the end of the exercise. Learning thus takes on new dimensions for the student, as he realizes that he will not be performing simple routine tasks that lead nowhere.

Now that the choice of the project and the objectives of it have been determined, and the plans for the project have been laid out, the teacher can go ahead and prepare the materials needed. The best way to do this is to make an actual working model. This will give the teacher an exact knowledge of the step-by-step procedures, any envisioned difficulties, and an idea of exactly where the students should be, what they should be doing, and, in short, what they should be learning.

Having the finished project to show the students during the overview can also serve as an effective visual aid. It is a three-dimensional piece of substance which can easily be related to by the students. In the overview the teacher could then vividly demonstrate what processes will be required, and what tools and special skills will need to be learned. He can in this way introduce in a general and functional way the various machines (bender, metal sheers) and tools (rivet punches, saws, files) that will be required. As the project progresses, he can go into more and more detail on each individual process, so that the student goes from a general idea of what he needs to know to a specific and detailed knowledge and application of what he needs to do.

G. Critiquing a Technical Lesson

In retrospect, there is only one major criteria for determining whether or not your lesson has been successful, that being the subsequent performance of a task, or a set of tasks, by your students. But the parameters of the lesson - the methods you use to transfer information and skills - vary greatly, according to personal teaching style, setting, availability of aids and materials, etc. Given this set of innumerable and ever-changing variables, there are, nonetheless, several concrete points on which a successful lesson hinges, and upon which you can effectively critique your own lesson.

Here are two different critique lists that break down the various components of a technical lesson. The first is done in a format that permits a trained observer to critique another person's lesson, and is the one that will be used to evaluate your lessons during the practise teaching phase of training. The second, although basically similar in format to the list, is more personalized, and can be used by the teacher himself in critiquing his own lessons during the school year:

I. PRACTICE LESSON EVALUATION SHEET

Parameters:

1. Lenght of time: _____
2. Type of Lesson_____
3. Evaluator:_____

A. Preparation:

1. Lesson Plan

   a. Overall plan
   _____ very good _____good _____adequate_____barely adequate
   _____ bad

   Comments:_____

   b. Lesson sequence
   _____ Logic excellent_____logical _____adequate
   _____ barely adequate _____ bad

   Comments:_____

   c. Lesson content:
   _____well defined _____defined _____adequate
   _____barely adequate _____bad

   Comments:_____

2. Audio visual, other aids

   a. choice of aid(s)
   _____very good _____good _____adequate _____barely adequate
   _____bad

   Comments:_____

   b. Efficiency of aids
   _____very good _____good _____adequate _____barely adequate
   _____bad

   Comments:_____

   c. Preparation of Aids
   _____creative excellent _____good _____adequate
   _____barely adequate _____bad

   Comments:_____

3. Learning environment

a. Location or setting
_____innovated very good _____good _____adequate
_____barely adequate _____bad

Comments:_____

b. Student comfort
_____very good _____good _____adequate
_____barely adequate _____bad

Comments:_____

4. Materials and supplies
_____very good _____good _____adequate_____barely adequate
_____bad

B. Motivation

1. Class awareness of lesson subject and objectives
_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

2. Class understands and reacts to "why they should learn lesson"
_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

3. Class attention:
_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

C. Communication

1. Effective teaching techniques

a. Variety of techniques
_____wide variety _____good _____adequate _____barely adequate _____bad

Comments:_____

b. multi-sensory techniques
_____well used _____used _____adequate _____barely adequate _____bad

Comments:_____

c. Student involvement techniques
_____widely used _____used _____adequate _____barely adequate _____bad

Comments:_____

2. Abstraction level control
_____outstanding _____good _____adequate _____barely adequate _____bad

Comments:_____

3. Audio-verbal communication voice, gesticulation, speed, clarity, vocabulary, inflection, etc.
_____very good _____adequate _____not adequate ____bad

Comments:_____

D. <u>Participation</u>

1. Student involvement - questions
_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

2. Student application of lesson content
_____immediate _____near future _____shortly remote
_____remote _____never

Comments:_____

3. Overall relevancy of student participation
_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

E. Evaluation

1. Evaluation timing - immediate and remote
_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

2. Evaluation validity
_____highly valid _____valid _____adequate _____barely adequate _____bad

Comments:_____

3. Evaluation contribution to learning
_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

F. Overall lesson evaluation

_____very good _____good _____adequate _____barely adequate _____bad

Comments:_____

2. PERSONAL LESSON EVALUATION SHEET

1. Lesson Sequence

- what is logical?
- did each step "flow" into the next?
- did you have to backtrack?

2. Lesson Content

- was it too much?
- was it too little,
- was it relevant, according to the program and to the needs of the student,
- were the objectives clear to you and your students?

3. Audio-visual and Other Aids

- were they efficient?
- were they effective,
- were they realistic enough from the students' viewpoint?

4. Learning Environment

- given the circumstances, was the location or setting of the lesson adequate and well prepared?
- were all needed materials close at hand, and in working order?

was the students' work reinforced?

5. Motivation

- were the students aware of the subject of the lesson?
- were they properly stimulated to learn the lesson?
- did you hold their attention throughout the lesson, though a diversity of activities?

6. Communication

- was the abstraction level held to a minimum?
- did you make yourself clearly understood, both verbally and with gesticulations?

7. Methods and Techniques

- were they appropriate for the subject matter involved?
- was the skill adequately demonstrated, both by you and the students?

8. Participation - Evaluation

- was student application of the lesson immediate enough?
- did the students do the work correctly, and in the desired sequence?
- were your parameters of evaluation (allowable tolerances) valid? Too severe? Too lenient?

Answering these questions after you have given your lesson can be a definite aid in determining your efficiency for that given lesson, and can help you find exactly where your weak points and strong points lie.

III. TUNISIA SPECIFIC:

JOB INFORMATION

TUNISIA - SPECIFIC JOB INFORMATION

A. Introduction

This part of the manual is the "catch-all", and includes all job specific information that you will need to know and understand in order to successfully start your first year as a PCV Vocational Education Teacher. The "technical" phase of your summer training program will concern itself with the subjects included in this chapter: familiarization with tools and methods in Tunisia, supply and communication problems in the school and in town, the "system" as it is and how you might integrate yourself into it, and all the other nitty-gritty information. This chapter, and the technical program itself should help you tie together all the loose ends you might see, and put everything else into a realistic balance.

As difficult and complex as the following information may seem, remember that all new experiences are this way at first. Also, you will always have at least one colleague or friend at the school who will be able to assist you in completing the various administrative functions required of you. It might seem an impossible task at first, but Voc. Ed. Volunteers find that after a few months experience on the job, everything starts falling into place.

B. Your Job

1. The PCV in the School and the Country

First and foremost, you are an employee of the Ministry of Education.

Second, you are an individual, an American representing the Peace Corps who is living and working in Tunisia with Tunisians: as a consequence, you must look to Tunisia and Tunisians to fill your living and working needs.

You are skilled in your field, and you will be an adequately trained teacher by the end of the stage. You probably have many fresh and different ideas, but they are not necessarily better when applied to the needs, ways and wants of Tunisia. In light of this, you should remember that the Ministry of Education has not asked you or Peace Corps to overhaul its system, but to use it as effectively as possible to accomplish its goals. It can be safely said that the Ministry has engaged Peace Corps to fill these

teaching positions, not because of P.C. ability to plan, organize, and implement revolutionary changes, but rather for its ability to supply energetic, motivated, innovative and well-trained teachers who will use and augment existing systems and resources to their maximum capacity.

Peace Corps has three main goals in Tunisia:

1. To supply technical assistance (i.e. to provide the Ministry of Education with skilled technical teachers).

2. To provide Americans with the opportunity to live and work with and to understand Tunisians.

3. To provide Tunisians with the opportunity to live and work with and to understand Americans.

Because of these above goals your role in the organization should be one of "in-put", not "take-out", and you should abide by organizational policies and expactations.

One of the Peace Corps responsibilities as an organization is to prepare you as well as possible to perform your job as a capable individual and to help you understand and appreciate the differences between life in Tunisia and America. Another responsibility is to work with host country officials, to assure that your job is well defined, obtainable, and valuable to Tunisia.

2. Employee of the Ministry of Education

Your job as an employee of the Ministry of National Education will be to teach your specialty in a shop situation. The emphasis of the classes is on "hands on" practical work. The curriculum is determined by the ministry, and is quite specific in its goals. Whether you teach the full spectrum of your specialty, or are limited to one or two areas will be determined by the school administration and/or your Tunisian colleagues. Daily lesson content (how and when you will teach the various areas of the official program) will be determined by you.

"Travaux Pratiques" classes are held in a large one room shop, usually occupied concurrently by two to four separate classes of ten to twenty students each, oftentimes

including all grade levels. Classes are held in four or five hours time blocks, with a ten minute break after two hours. The space, equipment and materials must be shared by all.

Although it is extremely doubtful, especially in your first year of service, you may also be required to teach "Technologie generale" classes in theoretical subjects, directly or indirectly related to your specialty. These are conventional lecture classes given in the French format. There are about forty students and one teacher in a conventional classroom with a blackboard. The classes last from one to two hours and are taught once a week. Once again, due to the high level of proficiency in French required to teach these classes, it is very doubtful that the administration will assign you to a "Technologie Generale" class.

Duties - or, what is expected of you in the way of visible performance as a P.C. Voc. Ed. Teacher in Tunisian education.

In approximate chronological order:

Sign In

The school year starts officially around the third week in September. It is essential that you show up at your school (well dressed, of course) about one week before the start of school. The administration will know nothing about you, except for your name and the fact that the Ministry has assigned a new PCV to their school. Quite often the school has never had a PCV, and is therefore unaware of what and who you are. So showing up one week early will serve two purposes: First, it will expose you to the administration, and, vice versa. Make every effort possible to meet your "Chef des Travaux", who will be your immediate supervisor, and also the Director, if possible. Both school and administration will be in a certain amount of bedlam, preparing for the beginning of the new school year. Do not be discouraged if you are treated as just another new teacher: these people have a lot to do, and until you establish your credibility you will be just another of many new faces. Ask your Chef des Travaux for your schedule. It is possible that this may not be ready at the time, but it is worth the effort, and can serve as a jumping off point for creating a relationship with this man. The second purpose of this early visit will be to familiarize yourself with the

school proper, and inform you as to any meetings or requirements that will be required of you before the first day of school.

- Attend

Attend the first of the year teachers' meeting, called the "Reunion d'Information". When you go to meet your Chef des Travaux for the first time, ask him for the date and time of this meeting. What it amounts to is a pep talk and general procedures explanation given by the director to all teachers, both old and new. It is generally conducted the day before school begins, and quite often is delivered in Arabic. Don't let this shake you! The main point of this reunion for you as a volunteer is the initial contact that it will give you with your colleagues. Search out the teachers of your own specialty, and sit with them. They will help translate the director's speech into French for you, and this can be an excellent jumping off point for relations with your colleagues.

- Show up for Class

... On time! You are required to show up for each and every scheduled session found on your schedule, which is called the "Emploi de Temps". In the first week or so, it is not uncommon to find no students when you arrive for class, due to administrative foul-ups. If this happens, make your appearance and stay put for at least twenty minutes. If no student or other teachers show up, take yourself and the copy of your schedule to the Chef des Travaux, and explain the situation to him.

- Gather, Guard, and Return

... Materials and tools. Other than basic machinery, almost all materials and hand tools must be procured by you from the "Magasinier". This man is the supply officer for all materials needed in all the shops. You must go to the "magasin", or storeroom, and make a written request to the magasinier for everything you need. Make a thorough list as soon as possible at the beginning of the year (usually in conjunction with your colleagues in the shop). It should include, as much as possible, all your prospective needs for the entire year, according to the classes you will be teaching. Be realistic, and don't "pad" the list. Getting a lot out of a little is a real virtue

in Tunisia. You won't get everything you want at once, but requests should be followed up accurately and repeatedly.

You are responsible to return all tools and non-consumable material to the Magasinier at the end of the year. He will, of course, have a list of everything that you have signed out from the storeroom.

A very strong point should be made here about the "strange" but all too often common disappearance of tools. Just as in the States, there are always people - students and teachers alike - who have sticky fingers. It is up to you to control the tools and materials that have been delegated to you. Make up a system of tool control, and follow it strictly right from the beginning. Some suggestions for this control are:

1) Mark all personal tools with paint or a stamp.

2) Appoint one student each session to be responsible for dispensing tools to the students in your group. At the end of a class session, go over your list of tools, and make sure everything is there. During class time have students sign for every tool they take.

3) Lock your tools away in a cabinet after each class session.

4) Report immediately any tools that are missing.

5) Make any student or teacher that is not in your group sign for a desired tool. It is a nice idea to share, even necessary at times, but keep a tight control over who has what, and where.

Cover Material

... Designated in the Ministry's official program of secondary vocational education for your specialty. The program does not have to follow in the order in which it is presented, but lessons must absolutely clearly show that they deal with designated material. Classes need to be conducted with full intention of completing the Program for a given year.

You must keep records of the class content for each class (general description), and of class attendance for each class. This information will be written into two

separate books supplied by the administration, and carried from class to class by one of the students in the group who has the auspicious title of "Chef de classe". The class content book is called the "Cahier de Texte", and the class attendance book is called the "Registre d'Appel". You should keep your own personal record of this information as well and include it in your personal grade book.

An important note on attendance: be sure that each student who is late for class or who was absent for the previous session has a "billet d'entrer", or admission slip, that is given to him by the administration. He must have this slip before he can return to class. Record the same information in your personal attendance book; then leave the slip in the official attendance register for the administration. You cannot authorize a student's absence from your class.

Quizzes and exams

You must give enough quizzes (usually written) and major exams (practical in nature) to meet the minimum requirements of the Ministry of Education. In shop classes, this amounts to at least two "tests" or quizzes per month, and approximately one major practical exam, or "devoir" per month, depending on when you finish up with a major theme or project. "Tests" last usually from 20 to 40 minutes each, and "devoirs" can last from one to three hours.

You must record semestrial and annual grades along with comments on all individual students' performance in your group into various administrative books and forms.

If you have a terminal class (students in the last year of their program), you may be expected to help in developing and administering semestrial and annual practical exams.

Testing, grading, and another of your duties - controlling discipline - will be covered later on in this chapter.

C. The Official Program

You will notice, as you read through the following translations (direct from French to English), that the Ministry of Education is extremely precise in its requirements pertaining to lesson content for each separate year. But they do not tell you how to teach the subjects. How you teach these subjects - your personal style and innovativeness - is where you can make a difference within the system, and derive personal satisfaction.

The following is a list of some observations that have been made through the years by voc. ed. volunteers concerning the official program, and the use thereof. It might be a good idea to scrutinize your own program, and arrive at some of your own conclusions before examining this list.

- The Program, as viewed by the Ministry, is a guide and not a textbook.
- It is designed to give uniformity to all specialties throughout the country.
- Some advantages, for us are:
  1. it gives us an outline of material to follow
  2. it gives an idea of the ultimate destination and final objectives for our students.
- Some limitations of the Program, and subsequent methodological problems that it creates are:
  1. lack of materials
  2. leads to memorization as a method of learning. Our students come to us already structured and stylized by this method.
  3. goals are often too high: the Program tries to cover too much territory
  4. lack of coordination between theory and practical.
- The most profound problem with the program lies in the fact that free and inquisitive thinking on the part of the students is not a built-in factor; the Program is, in fact, an inhibitor that produces "monkey see, monkey do" technicians.

It is in this light that we can be of great help to our students. Through motivation and innovative methodology, we can help to reverse this pattern of strict memorization, and get our students to start thinking and acting on their own, with a systematic and inquisitive way of looking at their specialty.

OFFICIAL PROGRAM FOR:

METALS

SCHEDULE

SUBJECT	1st Year	2nd Year	3rd Year
Industrial Design	4	4	4
General Technology	1	2	2
Drawing	2	2	1
Practical Work	8	12	19
TOTAL	15 h	20 h	26 h

FABRICATION ANALYSIS

Specialty: METAL WORKING

Directives: A preliminary technical analysis is indispensable for the execution of all operations and work projects.

The role of this analysis is to determine the following information:

a) The principal and technical functions of the operation or the object (purpose) to be realized.

b) The design of the project material and necessary parts.

c) The measurement data = dimensions and tolerances.

d) The methods of fabrication, according to machine tools.

e) The set of procedures of fabrication, including:

- The design of true dimensions
- The output
- The techniques for working
- The system of assembly
- The bonding if necessary
- The control and the method of protection.

PRACTICAL WORK AND TECHNOLOGY

Specialty: METAL WORK 1st Year

SUBJECT	OBJECTIVE	DIFFICULTY	EXPERIENCES
1) Hold contact with the students	Technology	Make point of Technology	
Measuring	Mesure Length Tools of Measure	Rules Sides of 1 and 1/10 mm Sliding caliper 1/20 mm	Practice exercises for lecturing 1/10, and 1/20 On material for instruction
Ferrous Metals	Classification of steels	Materials used in metal construction,	Properties of metals
		Hardening Tempering. Annealing	Hardening and tempering a tool Anneal hammer hardened metal

TECHNOLOGY		Observations
Execute	General	
	Technology Definition Objective	Demonstrate the interest of Technology
Train to read	Units of measure used for metal work Precautions to take in their use	Use of rule and sliding caliper
<u>Properties of Metals</u> Malleability Fusibility Weldibility Ductility Hardness Elasticity Tenacity Conductibility	<u>The Steels</u> Use of steels in metal work	Simple experiments
Practicals of hardening	<u>Heat Treatments</u> hardening - definition - objective	Comparision of a hardened tool and an unhardened tool

PRACTICAL WORK AND TECHNOLOGY

Specialty: 1st Year

METAL WORKING

SUBJECT	OBJECTIVE	DIFFICULTY	EXPERIENCES
Basic Techniques	Theoretical research Draw a perpendicular - a parallel - an angle - a circumference and polygons	Small items of thin sheet metal	Applications of different drawings
Oxy-acetylene welding	Lines of fusion without welding rod	-starting welding -regulating flame -holding torch & welding rod	Welding thin sheet metal
Electric Arc Welding	Welding - one narrow pass	starting arc welding regulating welder holding the electrode holder holding welding mask	welding sheet metal of average thickness
	Techniques of working metal shears	Shearing straight line. -circular line mechanical shears	Tools for cutting thin metal

cont'd

continued

1st Year

SUBJECT	OBJECTIVE	DIFFICULTY	EXPERIENCES
Basic Techniques	Metal punch	Simple Punch	Sheet metal and forms
	Filing	Positioning metal for filing Holding file Movements of filing	Straight Filing Adjustment

TECHNOLOGY		Observations
Execute	General	
Drawing tools Proper use of each tool	The Drawing - Generalities - Objectives	Connection with technical drawing
Starting Regulating Stopping	<u>Le Soudage OA</u> Oxy-Acetylene Welding Description of an OA Welder	Safety precautions to take during the operation
Starting an arc Welder Regulating amperage Placing the piece Striking an arc	Description of the necessary welding equipment	Safety precautions with the electric welder (remember the weldability of metals)
Description of a lever-operated shear and a motor-operated shear	<u>Shearing</u> Principles of shearing How a shear functions	Safety precautions to take during use
Mounting of a punch and die plate Method of operating	<u>Metal punching</u> Principles of metal punching Description of the metal punch	Important considerations of metal punching
Use of different types of files	<u>Filing</u> Objectives of filing - description of a file (tooth, shape and length)	Instruct the students on how to choose a file Reasons for using a file.

PRACTICAL WORK AND TECHNOLOGY

Specialty: METAL WORKING 1st Year

SUBJECT	OBJECTIVE	DIFFICULTY	EXPERIENCES
Basic Techniques	Drilling	Drilling of holes	Applications on flat iron Square iron Angle iron
	Interior threading (tapping)	Size of drill bit	Finishing tapping Drilling holes in soft iron for threading
	Exterior threading	Preparing the piece positioning	Study the diameters of bars 6 mm - 10 mm
	Forming metal joints	Simple cuts to join different forms of metal	Application with "T" bar and angle iron
	Techniques of forming Dressing	Truing by striking Truing an overhanging	Working with simple forms

continued

PRACTICAL WORK AND TECHNOLOGY

Specialty: METAL WORKING — 1st Year

Subject	Objective	Difficulty	Experiences
Basic Techniques (cont'd)	Techniques of conforming (continuation) Bending	Calculations of developments	Thickness of sheet-metal ≤ 2
	Tube bending	Finding the neutral point Calculation of the development of closed and open tube bending	Flat bar iron of average and thin thickness
	Techniques of assembly	- with bolts - with screws	Choice of type of joining according to the thickness, the nature of the material, and the technical object
	Permanent assembly	- with rivets - with welding - (O.A., arc, and resistance welding	

PRACTICAL WORK AND TECHNOLOGY

2nd Year

SUBJECTS	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY		OBSERVATIONS
				Execution	General	
1) Welding and Procedures of Welding	Oxy-acetylene welding Study of materials and the gasses used Operations of welding Weldable metals Applications in industry	welding edge to edge Welding interior and exterior angles	Demonstrate regulation welding flame Demonstrate welding with proper flame Welding without tack welding Welding with tack weld.	Oxy-acetylene Installing a welding post Application Choice of welding tips and proper rod Regulating flame Turning off welder Methods of welding Preparation of edges.	Classification of welders Autogenous welding, heterogeneous welding Principles of using gas welder The Oxygen Methods of production and delivery to shop Volume and pressure of tanks Precautions for handling The Acetylene Operation of generators. Principles-- How is the acetylene contained in bottles. (Contents beside acetylene) Method of delivery. The regulators for oxygen and acetylene.	Sheet metal 12 mm and 10 mm thick

2nd Year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY		OBSERVATIONS
				Execution	General	
2) Welding hetero-generous		Brazing iron	Demonstrate welding on properly and an improperly prepared piece of metal	Welding iron - chosing the welding tip - chosing the brazing rod and flux - proper temperature of flame - methods	Welding hetero-generous -general methods of braze welding -welding torch Roles of flux Brazing with and without welding torch	Show the students the difference between autogene heterogenous welding
3) Oxy-acetylene cutting	Gas cutting (manual)	Cutting straight and curved lines. -with guide -cutting sheet-metal -cutting chamfer	Cutting with bad and good flame Conclusions of demonstration	Oxy-acetylene Cutting - materials used - principles of operation - choice of tips - regulating gas pressure - cutting by hand - methods of operation - Using guides for cutting		The pieces cut must be used if possible for arc welding practical work

2nd Year CM

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY		OBSERVATIONS
				Execution	General	
4) Grinding	Deburring Grinding Sharpening	Deburring pieces cut by oxy-acetylene cutting Sharpening and squaring Sharpening tools	Show how material becomes hot when grinding Show wear of grinding wheel	<u>Grinding</u> Definition of grinding Description and use of grinder		- holding thepiece - Cleaning piece - precautions - sharpen cold chisel - sharpen wood chisel - sharpen center punch - sharpen scribe
5) Arc Welding	Tack welding and welding straight edges -without preparation and with chamfer -welding interior and exterior angles	Welding different pieces	Demonstration with high and low amperages Weld a piece and break for inspection	<u>Arc Welding</u> Chosing electrodes -regulating amperages -preparing edges for welding	-principles of arc welding -types of arc welding -electrodes -description of arc welder -roles of electrode covering -comparison of arc and gas welding	Welding sheet-metal thick and thin. Demonstrate penetration and deformation of object welded during and after welding Solutions.

2nd Year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY		OBSERVATIONS
				Execution	General	
Working with all shapes (forms) of metal	Dressing Truing Assembling	Mortising metals of different shapes Cutting angles on different shapes Tenon and mortise Assembly with bolts With gussets and squares	Truing a bar with a hook spanner Demonstrate and simplify the forms used for least experience Study the different ways of assembly Critique and conclusions.	- different deformations - methods of dressing and truing shapes - different methods of making mortices - Mortice and tenon assembling	Obtaining shapes with sheet-metal -laminating hot and cold stretching hot and cold - classification of shapes and sheet-metal - normal dimensions - commercial designations	Simplify lesson Look for weights of sheet-metals and shapes
Working with shapes	Bending	Calculate the development of bending - starting - bending to a form on a machine	Bending angle iron cold - demonstrate forces against bending	Study center of gravity of different shapes - bending - methods of bending - study bending machines for bending angle iron, "T" bar, channel iron, flat and square bar.		

SUBJECT	OBJECTIVE	DIFFICULTIES	EXPERIENCES	TECHNOLOGY Execution	TECHNOLOGY General	OBSERVATIONS
Working with pipe (tube)	- Bending - Assembling - Welding - Brazing - Weld brazing	Work drawing of development - Sawing - mortising for joinery - Assembling with couplings - Bending tubes hot and cold	Look at the advantages and disadvantages of different methods of cutting Demonstrate bending tube (gas and metal worker tube) with hydraulic tube bending machine	Principles of cold bending Necessary precautions Method of bending cold tube with machine (roller and follower) Filling tube Principles Different types of tube bending machines	THE TUBES Different types of tube Different methods to use Filing tubes Commercial designations Characteristics Dimensions The tube bending machines.	Discuss information about tube bending machines, for bending round tube, square tube, rectangular tube. Bending with sand (screen and dry)

2nd Year

SUBJECT	OBJECTIVE	DIFFICULTIES	EXPERIENCES	TECHNOLOGY		OBSERVATIONS
				Execution	General	
The Forge	Lighting the forge	Forging tools, and repairing tools Bending and twisting simple shapes Twisting Cramping and sealing Mechanism of rotation	Show the different heat temperatures for hard steel (colors) also the degree of malleability.	Description of the frame of forge. - hearth - ventilation - exhaust - accessories - lighting and conduct of the fire in the forge - zones of combustion - temperature of the forge - forging tools - operations of the forge		Study the blows used in forging Forge a chisel

PRACTICAL WORK

Specialty: METAL WORK

3rd Year

SUBJECT	OBJECTIVE	DIFFICULTIES	EXPERIENCES	TECHNOLOGY	OBSERVATIONS
1) Welding Oxy-Acetylene Resistance 2) ARC	Arc welding different positions: horizontal vertical overhead	Stress the aspects of penetration and deformation while welding		<u>The parameters of welding</u> preparation of joints choice of methods and the electrodes regulating the amperage positioning the joint for welding cost of welding	Study the function and industrial work of welding
	welding cast iron with brazing	preparation of work preheating welding and condition of cooling	Demonstrate welding a test piece of cast iron	<u>Weld-brazing of cast iron</u> Preparation of the joint, and temperature of the preheat necessary Temperature of wetting method of operation welding rod allowys types of flux	Applications for work and repair

3rd Year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY	OBSERVATIONS
	Resistance welding	welding steels and electric current used	demonstrate spot welding (show button of spot weld	<u>Spot welding</u> Principals of operation Sequence of welding Preparation of joints Machines used.	Application for different work
3) Oxy-acetylene cutting mechanically	cutting profiles on sheet-metal	cutting with mechanical guide	advantages of cutting with oxy-acetylene mechanically in manufacturing	oxy-acetylene mechanical cutting methods advantages and disadvantages	chose an exercise from real work compare the techniques of oxy-acetylene cutting.
4) Grinding	Wheel for grinding wheel for sharpening	Trimming the part for welding sharpening tools used for cutting sharpening drill bits of large and small diameter	the function of chamfer on different thicknesses of metal	<u>The grinder</u> classification froms and characteristics of grinder wheel choice of wheel following use write an order for changing a grinder wheel	Give directions for changing a worn out grind wheel (practical application) dress a grind wheel.

3rd Year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY	OBSERVATIONS
5) Metal Projects	Fixed grills and projects	Different grills Grills of tube Heavy grills Decorative elements Iron for each type of grill		Grilles classification form profiles iron used use of decorative elements	using modules identical pieces for a given square
	6) Doors	plain doors glass doors sliding doors pivoting doors rolling doors		representative codes of a door function different kinds of iron work	study use in real work
	7) Metal Curtains	extendable grills corrugated sheet-metal curtains curtains of narrow pieces of sheet-metal connected by hooks articulating grills		Metal curtains function fastening to large buildings movements of parts guides fastening	study application in real work

3rd Year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY	OBSERVATIONS
8) Metal Furniture	Application when using sheet metal	study and research: bending folding ribbing finishing assembling - permanent - demountable		revise the understanding acquired following the construction of the project <u>Protection of work</u> pickling brushing sanding metal plating galvanizing	Apply on real work in shop
9) Fittings of Rotation	connection and rotation	play or slack needed alignment of hinges		fittings of rotation hinges hook and hinges collar and pivot	

113

3rd Year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY	OBSERVATIONS
10) Parts of Locks	locks and locking devices	study different locks		<u>Parts of the locks</u> locks 1) general study 2) principles 3) parts 4) movements <u>locking devises</u> locking bolt sliding lock catches	size and use of ordinary keys
11) Objects of Metal	straight stairs	analysis techniques determine the elements of large work		<u>straight stairs</u> function form rules and construction types of stairs	survey sizes study and make estimates apply on real work build in yard.
	ramps	make a ramp fasten the ramp with cement		<u>Ramp</u> function components standardization and rules different types of ramps	

3rd Year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY	OBSERVATIONS
Metal Projects	Balconnies	make a balcony connecting the balcony to large work (building)		<u>Balconnies</u> function components standardization and rules of construction different types of balconnies.	
	Porch-roofs and awnings	draw an awning		<u>Porches and awnings</u> function terminology rules of construction connecting with large buildings	
Metal Frame-work	roof of building trusses posts			<u>Metal frameworks</u> terminology of a metal building - roofs - role - components - <u>posts</u> - role - conception of posts - anchoring of posts - <u>trusses</u> - different trusses - terminology - ridge pool - beams	Actual work if possible

3rd year

SUBJECT	OBJECTIVES	DIFFICULTIES	EXPERIENCES	TECHNOLOGY	OBSERVATIONS
Handling Leverages	Principles of leverage apparatuses	understanding and using apparatuses of leverage		<u>Handling</u> methods of lifting and moving a load different apparatuses of leverage	Using apparatuses of leverage found in shop

3rd Year

No.	OBJECTIVES	OBSERVATIONS
7	<u>Metal Frameworks</u> Trusses Porches Posts Flooring	Roles and components Study the mountings
8	<u>Elements of Locks</u> Latches Bolts Locks	Function Hand lock
9	<u>Stairs and Ramps</u> Overall design Details of assembly Study the form	Aesthetics Give reason for slope
Note: The order is not important, it can be given by questions each time necessary		

Specialty: WOODWORKING 1st Year

No.	Objectives Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
1	Use of the tools for measuring and layout	drawing different angles 45°, 30°, 90° and parallel lines	Reglet (metal 1/2 meter ruler) hard pencil, 90° square, compass bave square, 45° square and scribing gauge	Methods of using the reglet and layout tools finding the demonsions of angles	Planned piece - figuring the number of pieces in a plank - how to hold the square - precision of the layout Using reference marks How to hold and adjust the scribing gauge Use of the compass will be limited to constructing and reinforcing the dimensions Go over a blueprint showing the different tools after layout measuring nomenclature to be learned by the students

OFFICIAL PROGRAM FOR:

WOODWORKING

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
2.	use of the cross-out saw	cross-grain sawing	cross-cut saw clamping tools "martyr" (piece placed underneath to receive abuse instead of table)	tension of the blade (remember the "old World"type cross-out saw is still heavily used (frame saw) direction of the teeth	On the use of the cross out saw - how to hold the saw position in relation to the pencil mark guiding the blade precautions to take to avoid sawing on the line or on the wrong side of the line.
3.	Use of the wood chisel	different types diagonal and cross-grain	chisel 10 or 20 mm mallet	The sense of approaching the wood, i.e. the difference of working with or against the fibers precautions for avoiding breakages how to avoid getting the sawstuck in the wood (poor cross cutting)	Proper way to hold the chisel (digging or finishing) attention to the depth precautions against splitting the wood "go over" dead-end grooves

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
4.	Making the reference marks on several pieces for an assembly	Convential lay-out signs	Chalk	Putting the signs on the faces of the pieces to be assembled (matching up pieces)	Understanding that the form and positioning of those signs will be used throughout in all assemblies this lesson is the application of a lesson given in the theory class.
5.	Construction of a project with simple notch point	Utilitarian object Hot plate	Lay-out tools cross-cut saw back-saw chisel hammer	setting up an assembly with conventional lay-out signs different types of "entaille" joints nailing	Precision of lay-out in regard to the signs measuring the width of the "entaille" according to the width of matching piece verification of sawing and finishing (that is checking for mistakes)
6.	Joining of pieces by groove joints (entailles)	Utilitarian object: example picture frame (the choice of object is up to the prof.) fence section	layout tools (squares, rulers, etc. chisel	advantages and disadvantages of this type of assembly Example of use	How to lay out the width of the groove according to the size of the piece it's to be joined with

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
7.	Layout of rough cutting	Layout of the pieces to be rough cut	Mètre (rular of 1 meter pencil square grease pencil	direction of grain, avoidance of cracks, knots, etc. in wood how to get the max. amount of pieces (of the material)	checking straightness of edges, and dimensions. Go over the rough cutting set up of 3 or 4 exercises. Talk about sawing without guidelines
8.	Use of the band saw	rough cutting planks with mechanical saws	band saw (with blade well sharpened)	running the machine appropriate blades tension of the blade regulation of the blade and guide how to hold the piece dangers of the band saw	positioning of the hands and the piece to be sawn (planed face down on table). precautions to take to avoid accidents position of students around machine when it is in operation
9.	Jointer a. joining the face b. joining the edge Planer a. plane width b. plane piece to correct thickness	mechanical planing	joiner planer	principles of the functions of the joiner and planer (see lessons in theory) appropriate protectors adjusting amount of removal (moving the table up and down) the minimum length of a piece to be safely worked	positioning of the hands and understanding by worker preventions of risk (loose clothing, pieces too short, etc. planing of those pieces already pre-cut how to correct unstraight pieces on the joiner

No	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
10.	Layout and cutting of mortices	Morticing by hand and with machines	scribing gauge cold chisel round-nosed cold-chisel bit mortiser	Comparison of the chisel and the cold chisel the placement of the "bedarie" according to the operations running of the morticing machine (bit mortiser) direction of rotation of the bit	Check the position of the cold chisel the depth of each operation pay attention to the layout and to faces (the best side) (2 mortices by hand and 2 by machine) preview the operations by reading information on blueprint (manual and mechanical)
11.	Layout and execution of tenons by hand	bastard tenons and ordinary tenons	scribing gauge scie a tenon (regular saw) small teeth cross-out saw	Hand saws chose teeth appropriate to work	precautions for avoiding wide cut marks and scratches for avoiding recutting the tenon with the chisel Several tenons on the same piece repeating cross cuts on each tenon Go over also: Bastard tenons (open face) and double tenons

NO.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
12.	Completion of an assembly by tenon and mortice	assembly by tenon and mortice of 90 and 45 degrees	cold chisel bit morticer hand saw cross-cut or back saw	on the importance of well informed tenon shoulders in the solidness of the piece on laying out with reference marks	avoid assemblies forced as to the alignment of the layout signs show students an assembly with a tenon too large and non-parallel cross-cuts Do a mortice by machine and one by hand
13.	Execution of a slot mortice a. simple b. double by hand	Assembly of slot mortices of 90 and 45 degrees	Scribing block hand saw cross-cut saw chisel and bedane (cold chisel)	Use these enfourchements ex.: batl dormant (type of door frame) table leg to top joints; etc.	Take a lot of care in layout and execution Avoid forced assemblies Get the students used to leaving the tenon as it is after sawing, i.e. it should not be necessary to rework it

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
14.	Assembly by entaille (slot), resistence to tension	butted dove-tail joint	pencil hard scribing block cross-cut saw back-saw chisel	proportions for dove-tail angles uses of these joints necessity of doing the dove-tail in the first place	Check for squareness the lines laid out for sawing with respect to the reference marks on the face checking the layout of the female piece according to the male piece already executed
15.	Completion of an object with a machanically made mortice and tenon joint	Folding chair saw mounting (Old World type saw) (frame saw)	Bit mortiser circular saw (toupler) the shaper is unfortunately extensively used for sawing boards) cross-cut saw	method of making tenons with the circular saw or the shaper different types of teeth principals and functions of stopblocks, protectors and guides how it runs	go over the stop-blocks guides an protectors necessary regard to layout and fecing position of the hands make sure the piece is long enough

No.	Objectives and Difficulties	Title of Exercises	Tools	Technological Considerations	Advice and Observations
16.	Mounting and finishing of assembly	same exercise	file rasp racloir (scraper) sanding block sand paper	on the finishing tools on the importance of the direction of the wood grain	"dry-run" assembly precautions to take in gluing elimination of sharp edges
17.	reinforcing an assembly with a (flottage) joint	mortise and tenon assembly at 90° with a grooved lap joint (flottage)	saw chisel cold chisel	this joint is used in window frames, reinforcing table legs comparison of joints	make an easy fitting joint precision of sawing mark places to be cut beforehand
18.	Elongation or extension of a piece by use of joints	lapped scarf joint with dove-tails	hand saw cross-cut saw small chisel bevelled square	reasons and uses of elongating assemblies (door frames, reparation of door risers)	Go over a sample piece 500x60x25 which includes the 3 difficulties on the same piece check the layout according to the "male" piece see that all saw cuts are according to the square

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
19.	proper lay-out of jig-saw cuts for circular forms finishing of jig-saw cuts	ironing board or shelves with decorative sides wall mounted book shelf, etc.	compass band saw, small file rasp scrapers sanding block	orientation of the wood grain principals of jig-saw cuts appropriate width of saw blade for different circular cuts proper positioning of the blade on the driving wheel	avoiding forcing or bending the blade, pushing from the wrong direction keeping in mind the direction of the grain
20.	Lining up the grains with 45° mitre cuts	assembly by slot mortise with a 45° lap joint on the face	45° square scribing guage tenon saw cross-cut saw back saw cross-grain chisel	on the alignment of grain in mitre cuts use of these joints	precision of surface layout and of cuts reworking saw cuts

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
21.	"Flottage" type of slot-mortise joint, at 45° angle	mortise and tenon "T" assembly with 45° joints (for windows)	scribing gauge mitre square bit mortiser cross grain chisel tenon saw cross-cut saw	on the use of these joints alignments of moulding assembly of cylindrical pieces of the same diameter	precision (layout) drawings, saw-cut) precautions to take for sawing grooves lining saw cuts of tenon up squarely with mortises
22.	construction of a 90° assembly with a 45° joint on the face and a 90° butt joint on the back remember many of these joints are more theoretical than practical	picture frame with slot mortise and 45° joint on one face or a serving tray	layout and measuring tools mortiser shaper chisel scraper clamps hand plane	care in making the cuts methods of clamping and finishing	matching up faces in regard to the layout signs chamfered or beveled edges with hand plane and then the shaper checking the assembly according to the alignment of the diagonals

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
23.	Joint with "queue droite" straight dove-tail (butt-joint)	book-end book-shelves, etc.	file chisel rasp saw scraper	use of these joints principals of layout and execution of the straight dove-tails fashion of gluing together demonstration by the instructor and the execution by machine of the "queues droites"	precision of layout drawing and sawing saving the ends squarely using extra long pieces in case of an unsuccessful first attempt
24.	Dove-tail joint with sliding groove	"T" square for drawing	back-saw chisel	strength of the joint right kind of wood proper proportions between the vertical and horiz ontal pieces	smooth assembly dry-run assembly (w/o glue) checking squareness at time of final assembly

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Consideration	Advice and Observations
25.	Construction of a work with tapered legs tenon and mortise	stool coffee table	mortiser shaper with double circular saws cross-cut saw screwdriver clamps finishing tools	reasons and use of tapered legs different processes of execution approach to the wood necessity to work with the grain methods of making the piece solid (corner supports, triangular cleats, and screws)	choice of faces and proportions customary dimensions methods of checking squareness (diagonal squaring measure) bevelled feet partial board top with solid wood edging.

PROGRAMME DE TRAVAUX PRATIQUES

Specialty: WOODWORKING — 2nd Year

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
1.	Initiation for future real work situations small picture frame with lap-joint	angle joint (45°) tenon and mortise with groove and overlapping moulding on one face (also the same at 90°)	machines mitre-box back-saw	reasons for overlap cases for usage how to use mitre-box regulation of height and depth of blade (guides-protectors) dado blades	precautions to take to avoid all risk of accidents go over a long piece for solidness, avoid the moulding cut that cuts into the tenon
2.	Initiation for the construction of windows with 2 overlapping 45° angle joints	tenon and mortise joint with overlapping of molding and groove for window pane	machines mitre-box back-saw chisel	use of the joints methods of layout, construction window pane groove on back side of frame should not cut into the tenon	speak of the "arested" moulding (that which doesn't extend to the corners) utility of the oblique lap joint precautions to take for making this cut regulating the blade

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
3.	Use of the jointing plane making the length and thickness of the piece according to the dimensions	Hand planing partial	jointer scribing gauge square jointing-plane (hand plane)	on the adjustment and angle of the blade of the hand-plane and the sharpening of the blade	how to hold the plane position of the blade and the back-iron (counter piece) understanding of direction of grain gain the attention of students on the difference between the plane and the jointer plane dress two faces with the jointer machine and two others with hand-plane
4.	Assembly of diagonal pieces with a "borgne tenon" (the tenon doesn't pass through the mortise)	Oblique assembly (60°) tenon and mortise with overlap	bit mortiser cross-grain chisel tenon saw cross-cut saw chisel	use of these assemblies role of the "paume" (the shoulders of the tenon are sunk obliquely into the shoulders of the mortise) form given to the tenon necessity to change the form of the tenon (difficulties of assembly)	as to the incline of the angle in regards to the relay to be left at the bottom of the mortise use the piece from the previous exercise

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
5.	Completion of an assembly with oblique angle according to the layout drawing	support of stack of shelves with brace	machines and hand tools appropriate	as to the technical drawings, use of the "echarpe" (bracket) take the dimensions of the faces and the oblique cuts	precision of layout drawing proper order or layout of the cutting list according to the plan (the true length of a piece not just the horizontal and vertical dimensions) use of kraft paper for drawings check squareness by pre-assembly
6.	Lateral joints by tongue and groove gluing and finishing of panels (several students per piece)	drawing board table top shelves	shaper with appropriate blades clamps finishing tools electric sander	different ways of joining panels when to use the spline necessity of making sure that there is some play at the bottom of the groove	matchingup panels (faces) signs and guide marks choosing tools that insure rapid completion pressing and drying several pieces together checking levelness or squareness of presses appropriate protecting blocks advice for avoiding mistakes during assembly.

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
7.	Dove-tail joints - simple - hidden or over-lap dove-tail	wall shelves book shelves book-ends (drawer)	table saw appropriate hand tools	on the use of dove-tails in carpentry and cabinet making the strength of the joint how to lay out dove-tails number and proportions of dove-tails	precision of layout and execution go over 2 pieces (650x 100x16 and 350x100x16) if the exercise fails redo it on the same piece use the bevelled blade for the notches the pieces will be machine planed but reduced to the width of the jointer-plane
8.	how to measure and layout ladder steps study of the cut angle of the tenon shoulders (this ladder does not have parallel uprights	ladder with inclined uprights or step ladder	plan drawing bevel-square mortiser hand tools	on the methods of laying out, according to the distance between steps, the angle of incline of the uprights and their dimensions	precision of layout and plotting of "false" cuts choice of woods and matching of faces pinned mortise and tenon joint dry-run assembly avoid tenons that have been cut too far into and wood with twisted grain

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Considerations
9.	uses and methods of reinforcing particle board with solid wood	interchangeable modular book shelves kitchen table	circular saw on shaper (oscillating dado blade for grooves)	commercial sizes of plywood and particle board panels uses of particle boards the role of edging with solid wood plastic pegs	dressing the panel choice of faces reinforcing the assembly avoid "raclage" (using the scraper) on particle board finishing
10.	Laying out circular patterns geometrically for jig-saw cuts assembly with joggly-joints (form of tongue and groove used in corner joints)	decorative angle brackets for one or two tablettes sheives	Compass band saw with jig blade shaper rasp file hammer nail set	direction of wood grain matching pieces arrangement of the nails and puttying over the heads methods of reinforcement	do the layout on one face only cut two pieces together finishing of interior surfaces before assembly setting the nails

No.	Objectives and Difficulties	Title of exercise	Tools	Technological Considerations	Advice and Observations
11.	Fabriaction of tables (one at a time or in small series) use of formica	Dining tables with drawers and Formica tops	machines laminating tools	normal dimensions for tables with drawers fixation of the top (dowels; screws, cleats) Formica lamonation	organization of work on the machines study and analysis of fabrication by students, with guides by instructor use of stop blocks and protectors assembly by twos
12.	Completion of a project	top for two school desks	machines clamp-blocks	different ways of assembling Angle of incline of top	make note of usual dimensions dry-run assembly
13.	Completion of a project joined with joggle-joints sizing and hardwaring doors	druggist's display case with glass doors and drawers	machines appropriate hand tools	study of a project analysis of fabrication different ways of articulating the closure and hanging	checking assembly sizing of doors and drawers tolerance and play interior fixtures

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
14.	table in hard wood with inclined legs	table with casters (rollers)	machines hand tools	study of forms and patterns choice of wood, and size of wood	doing the layout from the plan choosing proper joints solidity of assembly checking levelness of legs perpendicular holes for rollers
15.	Tourning between centers use of the wood lathe	tool handles	---	---	Turn a cylinder of hardwood

Specialty: Menuiserie — 3rd Year

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
1.	Find the true size of an object by orthagonal projection Angles of planing	stool with inclined legs	layout tools machines	on the pieces inclined leveling tops and bottoms drawing the object from dimensions knowing what size piece is necessary before cutting (saw horse, mixing through)	teach the students orthagonal projection (collaboration with a professor of technical drawing) checking the blueprint taking the dimensions for layout from the print.
2.	Menuiserie cintrée working with curved pieces bending pieces	a curved or arched piece	machines hand tools	different types of joints (curved spline of scarf joint, Slot mortise and false tenons) styles and forms (basket handle, Tunisian arch, etc. number of pieces necessary to form the arch	Layout according to drawing. mechanical forming use of forms (for bending pieces) method of clamping curved forms using the shaper without a guide prevention of accidents

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Consideration	Advice and Observations
3.	Table with extension (leaf)	table italienne Formica top	machines lamenating tools	principals of the working of extendable table different sorts proportion	sealing edges (varnish) paint) go over hardwood guides, simple legs
4.	Hollow core (plywood) doors completion of said door with frame and panels hardware	hollow core doors (a small series)	presses jointing plane	constitution of hollow core doors conventional sizes precautions to take against warping door handles	choose full scale dimen - sions dontt forget to pierce interior members for ventilation (to avoid swelling) preview placement of locks precautions to take in gluing
5.	constitution of a piece of furniture with sliding doors	wall mounted cabinet with sliding doors (plain or glass)	machines	different models of cabi-nets with sliding doors. Normal dimensions. Hardware (roliers; etc.) Balancing of doors. The play to anticipate between doors. Special locks.	cross section(drawings) full scale. Preview stop-blocks. Squareness of assembly. Doors meet in manner to prevent entry of drafts. Method of hanging and un-hanging doors. Method of tracking (suspension).

165

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
6.	Frame for window according to full scale cross-section plan	tilting or trap window, axle mounted window with casing	machines	type of window assembly with protruding bottom member for shedding water closure with rounded tongue and groove to keep out draft different articulations	full scale cross-section plan obligatory (of each assembly) hardware (left-right) use of compass hidden dowels water run-off hole
7.	Completion of a "moucharabich"	"moucharabich" 1 per group of 2 students	appropriate machines and hand tools template for assembly with nails		
8.	Interior glass doors (French doors)	interior glass door with panels	machines	Different models arrangementsof small wooden handles dimensions of the panel, height of cross rail, wedges and dowels, assembly of the small sashes	Full scale cross section drawing; choosing, matching faces; taking dimensions from the plan. Moulded frame that holds in glass; making the grooves that the panes are laid into. Insertion of dowels and wedges.

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advices and Observations
9.	Completion by group of students of a French window with louvred shutters (Americaine)	window with two horizontal crossings, with louvered shutters (4 sections) mounted in window casing	machines piqueuse (makes the mortises for the slats automatically	full scale cross section drawing choice of arrangements of cross members junctions of the horizontals calculations for the slat mortises choosing moulding appropriate closure joint hinges	necessity of using "bois rouge" (pine) or other woods resistant to bad weather fillsters (of the window sash) Assembly of intermediate cross members of shutters according to placement of slats comparison of bit mortiser and automatic slat mortiser (piqueuse)
10.	Completion of solid exterior doors	a) panel with large frame and raised diamond panels b) solid doors (students work in groups)	machines	decoration of exterior doors (style-taste) woods used normal dimensions doors with one central cross member, with 2 full scale cross section drawing	completion of a panel by the student and a door by a group of students checking of panels as a group before assembly

Specialty: Ebenisterie

3rd Year

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
1.	Veneering	Veneering with hammer a) side by side b) matching grains c) veneering edges	veneer saw planing rasp hot-iron ironing board dressing board with hand plane	preparation of the surface to be veneered. choice of motif rough cut out of veneer gluing, finishing of veneered surfaces using masking tape (papier à joint)	anticipate the dimensions for the top precautions to take for the gluing and flushing of edges and the finishing holding the veneer hammer checking the flatness of the surface to be veneered
2.	precision of squareness and alignment of joints and finishing of opposing grains	chess-board with molded border	appropriate tools veneer press	on the veneer presses (hydraulic-pneumatic) preparation and process of pressing veneer	go over an oblique assembly glued, reinforced with a dowel of 5 mm Exercise can be mounted on legs Attention to accepted size and colors for the squares

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Objectives
3.	Layout and execution of a panel in the form of an ellipse preparation and veneering of sunburst design	coffee table a) with elliptical top b) with 4 legs	appropriate tools	rendering to proper proportions the sides and formes of the coffee table how to layout an ellipse affixing hardware drilling holes for the dowels	alignment and matching of the grains in balance with the top Reinforcing the assembly with a cross brace between the legs
4.	how to complete a joint that is very solid but with hidden features	stand or pedestal serving tray	appropriate tools chisel of 4mm chamfer blade	difficulties of layout and completion of hidden dove-tails possibilities of utilization alternative joints hardware	precision of layout and execution preparing surface for varnish construction with hardwood Impress on the students the value of materials and time involved in such projects

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
5.	Method of constructing by frame of white pine, in plywood or particle board	modern bed with side by side veneering a) single bed b) legs inclined or straight	appropriate tools for veneering	proper size for bed and proportions for frames preparation of veneered panels and how to do them without a prees mounting the rails (metal) bed easily dismantled Choosing the proper faces	ventilation of compartments gluing - pressing make flush the panels after removing tape reinforcing ends of cross memebers with 8 mm dowels
6.	how to lay out, cut and finish legs (19th C, type curved legs) (neo-rustique) even flow of curved forms study of proportions of stackable tables (3), i.e. one under the other	stackable tables (3 pieces)	Compass with pencil point band saw with 10 mm blade calibration tools rasp scraper veneer press	studies of forms of curved legs of the first and second sawing methods of calibration press forms	each student is to complete one of the three pieces. see if anticipated number of class periods to complete projects is accurate table top to have edge mildly accentuated with round form jig-saw cuts avoid stopping in mid-cut assure alignment of legs with brace during gluing

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
7.	how to layout, center the pivot and hardware a table with pivoting, folding top (chess-table)	chess-table with pivoting top a) top veneered on both sides b) inclined and tapered legs c) rounded edges completion not required but understand plan	5 mm dado blade flange blade (for edge moulding veneer press	study of wooden forms 45° mortises methods of layout; practically, of the pivot and cross support appropriate hinges (hidden hinges) reason for using edging under veneer	counter belancing top pieces (plateaux) veneer side by side with design on face of upper surface (when top is closed) inclined legs, tapered on 3 sides
8.	Construction of a small cabinet (combination)	hair dressing table with 2 drawers and 1 fold down door	appropriate tools. veneer press	workings of folding down door appropriate hardware (guide), piano hinges study of proportions of height particulars of drawers, matching up faces, traction	necessity of choosing the piano hinge Side by side veneering counter balance the fold out door dove-tail joints for drawers or joggle-joints

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advice and Observations
9.	constructing a night stand completely veneered assembled with "loose tongue" joints	modern night stand veneered side by side one door one drawer	dado blades of 30 mm 7 mm and 5 mm veneer press	method of cutting a panel to size with attached template on the shaper on the slip-tongue assembly reasons for finishing veneered surfaces before gluing straight and elbow pivots	anticipate hardwood edging on all veneered panels - hardware elbow pivot - edging of same kind of wood as veneer
10.	method of constructing a table top of laminated pieces matching natural veneer and formica on the same table	dining table (italian) with expandable top	appropriate tools router for flushing formica clamps metal plane	on the study of proportions of the leaf to the frame of the table - of the inclination of the guides how to execute the tracks using grooves and dowels opening and closing the top	Make the tracks of oak and the dowels of white beech interior edges of table top and leaf to be covere with same veneer or formica cover the leaf with formica that matches the veneer of the rest of the table seal the butting edges of top pieces

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advices and Observations
11.	method of constructing an element with sliding doors	wall cabinet with two sliding doors veneered side by side a) shelves on metal brackets b) groove tracks for doors	appropriate tools	on cabinets with sliding doors study of positioning doors different types of sliding door tracks depth of grooved tracks (upper and lower) play between the doors tightness of closure	veneer both faces of doors with same kind of wood anticipate a size of door to fig snugly slots for doors choice of handles squaring assembly
12.	Restore a veneered cabinet	retouching and repair of veneer a) splits b) "cloques" c) dents d) cuts e) scratches	hardwood putty knife blade veneer saw veneer hammer small press hoop wooden pliers thin cardboadd clamps veneer iron	method of restoring cuts and dents in veneer imitation of natural wood colors with putty preparation of putties and surfaces to be puttied means of re-veneering areas where veneer has peeled off causes and origins	do a demonstration of each type of repair job on a panel choose same tones and grain for each demonstration show the tricks of the trade emphasize precision and joining of pieces precautions with coverings and surface to be covered

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advices and Observations
13.	Finishing of works treated in cabinet making for harmonization of different colors	discoloration and fading in veneers and woods	cotton applicator rubber gloves glass or clay container measuring glass (graduated) goggles	on how much stain to mix up at one time methods of preparation and application advice on application and security initiate students in precious woods necessity of operation	always start at the bottom of the piece to avoid "halos" use of gloves and goggles obligatory necessity of a clean surface (free of glue and grease attention to drying time precautions to take
14.	Lacquering with brush for sealing and giving lustre to veneered cabinets	lacquering	applicator piece of cork	composition of lacquer portion and preparing application and precautions to take goal, sealing and "bringing out" the wood	choose a small piece from among those already done attention to the time for drying between applications use powder (poudre) and alcohol for filler

No.	Objectives and Difficulties	Title of Exercise	Tools	Technological Considerations	Advices Observations
15.	initiation into the colors of precious woods sealing and putting a finish on cabinets	coloring and sealing: a) prepare surface for putty b) tinting, staining c) polishing d) varnishing e) laying out accessories (mirrors, marble tops, etc.)	sponge glass container clay container cotton cloth	designations and amounts of material to be used methods of preparation and application advantages and disadvantages placement and fixation of accessories (mirrors, marble tops, etc.)	samples to show: demonstration before each operation precautions to take make students aware of what is available to use -water-based stain -alcohol stain according to the needs
16.	Turning a piece on the lathe	decorative turned legs	wood lathe appropriate tools	on different styles or motifs - cutting tools - working between points - working on the plateau (tool vest) - working in the air (free hand)	do a small series of exercises rungs, legs students work lathe in orderly procession

183

OFFICIAL PROGRAM FOR:

PLUMBING - HEATING

Being a relatively new subject field in the school system, the Program for plumbing and heating is not quite as definitely planned out as the Programs for the other specialties.

Included in this Program are technical design, and general theory classes, which you will not be expected to teach. They are included to give you a better overall idea of the technical formation of students specializing in plumbing-heating.

Specialty: SANITARY INSTALLATION

At the end of his studies, the student should have a basic knowledge giving him the possibility of later dominating his trade and especially able to adapt himself to sanitary and heating installations. As well as the installation, maintenance, reparation, and regulation of the apparatus and all safety accessories. Also to aim at the development of the whole personality permitting him to meet all eventual adaptations.

Goals

It is indispensable for the student to know:

1. the composition of all the materials used in the profession;

2. the function and installation of sanitary heating, pumping, and of safety apparatus that he will be called upon to install.

Finally, at his departure from school, the student will be familiar with the work methods employed in the field.

Directives

Travaux Pratiques

A) 1ère Année - Will be reserved to the introduction and the acquisition of difficult technical principles encountered in the profession.

   1. bending and functioning of pipes according to the different materials used

   2. Layout, cutting, and different assemblages of sheet metals and zinc.

B) 2ème Année - Will be reserved to the realization of work exercises, as well as the initiation into the installation and assembly of sanitary apparatus (to walls, partitions, and to the floors).

C) 3ème Année - Will be reserved to the realization of small assemblages (sanitary and heating) to familiarize the student with the methods of work used in the profession. The students should participate in the work of maintenance and modification in the heart of school establishments or outside of school.

Design Technique — 1ère Année (4h/wk)

Lessons	Observations
1. Generalities Different types of technical design, relation with the work shops, materials of the draftsman (maintenance, use)	Present different diagrams, documents, general design, definition of design, buying advice Applications - parallels, perpendiculars, unusual angles
2. Design presentation formats, cartouche d'inscriptions (P), lines normal writing, scales	choice of pencils, (acquisition of materials will be done the whole year)
3. Orthogonal projection conventions; method of execution of a design, correspondence between views of volume, forms used (cuts, matches, grooves, slots, chamfers, outlet hole (P), one-eyed hole (P).	The cotation (P) will be done progressively
4. The cylinder (projection, cotation (P), development)	notions of symetry, reduction of number of views
5. The cone and its frustum projection, cotation (P) development	
6. Right prism (projection, cotation (P))	construction of regular polygones
7. Pyramids and its frustum (projections) 8. Right connections (parallels, perpendiculars, ordinary, tangents)	insist on the precision of the drawing
9. Perspective quadrant (goal, principal, method of execution	simple volumes - cube, parallel piped rectangle

Lessons	Observations
10. Simple cuts (definition, accomplishment, conventions, shading of different materials) 11. Coventional representation of threaded pieces 12. Descriptive Geometry project plans, projection of a point, projecting of a turn, looking for the true size of a turn	methods
13. Building design 3 view representation of (an entry hall, a bay window plan of a water closet, plan of a kitchen floor plan)	- simplify the premises - useful dimensions

Note: The order is not imperative

General Technology — 1ère Année (1 h/wk)

Lessons	Observations
1. Technology (definition, goals, different technology, comparison between the craftsman and industry)	show how technology is important in the current world
2. The "pied à coulisse au 1/10" (P) (ruler, meter)	Experimentation, lecture
3. Material properties hardness, toughness, malleability, conductibility, weldability, ductibility, fusibility, elasticity, specific mass	simple experiments

Lessons	Observations
4. <u>Metallurgy</u> Properties and utilizations of the following metals: 5. - lead 6. - tin 7. - zinc 8. - copper 9. - steel 10. - brass 11. - bronze 12. - aluminium 13. - aluminium alloys 14. - l'alpan (P) 15. - le zamac (P)	show samples of these different metals and alloys
16. Properties of wood	uses in the profession
17. Tin solder	different qualities
18. Contributing metals in oxy-acetylene welding	tremazique (P), brazing
19. Soldering torch	forms, maintenance, use
20. Propane torch	handing of bottles, manual regulator, torch tips, maintenance
21. Oxy-acetylene station	make-up, maintenance, use, manual regulator

Travaux Pratiques		1ère Annee (10 h/wk)
A. Lead Pipe Work		A. Lead pipes
1. Straightening of lead pipe drains		1. properties of lead
2. flare fittings		2. tin solder
3. simple joint		3. fabrication of lead pipe (different Ø used), tools used
4. shoulder joint		4. bending and straightening
5. rolled shoulder joint		5. cutting
6. plug (built in)		6. solder and the "porte-soudure"
7. plug (added)		
8. function knot on thick lead		
9. Right branchment on lead pipe		
10. Slanted branch on lead pipe		
11. Bends of 60°, 90°, 180° with the use of wooden balls	big radius	
12. Bends of 60°, 90° with sand		
13. Empattement pied de biche (P)		
14. oblique siphon		
15. right siphon (big radius)		
16. right siphon (small radius)		
17. tinning of copper couplings		
18. copper-lead joints		
B. Steel Pipe		B. Steel Pipe
19. right and left hand theads		7. properties of steel
20. Mounting of couplings		8. Fabrication of steel soldering and drawing different Ø, tools for steel pipe
21. long screws		9. Dies (construction and uses)
22. 90° turn by a pipe bender		10. Reamers, counter sinkers
23. 60° turn by a pipe bender		11. pipe benders (methods used with black iron and galvanized)
24. 90° turn with heat		12. tubing cutters - pipe wrenches
25. 60° turn with heat		13. Pipe vises
26. double turns in perpendicular directions		14. parallel vise
		15. hacksaws, teeth, and blades

Theme	Observations	Practical Technology
C. Copper Pipe		C. Copper Pipe
27. cold drawn pipe		15. Properties
28. Annealed copper pipe	29. flaring tools	16. fabrication (different ϕ, tools used)
29. flanges		17. copper tubing cutters
30. joining		18. flaring tools
31. bending with heat and sand		19. tubing benders
32. bending with hand bender		
33. 2 perpendicular bends	34. with tin solder	D. Sheetmetal tools
34. capillary solder		20. sheetmetal snips, different models
D. Sheetmetal Work		21. sheetmetal shear
35. tracing and cutting of black sheetmetal		22. benders, rollers, and molders
36. tracing and cutting of galvanized S.M.		23. tools of the tinsmith
37. tracing and cutting of zinc		E. Materials for oxygen-acetylene weldings
38. assemblage of 2 pieces of 6/10 galvanized SM	38. by clamping	24. torch, gauges function, make-up, use
39. Assemblage of 2 sheets of 10/10 zinc		25. preparation for OA welding
40. solder of 2 sheets of zinc with a soldering iron	40. by clamping and soldering	
41. soldering of galvanized S.W. with a soldering iron		
42. solder of zinc with a soldering iron		
E. Oxygen-Acetelene Welding		
43. fusion welding with black sheetmetal (ϕ 2 mm)		
44. Line welding on black SM ϕ 2 mm		
45. solder of 2 pieces with raised edges		
46. solder		
47. welding of black iron pipe end to end		
48. brazing of copper pipe		

Technical Design — 2ème Année (4h/wk)

Lessons	Observations
I. Expanded surfaces	Intersection with an oblique plan, right section
1. right prism 2. regular pyramid 3. oblique pyramid 4. Frustum of pyramids, and cones	
II. Building Design	
5. the "solution" (?) of building design 6. introduction to foundations, walls; and roofs 7. intro. to floors 8. intro. to partitions 9. view of a portion of a villa with the plan and a cutaway view of sanitary fixtures 10. representation of an apartment with sanitary fixtures 11. view of a kitchen, bathroom, with fixtures 12. supply and sanitary fixtures with cold water 13. hot water supply of sanitary fixtures 14. drainage of used water 15. "la perspective cavalière" 16. waste water from a toilet 17. view of waste piping with primary and secondary ventilation 18. view of a bathroom with a bath 19. view of a Turkish toilet (reservoir above) 20. installation of gas 21. view of a hair salon 22. view of ventilation piping 23. evacuation and drainage	(5) scales, symbols, dimension lines, shading of different materials (11) furnish the students some views of sanitary fixtures, valves of water and gas (13) normal representation of conduites of hot and cold water, gas, and used water (14) slopes (fall) (16) joints with lead pipe) (20) water heater, gas stove) (21) batteries of sinks (22) square and circular conduites (23) profile of a sewer

Lessons	Observations
III. Central Heating	
24. thermosiphonage	(24) functioning principles
25. principles and design of a forced heating system.	(25) role of expansion chambers, slope, air purge valves
26. design and principles of installation of a hot water heater with boiler (primary and secondary circuits)	
27. principles of contral heating and production of hot water (vertical system	
28. hot water tanks	
29. installation of a mazout heater	(29) capacity, commercial forms
30. expansion chambers	(30) role, capacity, forms

Travaux Pratiques — 2ème Année (15 h/wk)

Themes	Observations	Practical Technology
I. Sanitary installations 1. fixation of a lavatory 2. fixation of a bidet 3. fixation of a sink 4. fixation of a timbre d'office 5. fixation of a water closet flush-type-tank above 6. fixation of tank-type W.C. fixation of tank-type urinal	fixation of sanitary apparatus (lavatories on brackets, mounting of faucets) Bidets: fixation on lead brackets, and faucets W.C. : same things	joining of the drain pipe of the W.C. by rubber cones joining of the toilet by brass screws on lead brackets
II. Sheetmetal 8. cylindrical pipe cut at the end 9. elbow of 2 square pieces 10. reduction cone assembled by rivets 11. Tee branch of diff. Ø by rivets 12. stale aspirator 13. execution of an anti-foaling elbow 14. cylindrical elbow of many elements	- tracing and cutting - autogenous welding - riveting - fastening of SM - tracing of different parts of a "T"	tools - shears, hammer, chisels, beckeron (of anvil), rivet sets, seam sets, rivet snaps, sta[illegible] anvil, oxygen-acetyl[illegible] torch, rolling machine, spot welders
III. Steelpipe 15. installation of a radiator 16. installation of an expansion tank 17. installation of accelerator 18. execution of a collector boiler 19. gas heater (instant) 20. execution of a rising column for water distribution 21. horizontal distribution of water 22. water distribution	-bending and welding -torch cutting -fixation of flanges	mounting of radiator sections fixation of expansion vessel cutting torch (function make-up) tools for copper hydraulic benders water meters gas meters joining of secondary ventilation

Themes	Observations	Practical Technology
IV. Plastic tubing		
23. function, gluing with special premade joints and fittings		23. Properties of commercial PVC
V. Copper Tubing		
24. Cold bending	- with tubing benders	
25. hot bending	- with sand	
26. functioning	- with a brock	
27. welded fittings, soldered and brazed	- matrix tube	

TRAVAUX PRATIQUES — 3ème Année (20 h/wk)

Themes	Observations	Practical Technology
1. a sanitary installation (S.I.) composed of a shower, lavatory and a water heater		1. tools for pearcing walls, for fixing shields, etc.
2. a S.I. composed of a patting a sink on its brackets, installing a gas W.H. of 125 nth/mm	2. start the students installing sanitary and heating apparell, trace the supply piping, taking measurements, and complete small installations	
3. install a level heating system of 3-4 radiators and a boiler		3. setting in place of cast iron, cement, and plastic pipe
4. hot water supply with a boiler (primary circuit)	4. make known the installation function regulation of the burners as well as the safety apparatus	
5. a S.I. of: a lavatory, bidet, sink and bathroom heater(gas)		5. installation of an electric pump (suction lift vs. discharge lift)
6. installation of a heat generator (mural) of 4-5 radiators	6. function and regulation of a bathroom W.H. and water heaters (gas and electric)	
7. installation of a group surpressor		7. insulation of piping, glass wool, cork, asbestos
8. installation of a heater by forced circulation (4-5 radiators) and a mazout heater	8. setting, regulation and function of pumps and surpressors	8. Installation of a temperature regulator on a coal boiler
9. installation composed of double lavatory, sink, W.C., gas W.H. of 100 liters	9. joining of gas fixtures and ventilation of burned gases	9. fixation of a pyrostat and acquastat (electric)

I. Objectives

At the close of the apprenticeship, the apprentice must be:

- able to troubleshoot a problem of carburation or ignition and remedy it himself

- able to locate an electrical problem and remedy it

- informed in a precise manner of the principles of motor repair and capable of repairing certain parts

- able to proceed with basic operations of sheetmetal working and welding

- capable of fabrication small replacement parts.

II. In the first and second years, the proposed work is above all preparatory exercises designed for the difficulties an apprentice will encounter.

These exercises will be performed at first on old material suited to this purpose and toward the end on serviceable material.

In the 3rd year, the apprenticeship will pursue the study of all the mechanisms.

It is desirable that this work will reinforce with the student the modern industrial methods and to progressively habituate him to the scientific organization of the work.

III. Etude

All work and exercises must be based on diagnosis or plans made by the student on the mechanical state of the device to be repaired

This study will have to consist of 3 parts:

1. before disassembly, a diagnosis of the trouble

2. after disassembly, compare the diagnosis with the problem

3. choice of the means of repair (tools, reparations, adjustments, etc.)

OFFICIAL PROGRAM FOR:

AUTO-MECHANICS

Important Advice

The indispensable elements to assure the formation of our students in auto-mechanics depend on 3 factors:

- to know what is necessary (the teacher)
- to know how to do it (students - teacher)
- to have what is necessary to do it (tools, etc.)

a) teacher's preparations
b) the tools and indispensable material
c) before proceeding with the work, to prepare the students for analytical experimentation
d) necessity of the usage of technical manuals

Small jobs of actual work are recommended during the 2nd and 3rd years under the condition that the work be synchronized with the student's level and parallel to the lessons and practical exercises already acquired.

TRAVAUX PRATIQUES

Specialty: Mechanic-Auto — 1st Year

Title of Exercise	Objectives	Technological Elements	Experimentation	Indication
Tool usage	knowledge of tools	wrench constitution	put in contact with different tools practice manipulation	- tools - magasin (storage)
tightening and locking bolts, screws, etc.	- assembling - safety	different modes of tightening and securing	assembly and mounting of simple apparatus	- connecting rod cap - pulleys
notions of removal and replacement of a simple part	to favor the spirit of observation	notion of mechanical assembly	remove and replace a simple part	small, light assemblies
dressing of a surface with a file finishing by honing	geometrical correction of a surface	- the gasket surface - the theory of honing	check many honed surfaces - flatness - state of surface	honing by hand and with surfacer ex. : manifold
gasket (joint) making	sealing	study of simple types of gaskets (paper, cork, rubber, etc.)	make diverse kinds of gaskets of paper by different methods of cutting	demonstration on a packet of gaskets

1st Year

Title of Exercise	Objectives	Technological Elements	Experimentation	Indication
jacking up a car (manutention)	Safety	correct support (jack stands) and blocking of wheels	block vehicle and support it securely - remove a simple part	remove a wheel or shock absorber
Tires demounting	manual ability	wheels - tires (roues) - (pneus)	demount, check, repair inner tube, remount, inflate	precautions and safety procedures
suspension springs shock absorbers	- knowledge of the elements - appreciation of condition	- object of functioning principle - different systems of shock absorbers	remove springs, torsion bar - check and service - check shock absorbers/ bushings	safety
motor	to put in contact with the different parts	notion of the constitution of the different parts of the motor in chronological order	partially disassemble a motor - repair of parts - clean the pieces - methodical arrangement and reassembly	work on used non-functioning motors
Head (culasse)	to develop the spirit of diagnosis and reparation	study of the head	all the following work: - check the surface flatness - remove valves (soupape) check, grind, recheck - remove and replace valve guides	

1st year

Title of Exercise	Objectives	Technological Elements	Experimentation	Indication
mount piece with flat surfaces	to learn a respect for bolt tighting - order of tightening and amount of torque	torque wrench	- tighten down a head and connecting rod cap - order of tightening	Tighting (review techniqua)
brakes (freins)	initiation to brake systems	generalities on the system used	- remove brake drum (tambour) - remove shoes (machoires) - reassemble	work on a brake system on a chassis
radiators	initiation to the systems	- constitution of a radiator - charts showing the principle of the thermostat	- circulation check - functioning check (boil water to demonstrate thermostat function)	thermometer
fuel pump	trouble shoot fuel problems	fuel systems	- check before removal - have expertise on the component parts - use what is necessary for repairs - replace and test	check fuel pressure of many systems

TRAVAUX PRATIQUES

Specialty: Metal Work — 1st Year (1/6 of the yr)

Title of Exercise	Objectives	Technological Elements	Experimentation	Indication
1) Filing (Limage)	a) manual ability b) precision and security of control c) correct holding of file	- working post (vice) - tool terminology - different types of files - usage to dress a surface	- fixation of the piece in the vice - correct hold of file	application on auto parts
2) Traçage (layout)	Determining the form of a piece	tracing and marking material (compass, scratch, awl, rule, etc.) geometric method of layout	- mark piece on table - sharpen tools - centering, punching	
3) Sciage (sawing) hacksaw (scie à metaux)	usage of hacksaw	study parts on saw direction of the teeth on blade (lame)	saw following a line on sheet metal, a tube, profile; etc.	
4) punching and marking (pointage et markage)	spirit of decision and choice	study of punching and marking	usage of punch and marking tools	

Title of Exercise	Objectives	Technological Elements	Experimentation	Indications
5) Chanfreinage (chamfering)	Spirit of finishing	- chamfering after tracing - tools used	fixing the piece in place	
6) Grattage (scraping)	improving, cleaning surfaces	constitution of a scraper and methods of scraping	scrape cylindric surfaces	diverse alloys
7) Piercage (grinding) (burnishing)	use of diverse stones	object of burnishing (constitution of stones)	burnish plane and cylindric surfaces	retouch a motor part
8) Perçage (drilling) Taraudage (tapping) filetage (die)		study drill bits study taps study dyes	diverse methods of drilling tapping and dying by hand	

Title of Exercise	Objectives	Difficulties	Experiences	chnological Elements	Observations
Initiation to the principal techniques	Layout (traçage)	perpendicular layout parallel layout circumference layout	tools - designation - use		these notions of layout must be used during a chosen exercise
	cutting cut-out (decoupage)	manual and mechanical shears (cisailles)	tools and machines		
	dressing and trimming (dressage et ebavurage)	make a sheared piece of sheet-metal as flat as possible			the technological element must be communicated to the students at the time of demonstration
	shaping-forming (mise en forme)	bending - folding (pliage - cintrage)	hot and cold		
	Assembly (assemblage)	- riveting - spot welding		spot welder - description - usage	

TRAVAUX PRATIQUES

Specialty: MEC-AUTO — 2nd Year

Title of Exercise	Objectives	Technological Elements	Experimentation	Indication
Grinding and seating valves (rectification)	to properly grind and seat valves	compression - good seal - angle of seat and valve where surfaces come in contact (portée)	grinding	
Timing: assembly and adjustment (gears, chain)	synchronisation of the crank and cam shafts (tiling chain or gears)	Timing - different methods (chain, gear, O.H. cam)	- adjust valves; positioning of crank and cam - mounting of timing chain or gears	valve adjustment - adjust on different motors - review technique
Wheel balancing	- usage of a wheel balancer - discovery of the consequences of an unbalanced wheel	- traction - tire wear	dynamic and static balancing	test on many wheels
Cooling system, water pump	introduction and familiarization with system	cooling of motor - heat transfer - thermostatic control	remove, check, and replace if necessary, the water pump. Use the hydraulic press to install new bearing	

Title of Exercise	Objectives	Technological Elements	Experimentation	Indication
Methodical disassembly of a motor	- introduction of systems - usage of precision tools	the motor parts - applied tolerances of the different parts	methodical disassembly - repair, classification; cleaning, checking crank tolerances, cylinders, pistons, cam, etc.	micrometer, dial indicator, valve gap, seals, gaskets
Removal and repair of pistons, rings, and connecting rods	particularities of this work and the standard exchange of these pieces	pistons, connecting rods, bearings constitution	put in place: pistons, rods rings, (use ring compressor) - precautions of orientation of pieces and their fragility	collier a segments (ring compressor) plastigauge
replacement of connecting rod bushing (bague)	installation of a bushing	study the installation of different rod bushings	extract, put in place, -bore- from a new wrist pin by machining	
Ignition Timing	Set timing	Timing: - top dead center - advance - retard	timing of different motors	check timing with timing light (if available)

TRAVAUX PRATIQUES

Specialty: ELECTRICITE — **2nd Year (25% shop time)**

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Connections and wire binding	to make good circuit connections (strength, insulation; etc.)	conductors; insulation, resistance	work with wire of different diameter, rigidity, and suppleness	simple notions
Assembly of circuits using various connectors and terminals	to make connections using a soldering iron (fer à soudre)	connections, resistance, voltage drops	solder wires of different diameters	use connectors and terminal ends
Solder terminals on battery cable	connection on a cable - strength	intensity, over heating, voltage drop	solder or weld connection with torch	
Replacement of wires and cables	elementary knowledge of electrical work (i.e. battery cables)	- diameter of wires - modes of connection	connectors, terminals, wire harness, clamps, - layout of circuit	work on a vehicle if possible
battery repair (case)	simple repair	- wire diameter - modes of connection	seal cracks in case (battery)	soldering iron

2nd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Repair of battery terminal	to repair battery connections	constitution of battery - external connections	cut out and make up new terminal	torch work - use old batteries
Battery check - charging battery	check state of battery	tension gravity level of electrolyte	check condition of many batteries (review)	stress this exercise's importance
Replace accessories and lights of vehicle (if possible)	work on small accessories (motors) switches, horns, lights)	characteristics of accessories, functioning, etc.	- remove headlights - change switches, relays	study varied accessories on car of your choice
Adjust headlights (if there is a place) and horn	correct functioning of headlights and horn	- optics and reflection principles - sound vibrations	geometrical and optical adjustment of headlights	work at the car and on the bench
spark plug condition check	clean and adjust plugs	insulation, electrodes, gapping, cold and hot plugs - spark plug condition as symptom of further problems	inspection: visual - clean and adjust - check many different plugs - tost report on plugs	use a large variety of plugs

2nd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
coil and condensor check	Inspect functioning of coil and condensor	- high tension spark - capacitor - insulation	- check the spark of many coils - check with meter or checklist	preview with many coils and condensors, perhaps have students construct their own tester
Partial revision or R+R of distributor - adjust points - test	put in working order the simple parts of a distributor	points, pring adjustment, insulation, rotor, cap, etc.	replacement of points and condensor adjust and test	work on a distributor for a 4-cylinder motor
Remove and partially disassemble a generator or a starter - replace on motor	simple connaissance of the cars apparatus	function of starter and dynamo - precautions to take during removal and replacement	remove generator or starter - partially clean and disassemble - check: brushes, armature bendix) - reassemble and replace	work on cars where the starter or generator are accessible

TRAVAUX PRATIQUES

Speciality: MEC-AUTO — 2nd Year (50% of the year)

Title of Exercise	Objectives	Technological Elements	Experimentation	Indications
Carburator	study of the circuits and functioning	carburation	study with aid of schematics of different carburators in the course of disassembly and assembly search for problems and recondition	schematic on: - solex - zenith - weber
Brake inspection	study of different braking systems as well as the inspection and means employed for the reparation	acceptable conditions of the brakes	preliminary tests in order to diagnos the state of the brakes followed by visual inspection	
Drum brakes: put in working order (shoes, drums..)		Remove drums, shoes; change lining (riveting), remount and adjust-rebuilt and/or replace wheel cylinders: master cylinder - bleed brakes		hone cylinders if necessary (rectification)
Disc brakes : put in working order		removal of caliper (étrier), inspection and change brake pads - precaution necessary for reassembly and final fixation. Inspect in the course of disassembly the condition of disc's surface as well as the eventual warping..		check tolerances given by auto constructor

2nd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
- Cam shaft - push-rods - oil pump	Organ placement	Distribution devices (cam shaft, push-rods, lifters, rockers) oil pump	- put in place cam shaft - note how it is locked in place - precautions on its precise placement as well as the seals, check oil journals and replace bearings	procedure of removal - test on many motors
Placement of the head	correct mounting of a component	Gasket and seals: - water - gases - oil	precautions to take when putting a gasket in place (clean surfaces, gasket sealer, etc.) tightening of head in correct order and sequences using torque wrench and torque	

TRAVAUX PRATIQUES

Specialty: METAL WORKING (Ajustage) — 2nd Year (12,5 % of the Year)

Title of Exercise	Objective	Technological Elements	Experimentation	Indication
use of drill press	drill holes under various conditions	guiding of bit, lubrication drill speed	complete hole; semi-drilled hole; adjacent holes (tangent); joined holes (secants); deep drilling	precautions - application on steel, cast iron; bronze, aluminium
drilling with hand drill	manual drilling	use of hand drill (chignole)	same work as above	proper holding of drill
Tapping of threads (taraudage)	threading with a tap by hand	Tap, proper usage, lubrication	different types of holes - complete (débouchant), semi (borgne) from 3 to 14 mm	applied on diverse metals
Threading by hand (filetage)	threading with threader (die) (filiere)	guidance lubrication	- threading with guide - preparation of piece - re threading from 3 to 14 mm - making of a stud (gougeon)	applied on diverse metals

TRAVAUX PRATIQUES

Specialty: Welding and Sheetmetal (Soudure et Tôlerie) (12.5 % of the Year)

Title of Exercise	Objectives	Technological Elements	Experimentation	Indication
Tolerie: Tracing Geometric construction	- execution of all operations - geometric drafting ability	- marking tools - methods of marking on sheetmetal	1st and 2nd years combined - limited to cones, hoods	- reminder of notions - precautions to take
Shearing (cisaillage)	manual ability	usage of different shears (cisailles), machine adjustment	exercises on different thicknesses of sheet-metal	safety precautions
Welding: regulating bottle pressure and flame at torch - running a straight bead	manipulation of the welding equipment	- calcium carbide - acetylene and oxygen - oxyacetylene flame - choice of welding tips (buses) - regulating)	manipulation of welder - setting up and putting away of welding equipment - lighting and extinguishing of torch - adjusting regulators - welding beads	- safety precautions - handling of botties - safety glasses

Title of Exercise	Objectives	Technological Elements	Experimentation	Indications
Weld: End-to-End, flat, an exterior angle	manual ability, knowledge of welds, currents used	particularities of welding, shrinking and dilation of metals, overheating of torch	weld end to end and at an exterior angle with different thicknesses of sheetmetal	preparation of metal surface
Weld an interior angle - welding of tubes	manual ability and knowledge of tubes and sheetmetals welded at angles	particularities of welding - advantages and inconveniences - metal deposits	weld interior angles - weld tubes and sheet	preparation of tubes and sheet surfaces
Brazing	manual ability - knowledge of the function of brazing	particularities of these welds flux powder (borax)	brazing on different thicknesses	brazing preparations

TRAVAUX PRATIQUES

Specialty: MEC-AUTO

3rd Year (50% of the year)

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Disassembly of 2-cycle motor	discovery of the particularities of this type of motor	2-cycle motor (le moteur à 2 temps)	methodical disassembly - arrangement of disassembled pieces, etc. - repairs	cycle motor
Decarbonise ports of 2-cycle engine	periodic maintenance of a 2-cycle motor	distribution of gas mixture and exhaust in 2-cycle motor	decarbonise with the aid of a wooden point - stress précautions to prevent scratching cyl.	wooden point and compressed air
Adjust and check carb	troubel shoot carb problems and remedy	carburation at all speeds	usage of an exhaust analyser	- vacuum gauge - exhaust analyser - screw driver - wrenches
Carb and accelerator linkage	check accelerator linkage	carburetors, linkages, cables, hoses, pivot joint, control link	check the functioning of: butterfly valves, choke valve, clamps, jets, hose between pump and carb, filter, play of butterfly valve axle	
Adjust carb	to assure ideal carburation at all speeds	homogenity of the mixture	experimentation at all speeds - check at a constant level	different systems (review)

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
a) cold starting b) idling	- to facilitat cold starting - to maintain a slow idle speed	- different choke mec anisms - idle circuit of carb	on cold motor, start engine without using accelerator turn idle throttle stop and idle mixture screw	tachometer
idle, acceleration running progression	progression of acceleration check progressive running up to high speeds	progreesion - by pass jet - by main jet principle of compensator	check progression of idle speeds accelerate from mid-speed to high, verifying the smoothness of acceleration	repeat operation many times
acceleration at all speeds	check the effectiveness of accelerator pump	different systems of acceleration	check for flat-spots in acceleration	check jets, pump and injector
Clutches	troubleshoot problems	clutch: role, qualities, requirements	establish a troubleshooting diagnosis before disassembly check: play of pedal, disc lining, clutch chatter	

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Disassemble clutch	to reuse repair, or discard clutch disc	the clutch parts - role and constitution	check: disc, splines, flywheel (flatness, score marks), throwout bearing - bolt tightness - pressure plate	
centrifugal clutch - clutch lining - clutch shoes	centrifugal clutch		state of lining and shoes effectiveness of spring of the shoes	
transmission - remove and replace	familiarization with different positioned transmissions	- front drive system - transaxle system (rear) - classic system	according to the system employ the most efficient method of removal and replacement	stress the importance of attention to the removal and replacemer of different types of transmission - alignment and progressive bolt tightening
Transmission: establishment of diagnostic procedure before and after disassembly	to learn to analyze and discover transmission problems with the help of the natural faculties of the student	methodical research of problems relating to the functioning of the transmission	road test; discovery of problems: - difficult shifting - gear noise	use all speeds - trouble shoot ostablish an analysis of reparation

3rd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Disassembly of transmission	familiarization with different transmissions	constitution of transmissions review technology relating to the mechanisms	depending on the transmission: disassemble completely	arrange and classify the parts, checking degree of wear
reassembly of transmission	gears assemblage - conditions of good reassembly and functioning	different procedures of assembly - tolerances - review	assembly: procede in reverse order of disassembly respecting tolerances and verifying the different movements - check after assembly	show in certain cases the sumps (case) - different systems of trans
Transmission remove, fix or exchange	study of different transmissions and the problems they can have	gaskets and seals	work on at least 2 modols - follow instructions - refer to control model for the tolerances and condition of seals and bearings -	stress the importance of precautions to take with transmission case and gaskets
Drive shaft - troubleshoot - disassemble	to localise problems before disassembly	functioning of a U-joint and the differential	road test or put on safety stands - look for excess play or noise - locate	elevate students sense of observation and deduction in the troubleshooting process - noise - play - vibration, etc.

3rd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Removal of drive shaft	study of different means of function for different models	different placements of drive shafts depending on vehicle	remove suspended and non suspended drive shafts - review technique	choice of the easiest method of removal
disassembly of drive shaft	troubleshoot	U-joints and differential	disassemble 2 types of drive shaft ex: (classic, banjo, split) disassemble the assemblages - check pieces - establish sense of estimation	
Assembly of drive shaft	assembly of U-joint	different types of assembly: - play in bearings - adjusting splines	- adjust bearings - play in splines - yoke - check splines (visually)	usage of: - caliper - dial indicator
Wheel axle	knowledge of different types - utilization of an extractor	the means of transmission	remove different models - use appropriate methods and tools	hub puller, bearing puller
Front axle - check geometry - preliminary work	preparation of vehicle for adjustments	geometry of front axle - alignment	check: tire pressure play in front end (bearing, bushing, etc.) - replace defective parts - put in position on alignment rack	usage of alignment rack: - review techniques - review characteristiques of alignment problems: tire wear

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
2nd adjustment: - camber - castor - toe-in	to assure good traction and straight steering minimizing tire wear	objectives of all the characteristic angles	utilization of aligning equipment - eccentric adjustment or addition and subtraction of shims	review characteristic of alignment problems: - bad tracking - etc.
Steering	knowledge of different steering units	role and function of steering systems	remove, disassemble, become knowledgeable with pieces - exchange parts - adjust play	stress importance of good condition of steering mechanism for safety reasons
general trouble-shooting (dépannage)	to guide the students to a systematic method of trouble-shooting	common mechanical disfunctions - electrical and carburation	exercises including all common problems of the motor: - ignition, -power - carburation, -cooling etc.	- test light - timing light
Governing of a Diesel injection pump	to begin to understand the difference between injection of Diesel as compared to carburation and ignition	components of injection pump - accelerator and power cut	preparation of pump before governing adjusting to constructors specs	Diesel motor
Injector calibration	Pressure check	trouble shooting	disassembly and cleaning	review techniques

TRAVAUX PRATIQUES

Specialty: Metal Work — **3rd Year (12.5% of the Year)**

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Reaming by hand	(Execution of all the operations of the 1st and 2nd years combined with:) to ream by hand	- reamer: mode of action hold lubrication precautions	ream with cylindric reamers - of diverse types - adjustable and non-adjustable	apply on diverse metals
Lock pinning (dowel) tapered	conical bore	- conical bore (ream) - utilization - drilling the lead hole	- drill lead hole - execution of the conical bore - chock with tapered pin	work with diverse pins
Assembly and mounting	riveting	- methods of assembly and mounting by riveting	repairing, removal and replacement of assembly - cold riveting	- order of replacement - check burrs - different rivets
Dimension and weights -linear measures	usage of measuring devices	- calipers: inside, outside, vernier - micrometer	use of vernier caliper - micrometer, etc. - check diverse pieces	list of readings of the dimensions

3rd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Measure by dial indicator	Usage of dial indicator	principles of checking by comparison - the dial indicators	check flat and cylindric pieces	list readings of dimensions
Summary of Exercises	Revision	Revision	execution of useful work	

TRAVAUX PRATIQUES

Specialty: Tôlerie - Soudure — 3rd Year (12,5% of the Year)

Title of Exercise	Objectives	Technological Element	Experimentations	Indications
Sheetmetal: fold and bend by hand and on the bender rolling by hand and machine	preliminary work with the execution of a piece initiation to rolling	the bender - determination of neutral fibers - the roller	execution of pieces of different forms allow for the dimensions	utilization of the machines
Work of the blank shaped tube - truncated schematic - hot rolling with sand	to habituate the student to work a tube	the processes of fabrication	exercises on a tube to the form of an exhaust manifold	repeat exercises until obtaining a correct rolling
Work on extruded sections	work on extruded sections	study different sections (profiles)	work on diverse extruded sections - assembled on useful work	profit by revision

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Welding: Arc-weld - exterior and interior angle	knowledge of principles of arc welding	- choice of electrodes - adjustment of welder - piece preparation - mode of operation	welding exercise on sheetmetal with and without chamfer	precautions to take against deformation
Recharge on a cylindric shaft	recharge practice	principle and utility of the recharge	work on diverse shafts	choice of electrodes

TRAVAUX PRATIQUES

Specialty: Electricité-Auto — 3rd year (25% of the Year)

Title of Exercise	Objectives	Technological Exercises	Experimentations	Indications
Distributor: disassembly - complete revision - reassembly - adjustments - test on synchroscope - cam angle	to put in complete working order	- functioning of ignition	disassembly - mechanical and electrical check - adjust advance curve - cam angle	work on distributors of 4 - 6 cylinders
Magneto: disassemble and check - replace and test	knowledge of functioning	autonomous ignition devices - magnetic principle - knowledge	complete disassembly - mechanical and electrical checks - adjust - test off and on motor	turning magnetos and magnetic flywheels
Starter: disassembly and verification - exchange parts - reassemble - test - replace - work on diverse types	detailed knowledge of starters - put in working condition	revision on principle of electrical motor - constituent parts - usage - theory - starter relays - switches, solenoide	remove and disassemble completely a starter - do mechanical and electrical verifications - put in working order - replace on motor - check relays and solenoid	work on car starters only - avoid heavy truck starters

3rd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Troubleshoot <u>starter circuit</u> on the car	to remedy a problem in the starter circuit	systematic search - method of diagnosis	troubleshoot on a car: - connections, cables, battery, circuit, dirty terminals, etc,	insist on priorities: above all, stress importance of contacts and lean battery terminal
2 brush <u>generators</u> remove, disassemble, verify, exchange parts, assemble, test on and off car	deepened knowledge - put in working order - ability to test	revision of theory - constitution of generator - different parts	remove, disassemble, check mechanical and electrical - put in working order - clean armature - check insulation - test on and off car	car generators only
<u>Alternator:</u> remove, disassemble, check, exchange parts, reassemble, test - all types	knowledge of modern alternators - put in working order - test	theory, revision of functioning, diverse parts, constitution, nomenclature	remove, disassemble, check mechanical and electrical functions; bearings, insulation, diodes, reassemble, test on and off car	work on current models

3rd Year

Title of Exercise	Objectives	Technological Elements	Experimentations	Indications
Regulator	connections of the different regulators - mounting	importance of regulator in system - delicacy - ground	adjust a regulator at a test bench with its generator (or alt) - replace on car and recheck its functioning	delicacy of work - work on as many types as possible
Charging circuit	troubleshoot charging problems	- function of charging circuit - methodical troubleshooting - principles	troubleshoot charging problems - check generator output, regulator, ampmeter, wires, and connections - use test lamp	troubleshoot late model cars - avoid problems too sophisticated
Electrical accessories	methodical troubleshooting of electrical accessories	methods of troubleshooting - diagnosis and localization - successive elimination - remark on poor ground connections	localization of problem in lights, signals, or any other piece of electrical equipment on the car	troubleshoot light and signal circuits on car of preference

Some final Notes on the Official Programs

In retrospect, the official program is generally restrictive, and limits the introduction of new ideas. It is prohibitive of innovative, comprehensive thought on the part of the students. But - it is flexible enough so that once you get used to the system, you can make an important contribution to the free-thought process that we as Americans understand and appreciate. It simply is not enough to teach your students "how to": you must strive to make them understand the whys and wherefores of their specialty.

Here are some suggestions, once again proposed and implamented by previous volunteers for implementing this motivated type of methodology:

A. For the metals group (metals, auto, and plumbing)

1. Meaningful metal-working projects. Give the kids a project or piece to make that is as original and relevant as possible. This can be very meaningful work, and can at the same time free you up to work with your students on a smaller group basis, while the rest still have busy work to do.

2. Set up safety projects, such as barriers around dangerous machines, setting machine stands into the floor, re-wiring faulty or dangerous electr circuits, etc.

3. Look around the shop, the school, and the community itself for relevant projects. These can even be done in conjunction with the other specialties at your school.

B. For the Wood choppers:

- to alleviate "Dead Time", you can:

1. Perfect previous work

2. Give quizzes and review tests

3. Teach affutage - tool sharpening

4. Take apart machines, clean and grease them, show how they operate internally

5. Create improvements in the atelier

6. Use scrap wood to create minor projects or to re-emphasize previous exercises

7. Final real work projects.

- Some ideas for projects are:

1ère année

- chalk boxes
- picture frames
- T squares
- joinery exercises
- small stool
- lamp bases
- Mallets, tool handles
- coat hangers

2ème année

- portable tables
- stools
- ladders
- joinery exercises
- child's bed
- real work needed by the school; i.e. desk repairation, etc.
- blackboard
- medical boxes for the workshops

3ème année

- doors
- windows
- stools
- closets
- formica top kitchen tables
- joinery
- table for televisions.

D. Relations at School

It is an important point to make here that we as Voc. Ed. shop teachers are only a small part in the grand scheme of life at a lycée or a collège. Of course, for our students we are by for and away the most important, for they are technical trade students, and as such the education they receive in the atelier (workshops) is weighted much more heavily both in terms of class hours allotted and in the overall grade average each student receives. But in the eyes of the administration we are only one of many concerns for which they are responsible.

In short, these three groups of people, administration, our colleagues, and the students - will react with us and we will interact with them at respectively different levels. Of course, there will probably be exceptions to this rule - there always are - nonetheless, certain generalities about modes of conduct (both theirs and ours) can be made:

The School Administration

Following is a list of the different functionaries in a typical lycée or collège administration. The observations made as to the particular functions of each of these positions is true in all cases. The observations made as to how much contact you will actually have with the individuals in these positions are generally true, but may begin to vary as you get to know them and find out what they may or may not be able to do for you.

1. The "Proviseur" (lycée) or the "Directeur" (collège)

   - our equivalent of a principal, this man is the chief honcho. The buck stops with him.

   - he is ultimately responsible for everything that goes on at the school.

   ++ Exhaust all other possible resources before going to him.

2. The "Censeur"

   - he is the number two man, and as such is the assistant director;

   - he is directly responsible for all dealings with the faculty of the school;

- he is responsible for establishing and maintaining the class schedule for all of the teachers.

+++ Usually, there is no call for contact on an official basis with this man, except perhaps at the beginning of the year, if you find yourself with schedule problems.

3. The "Econome"

- responsible for all financial matters at the school. This is the man who gives the final o.k. for all financial purchases.

++ You will probably have limited contact with this man, although you might have to go through him for equipment purchases.

4. The "Surveillant Général"

- this man is responsible for matters concerning the student body

- he is the head disciplinarian

- he handles all discipline, attendance, and general student problems.

+++ You will probably have contact with this man, especially if you have a student or students who pose discipline problems that you yourself cannot handle.

a) The "Surveillant de l'Internat"

- the person responsible for all students who receive room and board (live-in) at the school

- he is also in charge of all student activities outside of normal class hours

b) The "Surveillant de l'Externat"

- he is responsible for all day students who do not live in the dormitories at the school

- he is responsible for all problems during class hours;

- he supervises hall guards, or monitors, called "surveillants".

c) "Surveillants"

- these are the hall guards or monitors who are responsible for immediate discipline problems in the classrooms.

- Their methods are quick and often rough.

+++ You will almost definitely have contact with surveillants for discipline problems that are beyond your control. Be careful with these people! Although they will restore immediate order to your class, it could later backfire in your face in the form of resentment by the students.

5. The "Chef de Travaux"

- he is the person responsible for all that happens in the shops

- he supervises teachers and shop maintenance, and is responsible for the schedules in the shops.

+++ This man is very important to you! In reality, he is your immediate supervisor. Get to know him as soon as possible. Most problems, of any sort, can generally be handled by him, without going any higher up in the chain of command.

6. The "Magasinier"

- this man is responsible for all school property and supplies

- he distributes all software and hardware needed by the shop teachers during the year, inventories it, and collects it at the end of the school year.

+++ You will have constant contact with this man! Stay on his good side and it will greatly facilitate your access to tools and material.

7. The "Inspecteur"

- he is the general pedagogical supervisor for a given region, usually in only one or two technical subject areas. He is an overworked and understaffed person, constantly on the road visiting and inspecting teachers at different schools within his region.

- his job is to inspect, supervise, make suggestions, and write up reports on classroom teaching.

- it is only through an official inspection by this man that a Tunisian teacher can get a raise in both pay and status.

- although not graded officially, you will possibly be inspected. As a foreign teacher, this is essentially unofficial and has no bearing on you salary or your status, although the usual reports will be made and sent to the Ministry in Tunis.

++ Contact varies. Remember that this man is a "big shot", and must be treated accordingly.

Here are some general observations about your relationships with your school administration:

- The amount of contact with these people ranges from a lot at the lower echelons to a little or none at the highest echelons.

- In general, if you have a prbblem, start with the lowest man on the totem pole. This is an unwritten rule, much the same as it exists in administrations in the U.S.: the chain of command must be respected.

- This, as stated before, is somewhat flexible, and can change according to the peoples' personalities, your personality, and also who you get to know or are on the good side of.

- It will probably be very rare that you receive positive reinforcement from the administration. This is applicable not only to yourself, but to your Tunisian colleagues as well. A pat on the back is something that simply is not done in this society.

The fewer problems you create for your administration, the quicker you can ameliorate your relationships and establish your credibility.

Finally, here are some suggestions that will prove helpful in keeping in good grace with your administration:

1. Get to know them:
   - by name
   - by title
   - by what they will be able to do for you.

2. Their help or hindrance depends in part on you. If you show them respect, you'll receive theirs in return. Several ways to do this are:

   - be on time
   - attend all required school functions
   - fill out all required forms
   - don't break, lose, or waste school material
   - cover the material in the program
   - respect the chain of command
   - be as independent as possible
   - maintain high standards of professional and personal integrity.

Relationships with Colleagues

Our credibility is more easily and quickly established with our colleagues than with the administration. This is due in part to our more intimate and professional contact with them. A major problem for you will be general lack of understanding of your volunteer position here. Quite often we are wrongly viewed as just another "cooperant", or foreign teacher under contract, who makes three to six times as much money as you or your colleagues. This is a stigma that is painful and often difficult to shake.

As far as colleagues go, Tunisian "stagiaires" (first year teachers), and newer younger teachers seem to lend themselves more easily to warm professional relationships, due to the fact that both you and they have something to learn from one another. Colleagues that are well-seasoned seem to be harder to work with in general, because they are much more set in their ways (both professionally and pedagogically) and are less apt to accept our new and different methods. Here it is a matter of time and subtle displays of our effectiveness that will lead to our acceptance as qualified technical teachers. Rounding out the bottom of the scale

are Eastern European colleagues (remember that Tunisia still lacks qualified technical teachers, and contracts out to a host of different countries), who can be more obstinate than the old Tunisian troopers, and seem at times to be obsessed with creating a wall - the old iron curtain perhaps - between themselves and all other colleagues.

A certain amount of jealousy might exist among those of your Tunisian colleagues who are technically less competent than you and must be treated with much more subtle approaches. You can gain their respect, but it must be done in a delicate way, so as to appear that they are making technical discoveries "on their own".

Backstabbing and contradictory approaches given to our students by our colleagues is not uncommon (remember that you are playing the game on their turf!), and you must discover for yourself where to draw the line on this sort of "help" by your counterparts.

Here are some things to reflect upon concerning your relationships with your colleagues:

- be polite and somewhat reserved at first
- approach them as you would any new co-worker or potential friend
- make an effort to get to know them
- ask them questions about their experiences, about how they handle certain problems
- your colleagues are a great source for social contacts
- choose your friends carefully, just as you would do at home.

Student - Teacher Relationships

The students that you will be teaching in your shop will range anywhere from 13 to 18 years of age. There is no point in elaborating on this any more than to say that these are boys that are going through the confusing process of growing up. They are like students in junior and senior high schools in the U.S.: quick to react, extremely high energy levels that are sometimes difficult to channel, rambrunctious, devils and angels at the same time.

The traditional relationship between Tunisian teachers and students is one of distant esteem and respect. A professor arrives in his classroom (or shop) at the opening bell and leaves immediately upon the final bell. He will not linger and talk with students nor will he tend to associate with them either in or outside the school. Questions pertinent to the lesson are permitted but calling into question the teacher's professional competence or personal authority is not tolerated. The teacher himself does not generally inflict punishments. He will simply announce to the student concerned that he will be punished. The teacher then turns the matter over to the school administration. In terms of his social relationships within the school, he tends to associate only with colleagues.

This is perhaps one way in which the PCV Voc. Ed. teacher can have some meaningful type of input into his class. He can offer them energy, enthusiasm, motivation, and compassion - things to which Tunisian students are not accustomed. BUT! Be careful! Since the students have probably never been exposed to this sort of thing before, the idea of "Hi, I'm a friendly Peace Corps Volunteer, and I'm here to help you" can be very dangerous. Not understanding where you're coming from, they might see it as a weakness, use it as a wedge, and try to take advantage of your naïveté. There is a fine line to be drawn here. If you come on too friendly and openly to your students; especially at the outset, you might risk losing total control of your class. The best thing to do is to start the school year off strictly, pure business and no joking around. As time progresses, you will win the respect and credibility that you will need in order to maintain control, and as this happens, you will be able to become more and more yourself. It's much easier to start off hard and ease up later on than vice versa!

Your students will break down into one of two categories - "Internats" or "Externats".

Internats are students who live too far away from the school to commute each day. They therefore live in dormitories at the school throughout the week. Their homes are in rural settings, and their parents are generally poorer and less educated than their "city" counterparts. Because the school is run much the same as a military school in the U.S. (marching in line to and from classes and meals, light out at a given time, strict supervised control 24 hours a day), your internat students will tend to be more docile and pose fewer discipline problems. They are generally slower to learn than the externats, but at the same time more willing.

Externats are day students who commute daily to and from school. Their families generally come from a higher economic bracket of society, and are more cosmopolitan in their outlook. Not being forced to observe the rigid standards of living of the internat students, they are often cockier, more energetic, and often cause the bulk of the discipline problems in the school. They are quick to learn, but lack the respect for authority that the internats have, and their level of concentration is oftentimes much lower.

E. Discipline

This very well could be the most frustrating area in the first few months of your teaching experience. One thing to bear in mind at all times is that every teacher in every subject in every country throughout the world has discipline problems from time to time - no matter how good a teacher he or she is. "Kids just are like that", whether they are in school in the States, in Tunisia, or anywhere else. Even when you lose your temper, remember that you are not alone with your discipline problems: there is no sense in wearing yourself to a nervous frazzle because of an educational situation which existed before you came, and will continue to exist after you leave.

Do not, in the beginning, worry about "making friends" with the students. First of all, they want and expect a teacher that they can respect as a teacher. For establishing discipline, the most effective method is firmness, particularly at the outset. Once you are sure you have received your students' respect, and have established your credibility, you can afford to become more flexible. It is only a matter of a few months in your first year of teaching - afterwards, you will find that you can loosen up considerably; and that's when the real fun and positive experiences of teaching begin to take shape.

The following are the means at your disposal for controlling discipline; listed in the theoretical order of application:

Yourself: This is oftentimes the most difficult of means, but if you can nip a discipline problem in the bud without going any further, it is by far and away the best (in terms of credibility) and effective method.

"Surveillants": Use of these hall guards generally yields very short-lived, but immediate results. Surveillants will quite often resort to physical punishment which is technically illegal in Tunisia), in restoring order, a method that can backfire and make things worse in the long run.

"Observations": These are written official notices to the administration of a student's misbehavior. Three of them constitute an "Avertissement". This method is possibly effective if consistantly and properly applied. But it also can backfire in the form of weakening your personal control over disciplinary situations.

"Avertissements": These are written official notices to the students' parents as well as the administration of a student's recurrent misbehavior. Three of these can cause expulsion from school. The administration gives these in accordance with a student's accumulated "Observations", or an occurence of a grave infraction of the regulations of the school.

Individual teachers may also give "avertissements" to deal with severe discipline problems. It is effective, but can label you as a villain among students and colleagues alike. After a student receives three "avertissements" he is automatically sent before the "Conseil de Discipline" and sent home for a period of time that varies from a few days to 2 weeks. After being sent before the "Conseil de Discipline" three times, a student is permanently thrown out of school.

"Exclusion": Send the offending student to the administration accompanied by the "chef de classe" (student responsible for the group) and a written note explaining briefly the circumstances. Write "Exclu" in the official role book next to the student's name. The student may be sent directly back to your class (the administration requesting your consent to re-admit the student) after having been chastised by the surveillang général, or he will be detained in "Permanence" (forced study hall), upon which a written report may be demanded concerning the precise circumstances of the exclusion. This is said to be an extreme measure, but Voc. Ed. Volunteers over the years have found it to be quite an effective means of getting rid of a troublemaker.

Written Reports: to the "Directeur". In cases of continued unbearable behavior (this is rare), a report is made describing the nature and frequency of problems caused, including requested action. This usually results in the student being expelled from school for one day to a week, but it can result in a student's definitive dismissal from school if it follows a pattern of misbehavior. This is truely an extreme measure which you more than likely will never have to use.

Before going on to specific discipline problems, and specific solutions, it might be well to differentiate between discipline problems themselves and "class management problems". These are items that, to be sure, can lead to potential discipline problems but are nonetheless either totally the fault of the volunteer teacher himself, or basically out of the control of either the teacher or his students:

1. Students turn off to French
2. No motivation
3. Differences in educational philosophy (teacher/student)
4. Interference by other classes
5. Lack of lesson preparation by teacher
6. Lack of materials
7. Lack of knowledge about the system and about the way Tunisians do things.

To round out the area of discipline problems, here is a list of problems and suggestions for dealing with them that have been proposed throughout the last few years by fellow Voc. Ed. volunteers in Tunisia:

1. Disrupting a lesson

   - punish one or two kids and make an example out of them
   - stop the class and give a quiz on that day's lesson
   - keep up the pace. Don't give the students the opportunity to cut-up.

2. Disobedience

   - seating arrangement to keep troube-makers away from friends
   - use of school procedures (observations; avertissements).

3. Incorrigeable Kids

   - give him increased responsibility rather than punishment
   - observations and avertissements
   - have a meeting with the father and school officials.

4. Unsafe Behavior, such as when students crowd around machines, not using guards, playing. Also cultural problems - not willing to wait turns or believing it is Allah's will:

   - set a good example
   - if a student forces his way to the front of line, give him the last position
   - stop the student from work and put him in the corner
   - threaten to send the student out of class and do it if necessary.

5. Stealing

- know tools will be counted at the end of class and will be located
- appoint a student "magasinier" from the class for each session, who will be responsible for dispensing and gathering tools and material.
- if not found, have an administrative investigation
- paint tools the same color, or stamp them, for identification

6. Cheating

- spread students out
- give "0" if caught
- tear up the test papers
- take off points for talking
- students must get permission before talking or moving during a test

7. Clean-up

- take off points if a student is not working
- hand out brooms and assign jobs
- assign specific jobs to specific students
- each student has a specific area for which he is responsible.

8. Interference of other Classes

- students in your class keep others out
- define work bench areas
- send students out

One last note on discipline:

THINK BEFORE YOU STRIKE !!

F. Grading

It is your responsibility to formulate and register grades on each individual student that you teach for each shop class. It is a good idea to keep a personal grade book in good comprehensible order, for at the end of each semester you are required to transfer these grades, and personal comments on each of your students into the administration's master grade sheets, called the "Bulletin"

The method for grading in Tunisia differs from ours, in that it follows the traditional French formula which employs a 1 - 20 scale. In this system, 10 is the passing mark, 9 and under is a failing grade, and 20 perfect. BUT... in the Tunisian system, especially in shop classes which bear much more weight in the final overall average of the student than any other of his academic or theoretical courses of study, it is almost unheard of, indeed revolutionary, to give any student, even the best, a final average of more than 16. There is a general rule of thumb to be followed here, and it goes like this:

- 20 is for Allah
- 19 is for Bourguiba (Tunisia's President for life)
- 18 is for Mohamed Ali (the boxer) and for teachers
- 17 and below is for the students

... Both administration and colleagues alike will likely become quite upset if you attempt to give even your best student a grade of 16 or over. One basic reasons for this; especially for a technical student's grade in the shop, is that if he receives a high grade, it will carry him through the semester, no matter how poorly he does in his other subjects.

So in general terms, what it comes down to for you as a shop teacher is this: 10 is a grade that you will give to a student who, although he is struggling with both the work and the comprehension, has made observable efforts ans has not been repeatedly absent or a discipline problem. You can reserve the right to give a failing grade of 7, 8, or 9 to students who obviously are not able to keep up with the material or the work; or who simply display an attitude of "I don't care". Remember, that given the weight of their average in the shop as compared to other subjects, that if you give them a failing grade of below 10, that they will probably receive an overall failing average for the semester. If this carries over to a failing average for the whole year (the total average of work for both semesters), they will not be allowed to move on to the next year of study. Students are allowed to repeat the same school year only twice:

If they fail once again on their second try, they are irrevocably thrown out of school.

A grade average of 11 should be given to students who can obviously perform the desired work, although they are slow to do it, and their final pieces show defects or fall below acceptable tolerance levels. Grades of 12 and 13 are considered very good indeed, and should be given to those students who work both well and diligently. Once you start handing out grades of 14 or 15, you are generally dealing with your most intelligent and highly motivated students. Average grades of 14 and above are roughly equivalent to dean's list averages in the States. The first student in the class is unlikely to have an overall average in all subjects of more than 13 or 14.

It is important once again, to repeat the importance of the final semestrial average that you give your students in the shop. The final average for a student for all subjects of study is formed on a "coefficient" basis. The coefficient for each course of study is a pre-determined value or weight of each class in relation to the others. It is used as the multiplier to change individual semestrial averages, expressed on the 1 - 20 scale, into a figure relative to all other classes.

When it comes time to fill out the semestrial "Bulletin", you will be required to register each student's grades on his individual sheet. Each sheet contains a line for each course the student may have. You will enter your grades on the appropriate line. You will be concerned with filling in the line marked "Atelier", or "Travaux Pratiques", which is the practical shop class that you will be teaching. There is space to enter grades in several areas, i.e. "tests" (short-term written or oral tests or minor practical exercises), and "devoirs" (major practical exercises). In addition, you will be required to fill in the "rang" of each student, or his numerical standing in the shop, according to the averages of his other classmates.

There are two other things which you will be required to fill in for each student on his individual sheet. One is the final numerical number attributed to him for shop class, arrived at by taking his final average and multiplying it by the coefficient number assigned to the shop course. The other is a short personal remark on the student's work or progress in the shop. A list of such comments is supplied at the end of this section on grading.

The "Bulletins" are more or less like report cards that are filled out in triplicate using carbon paper. One goes to the student's parents, the others are kept for file by the administration. The final report card at the end of the year is the sum

average of both semesters' grades and is put into the student's permanent record, his "Livret Scolaire".

The final semestrial average for a given student in his shop is arrived at by the following formula:

$$\frac{3 \times \text{the average of "devoirs"} + 1 \times \text{the average of "tests"}}{4}$$

This means that "devoirs", or major practical exercises, are given three times the importance of "tests", or short-term written or practical quizzes. Once you have taken the average of all major practical exams, multiply that number by three, and added on to that the average of all minor quizzes you have given, and then divided that sum total by four, you have arrived at the overall semestrial average of a given student. This reinforces the fact that you, as a teacher, must keep detailed and comprehensible statistics on the grades of all your students.

The Ministry sets minimum requirements for the number of exams given per month. They are: at least 2 tests (written, practical or oral with a duration of no more than one hour), and 1 devoir (one or more hours of major practial exercise). In reality, tests and devoirs are given at the discretion of the teacher when they are needed according to the needs of the work.

These grades will be recorded 4 times a year: once at the end of each of the two semesters (January and June), wherein you must also calculate averages "rangs", and the coefficients, and enter them into the Bulletin. The two other times that you must enter each student's grades is once in the middle of each semester, around the end of November, and the end of March. These are not the Bulletins - they are administrative "progress reports" which are sent to the parents at each mid-semester to give them an idea as to the progress of their children. In these mid-semester reports, you are required only to enter the student's grades up to that point in the semester, without having to figure averages, etc.

One final word here. You might, after having finished reading this section on grading, find yourself totally lost and confused. It is extremely difficult to understand this system simply by reading about it. But during the course of the training program, when it comes time to discuss the area of grading, your technical coordinators will run through practical exercises on the subject. It will surely become much clearer once you have seen the system demonstrated with practical examples, written and explained on the work sheets that will be provided for you.

Examples of comments written in the Bulletin and/or Livret Scolaire :

Bonnes appréciations:

- élève sérieux, rendement satisfaisant
- très bon élève
- bon élève
- bonne participation en classe
- résultats satisfaisants
- il a fait des progrès

Appreciations Moyennes

- peut mieux faire
- moyen dans l'ensemble
- passable
- assez bons résultats
- faible malgré ses efforts

Mauvaises appréciations

- ne travaille pas
- faible, ne fait rien pour s'améliorer
- médiocre (presque moyen)
- paresseux
- bavard
- insolent
- peu de résultats malgré de bon travail
- il fait le clown en classe.

G. Testing

The best way to give a fair, comprehensive test in a workshop, or in any subject for that matter, is to have the exercises and questions well planned out beforehand. This eliminates confusion on the part of the students, as they know right from the start exactly what will be expected of them during the test, leaving grading less open to speculation and criticism.

The purpose of an evaluation is to:

1. Find out what a student already knows in relation to the course objectives or to the pre-test at the beginning

2. Find out to what extent each student meets each behavioral objective

3. Provide a basis for constant program improvement and guidance

4. Find out how effective the instruction has been in assisting learners to meet the objectives

5. Provide a basis for giving grades.

In measuring and grading manipulative skills, the obvious and most effective means of measurement is in how a student performs a particular task, whether it be a short practical exercise (test), or a longer job or task exercise (devoir). It has been proven by former Voc. Ed. Volunteers that giving individual pre-determined oral questions related to the exercise serves to aid the teacher in evaluating the student's comprehension of what he is doing. Remember that it is not enough that a student be able to perform a task on a monkey-see, monkey-do basis, but that he demonstrate at the same time an understanding as to why he is doing what he is doing.

Measuring manipulative skills:

A. Performance Test("test")

1. Describe skill to be measured based on performance objective

2. Indicate work areas, distribute tools and materials

3. Indicate desired level of performance, e.g. tolerance, fit, accuracy

4. Indicate time allowed, special conditions, safety procedures, etc.

5. Explain method of evaluation.

B. Job or Project Evaluation ("devoir")

1. Planning and following blueprints

2. Accuracy

3. Finish within allotted time - if necessary

4. Use and care of tools

5. Safety requirements

6. Evaluate the project each time an additional step is completed which reflects a performance objective

The other type of test that teachers often give in workshops is of the written, essay-type. This can and usually should include some type of technical design that demonstrates the student's understanding of procedures and key technical words. Remember in this type of evaluation that French is not the student's native tongue. You should not mark off points for grammatical errors, although you should insist that all key technical words and phrases be written correctly, as they very often do not exist in the Arabic language, and must therefore be understood by the student in order to talk intelligently about the subject. This is a valuable evaluation tool, even though it is rather subjective in nature. To be as objective as possible, it is best to prepare the test in a way that the student may use representative drawings and designs, and a limited amount of phrases.

It is not suggested in giving written exams that you use objective type questions, such as multiple choice, true-false completion, and matching. These are methods that are not known in the workshops of Tunisia's technical schools, and therefore would probably be met with repression, apprehension and mass confusion.

There is one other valuable area in testing Tunisian technical students that is based on behavioral objectives, and is labeled in pedagogical terms "Measuring Attitudes".

The attitudes to measure are:

1. orderliness - the goal being to work in a systematic order

2. Perseverence - application to the job, keeping at the problem to find a solution

3. Problem solving - logical, systematic approach

4. Cooperation - working and sharing with others, shop clean-up

5. Following safety procedures

6. Creativity - trying new solutions, offering new ideas

7. Craftmenship - pride in quality work by self and others.

Two means of measuring those attitudes are

1) individual analysis, which means keeping a separate record on this subject for each student, using a rating scale, and

2) the sequential checking off of records, e.g. observing students on a regular schedule for 10 - 15 minutes.

In doing this, avoid recording at a particular time when a student happens to come to your attention.

Finally, in putting an effective evaluation program together, while respecting the requirements of the school program, you should register grades in your own gradebook in as systematic and comprehensive manner as possible. In doing this you should consider:

- grades for each behavorial skill completed (jobs or projects, "devoirs")

- grades for "tests" on related information

- weighing of grade determined by importance of objective and length of time spent (is it a "test" or a "devoir"?)

- grades for attitude should not be combined with those for skills and knowledges

- explain your system to your classes; usually it is a good idea to keep actual grades confidential

- plan for a periodic discussion with each student regarding his progress in meeting behavioral objectives.

H. School Procedures

Student Notebooks

Technical students in Tunisia have no textbooks. During the course of their three years of study, it is the information that the teacher gives them, either by the conventional blackboard method, or by blueprint handouts, that becomes their technical reference book. This is to say that beginning in their first year of study the students start to amass the information passed on to them by the teacher into one, or usually two different notebooks, so that by the end of their third year they will have what amounts to a comprehensive technical textbook that included all theory, exercises, procedures, and other pertinent information as regards their specialty. The Official Program sees to it that this is done in a fairly orderly and logical sequence.

One of the two notebooks that your students will bring with them to class is called the "Cahier d'Atelier". It is a large format notebook, about 0 cm x 13 cm, and all the pages are lined like graph paper. It is in this notebook that students will copy all diagrams and procedures for new exercises, such as the use of a new machine or a newly introduced technical procedure. In short, the students will put into this book under the teacher's direction, all practical designs and directions for each exercise (including step-by-step procedures, tools and materials needed, specifications, safety procedures, etc.) Usually, whatever you write and/or design on the blackboard should be material that will be copied into the student's cahier d'atelier. It might be noted that some schools insist upon using a cahier d'atelier that is already pre-arranged, with space alloted for designs, for procedures, for grading, and for other specifications. This, however, is the exception rather than the rule, and is good for you as a Voc. Ed. Volunteer in that the regular graph lined notebook gives you much more freedom in determining your own order.

The other book that the students will bring to class is the "carnet d'atelier". It is exactly the same as the "cahier", containing only graph-style sheets of paper, but is on a smaller format, approximately 7 cm x 10 cm. In this notebook the students will fill in all <u>theoretical</u> information that you give them that is not directly related to the specific exercises that appear in the cahier d'atelier, but pertains, nontheless, to related subjects.

Copies of both the cahier d'atelier and the carnet d'atelier will be shown to you during the training program, so that you might have a better idea of exactly what goes into each one of them.

Handouts

All diagrams, designs, and other instructional materials must be done in the format of a blueprint. This is the standard method of reproduction at all schools in Tunisia. Photocopy and ditto machines are not used. Preparing a blueprint is very easy and can be a great time saver in the shop. Blueprints are used most often for the introduction of a new exercise or procedure, called a "Lancement d'Exercise". Instead of wasting both the teacher's and the students' time by writing and copying off on the blackboard, blueprints can be radily handed out, and with them the teacher is assured that all of his students have the same design to put in their cahiers.

Blueprints are called by one of three names in French: "Tirages", "Calquos", or "Bleues". They are prepared by the teacher, who uses a technical drawing pen filled with India Ink and blueprint paper (papier de calque). Blueprint paper is an opalescent, blue tinted plasticlike material that can be bought in almost any "librairie"(stationary book store) in Tunisia, either pre-cut to specifications, or by the meter. Being opalescent, it is easy to trace a diagram by placing it underneath the blueprint paper. Once you have completed your blueprint, you fill out a requisition form, called a "bon", on which is written the title of the blueprint, the number of copies desired (always ask for about 10 more than you need), the date, and your signature. The copies are then run off on a blueprint machine, which all schools possess, and are given back to you with your master copy.

During training, you will be supplied with pens, paper, and other necessary material, and will be shown by the staff how to make a blueprint.

Technical Aids

Other than blackboard and blueprints, there exists virtually no other visual aids resources at the schools. The use of slide projectors, opaque projectors and the like is unknown and unavailable. This emphasizes the fact that the only written information the students receive is given by the teacher, and he must thus be clear and concise when preparing a blueprint or doing blackboard work. Everyone develops their own style for blackboard work, but there are, nonetheless, several items that must be kept in mind:

1. Write clearly, with lettering large enough so that all can see

2. Give students enough time to copy material into their notebooks before continuing or erasing.

3. Make it short and sweet. Don't get fancy or flowery. Use the simplest expressions with the fewest words possible in order to get your point across.

4. Be neat and orderly. Try to avoid backtracking, especially when writing on the board. This necessitates good lesson preparation, and well planned board work.

5. Make sure that all words and phrases are spelled correctly before putting them on the board.

Voc. Ed. Volunteers in Tunisia have found one method of writing information for students that has proven very successful. It is the preparation of "Flip Charts". Chart paper is cheap and easily available in Tunisia, although not too many teachers take advantage of it as an educational tool. Flip charts are advantageous because they can be prepared at home, before the class begins, and avoids wasted time at the blackboard. They give the teacher more time to prepare a well laid out lesson, without being under the pressure of the students while he makes the drawing or writes the material on the blackboard. They also eliminate the necessity of erasing to create more space, and the use of several charts for one lesson allows the teacher to present to his students in a step-by-step fashion exactly what he wants them to understand and copy into their notebooks.

Flip charts are also a good method for "cheating" for the teacher. Using different colored felt-tip pens, the prepared material is already written out for the students. Along the margins, or in between lines of the lesson, you can lightly write in pencil the different steps of the lesson or any other information (in English if you so desire) that will aid you in keeping the lesson plan flowing from step to step. You can see it and follow it, but the students can't. You thus will have a crutch to use, especially in the beginning, that will help you to keep the lesson going as planned without getting lost or wasting time.

Making flip charts is a subject that will be covered during training, where you will have the opportunity to see how seasoned volunteers use them and to prepare and use them yourself.

Ordering Supplies

As previously discussed, all software and hardware that you will need in the shop, including tools and material must be obtained from the supply room, called the "magasin", which is run by the "magasinier". To procure any material, you must fill out a requisition form, called a "bon", a copy of which will be found in the next section entitled School Forms. You are responsible for all tools that you take from the magasin and are required to return them at the end of the year. A concise list is kept by the magasinierwhich contains all material for which you have signed. Although allowance is made for breakage, and for "missing" material, your credibility with the magasinier and the administration will be greatly enhanced if you demonstrate a conscientious responsibility toward the property of the school. The more you lose or break tools, the harder it will be to stay on the good side of the magasinier, and thus to procure what you need in your shop.

I. School Forms

Although official school forms may vary somewhat, from school to school, they are essentially the same. Some schools may approach official communication between teacher and administration more rigidly than others. For example, the Lycée Technique in Kasserine requires a detailed work proposal for all major exercises done in the shops, whereas the Lycée Technique in Gabès does not.

You will find in this section uncompleted forms that you are likely to fill out during the school year. You will spend time with the training staff in filling them out in order to get a good idea of what will be expected of you in terms of properly filling out official school forms.

Here, in order of appearance, are the forms in this section:

1. Emploi du Temps : teacher's schedule
2. Bon : requisition form
3. Notice Individuelle : teacher's personal Qualifications statement
4. Demande de congé : teacher's official absence form
5. Reprise de Service : form to be filled out upon returning from an absence
6. Observation : official discipline form
7. Demande d'Exécution de Travail : form that some schools require of shop teachers for each project done in class.
8. Fiche de travail : form required by some schools specifying the steps and procedures of a given project
9. and 10. Bulletin : the official semestrial report card
11. Relevé des Notes : mid-semester progress report

Ministère de l'Education Nationale
- Enseignement Technique et Professionnel -

Heures dues: _____
Heures faites: _____
Heures supp.: _____

Emploi du Temps

à compter du: _____ au: _____

de M. : _____ Titre: _____ Specialité: _____

Etablissement: _____

Heures	8 à 9	9 à 10	10 à 11	11 à 12	14 à 15	15 à 16	16 à 17	17 à 18	18 à 19
Lundi									
Mardi									
Mercredi									
Jeudi									
Vendredi									
Samedi									

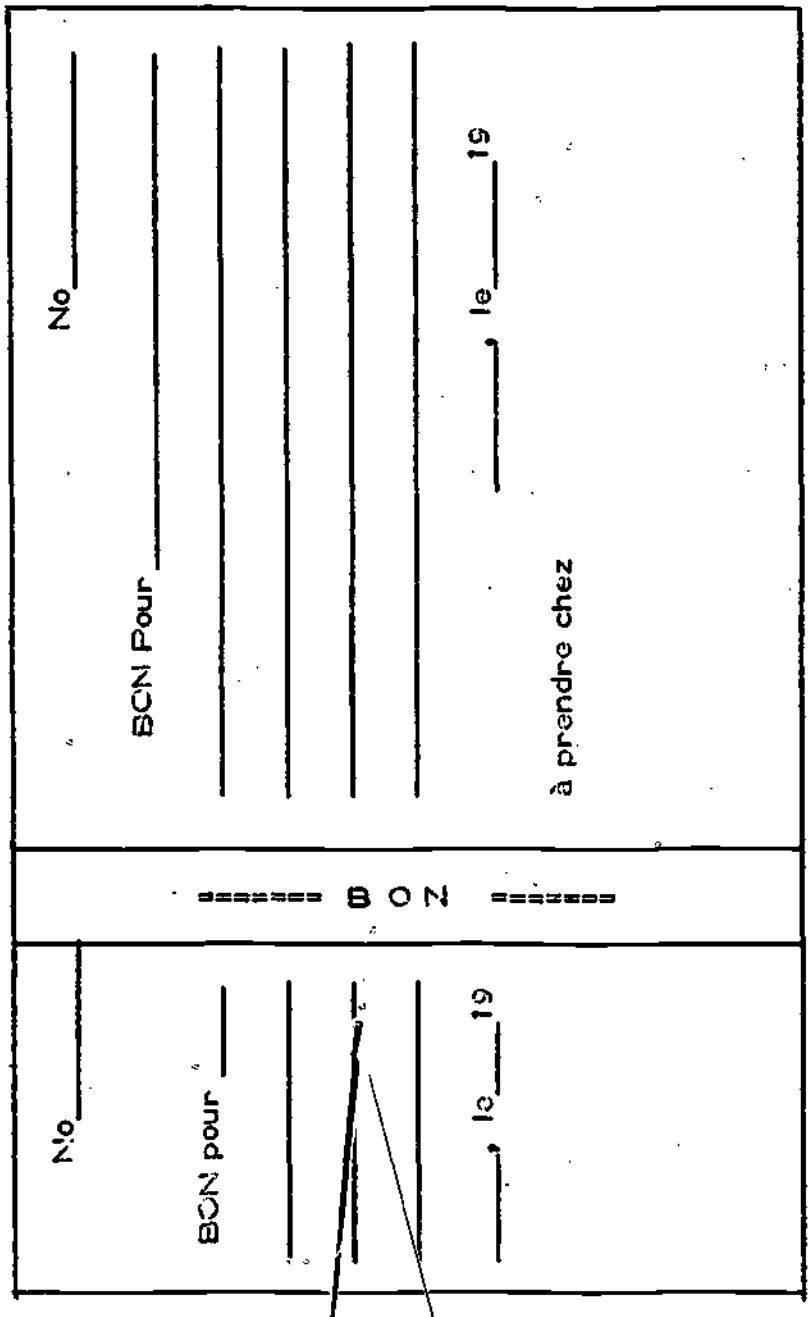
Important : L'Emploi du Temps sera soigneusement établi en trois exemplaires. Colorer légèrement en bleu les heures théoriques, en rouge les heures pratiques. Chaque indication de cours théorique ou pratique doit obligatoirement comporter la classe (ex par exemple, la matière enseignée, dessin ou technologie ou électro-technique) et le nombre d'élèves dans les cases rectangulaires

Certifié exact
Le Directeur
Signature et
Cachet

Approuvé
l'Inspecteur de
l'Enseignement
Technique

"BON"

A "bon" is a requisition form. All material needed from the storeroom or "magasin" for classes, especially in the "atelier" or shop, is ordered with the "bon". It's in two parts. The first part or stub, stays in the "livre de bon", which is like a check-book. The second part is like a check and is filled out before being given to the "magasinier". On receipt of requested materials, the teacher signs the magasinier's receipt book.



Republique Tunisienne
Ministère de l'Education Nationale
Délégation Régionale de l'Enseignement Secondaire de Sousse

Année Scolaire: _____

Etablissement: Collège Secondaire Professionnel Rue de Fes, Kairouan

Discipline: _____

Notice Individuelle

Nom et Prénom: _____

Date et lieu de naissance: _____

Etat Civil: _____ Nombre d'enfants _____

Profession du Conjoint: _____

Fonctions antérieures à l'enseignement: _____

_____

Date de la 1ère nomination (en Tunisie), etc. _____

Postes occupés: _____

_____

_____

Qualité (Agrégé, Licencié): _____

Date de la Titularisation: _____

T i t r e s

Nature	Facultés	Mention ou Rang	Date

Promotions

Echelon actuel: _____
Date de la dernière promotion: _____
Date et note de la dernière inspection: _____

Signature du Professeur

Signature du Chef d'Etablissement

Lycée Technique
Cité El Manara
Gabès

Demande de Congé

Nom et Prénoms:_____ Nationalité_____

Type de Contrat:_____

Date et lieu de naissance:_____

Nom et l'établissement:_____

Date de recrutement:_____

Grade:_____ Echelon:_____

Durée du congé demandé:_____

Détail de congés durant les 365 jours:_____

_____

Date de départ en congé:_____

Jour de congé hebdomadaire:_____

Lieu où l'agent désire bénéficier (2) de son congé (Adresse complète)

_____

Fait à Gabès, le _____ 19____

Signature

(1) Maladie, examen, convenances personnelles, etc.

(2) Il n'est pas permis au fonctionnaire ayant demandé un congé de maladie de quitter sa résidence habituelle sauf si le médecin prescrit la nécessité de déplacement pour soins.

Reprise de Service

A présenter au Chef d'Etablissement

Etablissement: .....

Je soussigné : .....(nom et prénoms)

Grade:;.....

Déclare par la présente avoir repris mon service ce jour

le..... à ..... heures.

Au terme de mon absence du..... au .....

Mon horaire de service le jour de la reprise commence à ..... h.

Gabès le ..... 19... Signature_____

Lycée de Jendouba Jendouba, le_____ 19___

Observation

Faite à l'élève _____ Classe:_____

Par M. _____ Qualité_____

Motif: _____

Signature de l'éducateur

_____

Je certifie avoir pris connaissance de cette sanction qui a été enrégistrée sur mon dossier et je m'engage à être désormais pontuel (le) - assidu(e) - à améliorer ma conduite.

Signature de l'élève

_____

Lu et approuvé

Le Proviseur

_____

Possible comments for Observations:

- indiscipliné (parle en classe)
- n'a pas préparé sa leçon (manque de travail)
- n'a pas de livre.

Demande d'Execution de Travail

Demande faite par Monsieur _____

de l'Atelier de: _____

Nom de l'ensemble à faire: _____

_____

_____

Nombre d'ensembles à réaliser: _____

Matière prévue pour chaque pièce: _____

Faire un croquis au dos de cette feuille ou fournir un dessin___

Explications complémentaires: _____

_____

Demandez-vous une urgence? _____

Kasserine, le.....

Avis du Chef des Travaux

Ce travail sera réalisé par

M.....

.....

Commande enrégistrée

sous le No .....

Date: _____

Remarques:

Fiche de Travail

Etabli par:_____ Date:_____

_____ _____

Désignation:_____ No. des pièces_____

Nombre:_____

DESSIN:

No.	Opérations à exécuter	Machines	Observations
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

Nom de l'élève: _____

Date de Naissance: _____

Qualité _____ Classe: _____

Nom du Professeur	Appréciations circonstanciées des Professeurs	Rang	M. A.	Rang	Produit

_____

_____

_____

_____

Bulletin des Notes du ____ Semestre

Année Scolaire 19... 19..

LYCEE TECHNIQUE
GABES

Coeff	Moy. Sem.	Dev. de Contrôle	Tests et Int. écrites	T.P.	Oral	Matières
						Etude du texte
						Test de langue
						Educ. Religieuse
						Ed. Civ. ou Légis.
						Histoire
						Expression écrite
						Test de Langue
						Géographie
						Mathématiques
						Education Physique
						Dession Technique
						Techn. Générale
						Schémas
						Electro-Technique
						Mesures et Essais
						Travaux pratiques
			20			
			20			
			20			

Elève:_____
Date de naissance:_____
Ind._____

RELEVE DES NOTES
du 15/3/77 au 21/3/77

Lycée Technique
Cabès

Professeur	Appréciations circonstanciées des professeurs	Devoirs de contrôle	Tests et Int.écr.	T.P.	Oral	Matières
						Français
						Histoire
						Géographie
						Mathématiques
						Education Physique
						Dessin Technique
						Schémas
						Electro-Technique
						Mesures et Essai
						Technologie Générale
						Technologie
						} Travaux pratiques d'Atelier
						}
						}

_____ _____

A. Conversion Factors

Conversion of Miles to Kilometers and Kilometers to miles

miles	km	km	miles
1	1.6	1	0.6
2	3.2	2	1.2
3	4.8	3	1.8
4	6.4	4	2.4
5	8.0	5	3.1
6	9.6	6	3.7
7	11.2	7	4.3
8	12.8	8	4.9
9	14.4	9	5.5
10	16.0	10	6.2
20	32.1	20	12.4
30	48.2	30	18.6
40	64.3	40	24.8
50	80.4	50	31.0
60	96.5	60	37.2
70	112.6	70	43.4
80	128.7	80	49.7
90	144.8	90	55.9
100	160.9	100	62.1
1000	1609	1000	621

LENGTH

Metric

1 km	.6214 mile (appr. 5/8's/mile)
1 meter	1.094 yards (appr. 39+ inch.)
1 meter	3.281 feet
1 centimeter	.3937 inch
1 millimeter	.039 inch

Customary

1 mile	1.6093 kms (appr. 1 3/5s kms
1 yard	.9144 meter
1 foot	.3048 meters
1 inch	2.54 centimeters
1 inch	25.4 millimeters

Area

Metric

1 sq. kilometer	.386 sq mile
1 sq. kilometer	247.10 acres
1 hectare	2.471 acres
1 sq. meter	1.196 sq. yards
1 sq. meter	10.7646 sq. ft

Customary

1 sq. mile	2.59 sq km
1 acre	.405 hectare
1 sq yard	.8361 sq. meter
1 sq. inch	6.45 sq. cm

Volume

Metric

1 cu meter	1.308 cu yards
1 liter	1.0567 liquid quarts
1 liter	.9081 dry quart
1 liter	.88 quart (Imp)
1 milliliter (or 1 cu cm)	.06 cu inch

Customary

1 cu yard	.7646 cu meter
1 liqu;qu. (US)	.9463 liter
1 dry quart (US)	1.10 liters
1 quart (Imp)	1.1365 liters
1 gallon (US)	3.785 Liters
1 gallon (Imp)	4.546 liters
1 cu inch	16.39 milliliters (or cu cm)

IV APPENDIX

Conversion Factors (continued)

Weight

Metric

1 metric ton	2205 pounds
1 metric ton	1.1023 short tons
1 metric ton	.9842 long ton
1 kilogram	2.205 pounds (avoirdupoids)
1 kilogram	2.679 pounds (Troy)
1 gram	.0353 ounce (avoirdupoids)
1 gram	.0322 ounce (troy)
1 diamond carat	200 milligrams
	(1000 milligrams = 1 gram)

Customary

1 short (Americ) ton	2000 pounds
1 long (British) ton	2240 pounds
1 short ton	.9072 metric ton
1 long ton	1.016 metric tons
1 pound (avoir.)	.4536 kilogram
1 pound (avoir.)	453.6 grams
1 pound (Troy)	.3732 kilogram
1 pound (Troy)	373.2 grams
1 ounce (Troy)	31.103 grams
1 ounce (avoir.)	28.35 grams.

Temperature

Celsius degrees (formerly known as centigrade) converts to Fahrenheit degrees thus:

$$C = \frac{5(F-32)}{9}$$

and Fahrenheit converts to Celsius, thus:

$$F = \frac{9C}{5} + 32$$

One Celsius degree equals one Kelvin degree, but the Kelvin zero is 273.15° below the Celsius zero, or to put it in a formula

Kelvin = 273.15° + Celsius temperature

And now follow a combination Fahrenheit-Celsius scales for the purpose of easy comparison

Fahrenheit		Celsius
230°		110°
220°		
212° F	Water boils	100° C
210°		
200°		90°
190°		
180°		80°
170°		
160°		70°
150°		
140°		60°
130°		
120°		50°
110°		40°
100°		
90°		30°
80°		
70°		20°
60°		
50°		10°
40°		
32° F	Water freezes	0° C
30°		

For the man who is working with bolts and screws and wants to convert from fractions of an inch to millimeters. 1 inch = 25.4 millimeters.

In	mm	In	mm	In	mm
$\frac{1}{64}$	0.40	$\frac{17}{64}$	6.75	$\frac{33}{64}$	13.10
$\frac{1}{32}$	0.79	$\frac{9}{32}$	7.14	$\frac{17}{32}$	13.50
$\frac{3}{64}$	1.19	$\frac{19}{64}$	7.54	$\frac{35}{64}$	13.90
$\frac{1}{16}$	1.59	$\frac{5}{16}$	7.94	$\frac{9}{16}$	14.20
$\frac{5}{64}$	1.98	$\frac{21}{64}$	8.33	$\frac{37}{64}$	14.69
$\frac{3}{32}$	2.38	$\frac{11}{32}$	15.08	$\frac{19}{32}$	15.08
$\frac{7}{64}$	2.78	$\frac{23}{64}$	9.13	$\frac{39}{64}$	15.48
$\frac{1}{8}$	3.18	$\frac{3}{8}$	15.88	$\frac{5}{8}$	15.88
$\frac{9}{64}$	3.57	$\frac{25}{64}$	9.92	$\frac{41}{64}$	16.27
$\frac{5}{32}$	3.97	$\frac{13}{32}$	10.32		
$\frac{11}{64}$	4.37	$\frac{27}{64}$	10.72	$\frac{49}{64}$	19.45
$\frac{3}{16}$	4.76	$\frac{7}{16}$	11.11	$\frac{25}{32}$	19.84
$\frac{13}{64}$	5.16	$\frac{29}{64}$	11.51	$\frac{51}{64}$	20.24
$\frac{7}{32}$	5.56	$\frac{15}{32}$	11.91	$\frac{13}{64}$	20.64
$\frac{15}{64}$	5.95	$\frac{31}{64}$	12.30	$\frac{53}{64}$	21.03
$\frac{1}{4}$	6.35	$\frac{1}{2}$	12.70	$\frac{27}{32}$	21.43
				$\frac{55}{64}$	21.83
				$\frac{7}{8}$	22.23
				$\frac{57}{64}$	22.62

Conversion from fractions of an inch into millimeters (continued)

Inch	mm	Inch	mm
21/32	16.67	29/32	23.02
43/64	17.06	59/64	23.42
11/16	17.46	15/16	23.81
45/64	17.86	61/64	24.21
23/32	18.26	31/32	24.61
47/64	18.65	63/64	25.00
3/4	19.05	1	25.40

Pressure:

pound per square inch (p.s.i.) = 0.06805 atm. = 0.07031 kg/cm2 =
0.7031 m of water = 2.307 ft of water
Standard atmosphere (sta) = 14.696 p.s.i. = 1.0332 kg/cm2
Metric atmosphere (kg/cm3) = 14.223 p.s.i. = 0.9678 atm

Flow rate

Cubic foot per second (cu.ft/sec) = 0.5382 mgd(Imp.)=0.6463 mgd(US)
Cubic foot per minute (cu.ft/min) = 0.4719 l/sec
Imperial gallon per minute (Igpm) = 0.07577 = 0.2728 m3/h
US gallon per minute (gpm) = 0.06309 l/sec = 0.2271 m3/h
Million gallons per day (mgd) (Imperial) = 52.615 l/sec
(US) = 43.811 l/sec
Liter per second (l/sec) = 3.6001 m3/h = 13.20 IGPH = 15.85 gpm =
0.819006 mgd (Imp) = 0.022325 mgd (US)
Cubic meter per hour (m3/h) = 0.2778 l/sec = 3.666 Igpm =4.403

Filtration Rate

Million Imperial gallons per acre per day (mgad.Imp) = 1.1234m3/m2/d
Million US gallons per acre per day (mgad)= 0.9354 m3/m2/day
Cubic meter per square meter per day (m3/m2/day) = 0.890[illegible] mgad(Imp)
= 1.0691 mgsd

Miscellaneous

Horsepower (h.p.) = 33.000 foot-pounds per minute = 0.746 kW =
1.0139 CV
Kilowatt (kW) = 1.36 CV = 1.34 h.p.
Cheval-vapeur (CV) = 0.9863 h.p. = 0.736 kW
One liter of water weighs one kilogram (at 4 degree C)
One cubic foot of water weighs 62.43 pounds
One US gallon of water weighs 8.345 pounds

Conversion: Foot-pound to kilogram metre

Pied-livre	Mètre-kilogramme	Pied-livre	Mètre-kilogramme
2	.27	62	0.55
4	.55	64	8.83
6	.82	66	9.10
8	1.10	68	9.38
10	1.38	70	9.65
12	1.65	72	9.92
14	1.93	74	10.19
16	2.20	76	10.47
18	2.48	78	10.75
20	2.76	80	11.04
22	3.03	82	11.31
24	3.31	84	11.59
26	3.58	86	11.86
28	3.86	88	12.14
30	4.14	90	12.42
32	4.41	92	12.69
34	4.69	94	12.97
36	4.96	96	13.24
38	5.24	98	13.52
40	5.52	100	13.80
42	5.79	102	14.07
44	6.07	104	14.35
46	6.35	106	14.62
48	6.63	108	14.90
50	6.90	110	15.17
52	7.17	112	15.44
54	7.45	114	15.72
56	7.72	116	16.00
58	8.00	118	16.27
60	8.28	120	16.54

B. Commands

hold this	tenez ça
go there	allez là-bas
come here	venez ici
be quiet	silence
pick this up	soulevez ça
put this down	posez ça
sit down	asseyez-vous
stand up	levez-vous
listen (to me)	ecoutz-(moi)
bring it to me	apportez-moi ça
get me the/it	cherchez-moi/ça
later	après, plus tard
in a little while	dans un moment (tout à l'heure)
you'll see	vous allez voir
stand here (there)	restez ici (là-bas)
take this (that)	prenez ça
I'll show you (later)	je vais vous montrer plus tard
leave it here (there)	laissez ça ici (là-bas)
that's enough	ça suffit
what's the matter	qu'est-ce qu'il y a
get out (of here)	sortez d'ici
who are you	qui êtes-vous
pass it around	faites le passer
they are similar (alike)	ils sont identiques
what are you doing	que faites-vous
what's happening (going on)	qu'est-ce qui se passe
push it	poussez-le
pull it	tirez-le.

C. L'Outillage de Menuiserie

Anglais	Français		Anglais	Français
plane	rabot (m)		joiner's scraper	Hachoir (m)
jointer	varlope (f)		brace	vilebrequin (m)
jack-plane	riflard (m)		régular screwdriver	tournevis ordinaire français (m)
hand saw	scie à main, en bas (f)		Phillips screwdriver	tournevis américain Phillips (m)
small hand saw	scie égoine (f)		match plane	bouvet à joindre (m)
key hole saw	scie à guichet (f)		scribing gauge	trusquin (m)
tenon saw	scie a tenon (f)		rasp	râpe (f)
band saw	scie à ruban (f)		file	lime (f)
cross-cut saw	scie de travers (f)		nail set	chasse pointe (f)
veneer saw	scie à placuage (f)		drill machine	perceuse (f)
wood chisel	ciseau de menuiserie (m)		brace square	équerre à écharpe (f)
mortise chisel	bédane (m)		90° square	équerre 90° (f)
gouge	gouge (f)		ruler	règle (f)
wood countersink	fraise (f)		beam compass	compass à verge (m)
drill bit	mèche (f) foret (m)		interior caliper	compas d'intérieur (m)
C-clamp	serre-joint (m)		exterior caliper	compas d'épaisseur (m)
press	presse		fall puller	tenailles (f)
hammer	marteau (m)		mallet	mallet (m)
bench	établi (m)			

L'Outillage de Construction Métallique

Anglais	Français		Anglais	Français
Hammer	marteau (m)		V-block	Vé (f)
mallet	maillet (f)		compass	compas (m)
universal pliers	pinces (f) universelles		ruler règle	règle (f)
water-pump pliers	pince à gas, multiprise (f)		reveled ruler	règle à patin (f)
punch (solid)	poinçon (m)		outside caliper	compas d'épaisseur (m)
center, prick prick starting punch	pointeau (m)		inside caliper	compas d'intérieur (m)
drift punch	chasse- goupille (f)		sliding caliper	pied à coulisse (m)
chisel	burin (m)		protractor	rapporteur (m)
drill bit	foret (m) mèche (f)		90° square	équerre 90° (f)
hacksaw	scie à métaux (f)		T square	équerre en T (f)
metal shears	cisaille à main (f)		bevel	fausse équerre (f)
file	lime (f)		soldering iron	fer à souder (m)
regular screwdriver	tournevis ordinair français (m)		vise	étau (m)
Phillips screwdriver	tournevis américain (m) Phillips		rivet	rivet (m)
tap	taraud (m)		screw	vis (f)
die	filière (f)		bolt	boulon (m)
box wrench	tourne à gauche(m)		nut	écrou (m)
rivet extractor	tire rivet (m)			
rivet set	bouterelle (f)			
scribe	pointe à tracer(f)			
scribing block	trusquin (m)			

L'Outillage de Mécanique-Auto

Anglais	Français		Anglais	Français
Hammer	Marteau (m)		socket wrench	clé à douilles (f)
mallet	maillet (m)			clé à pipes(f)
chisel	burin (m)		adjustable wrench	clé à molette (f)
punch (solid)	poinçon (m)		allen wrench	clé male (f) Allen
punch (hollow)	emporte-pièce (m)		open-end wrench	clé à fourche (f)
center punch	pointeau (m)		metal shears	cisailles à main (f)
file lime	lime (f)		pullers	arraches (m)
drill bit	mèche (f) foret (m)		ring-compresser	presse-segment monte-piston(f)
hacksaw	scie à métaux (f)		micrometer	micrometre (m)
vise	étau (m)		indicator	indicateur (m)
taps and dies	tarauds (m) et filières (f)		feeler gauge	jauge d'épaisseur (f)
scratch brush	brosse métallique (f)		slide caliper	pied à coulisse (m)
pliers	pinces (f)		torque wrench	clé dynamométrique (f)
water-pump pliers	pince multiprise pince à gaz (f)		clamps	serre-joints (m)
cutting pliers	pinces coupantes (f)		reamer	alésoir (m)
needle-nose plier	pinces plates (f)		side-cutter pliers	pinces universelles (f)
standard screwdriver	tournevis ordinaire français (m)		Phillips screwdriver	tournevis Phillips, américain (m)
Box-end wrenches	clé à lunettes (f)		combination wrenches	clés mixtes combinées (f)

D. La Sécurité

C'est une série de règles pour éviter les accidents.

1. Faites Attention Toujours, Réfléchissez Bien Avant de Travailler Parce Que:

Si un élève est en train de faire une expérience compliquée et il ne pense pas à ce qu'il fait, il perdra, et il ne sera pas capable de finir son travail.

AUSSI: Si on sait exactement ce qu'il lui faut (comme les outils, les parties, et le procédé de travail) on sera capable de travailler avec effecacité. C'est très important pour faire du bon travail.

2. Ne Jamais s'Amuser Dans Un Atelier !

Parce que c'est dangereux

Exemple: Deux élèves donnent, l'un à l'autre, des coups de poings. Il y a un autre élève qui travaille à côté d'un moteur qui tourne .... Qu'est-ce qui se passe ?

3. Ne Touchez Pas Les Machines Sans Permission et Surveillance du Professeur

Pourquoi? .... C'est dangereux !

Si on ne comprend pas comment utiliser une machine, il est possible de
1. abimer la machine
2. se blesser

Il y a de l'électricité
Il y a des parties qui tournent vite !

Soyez prudent avec les machines

4. Gardez les Outils Propres et en Ordre

Si les outils sont sales avec de la graisse ou de l'huile la main peut glisser facilement !

Si les outils sont dispersés dans l'atelier, on ne cherchera pas l'outil qu'il faut.

Aussi, on peut trébucher et se blesser.

E. Secondary Activites

During your first two or three months as a Voc. Ed. teacher, all of your time will be occupied with your primary job at school. It will be the most intense period during your stay in Tunisia, as you will be getting used to fulfilling your obligations as a teacher. Much of your time outside of school will be devoted to preparing lessons, and generally settling into your living role within the community. But as time goes on, and you become more and more accustomed to your job, the time spent outside of school for preparation will become less and less. By the end of your sixth month, you will probably find that the 20 to 24 hours that you teach leave you with quite a bit of spare time on your hands. It might, during the first few months, seem that this will never come to pass, but just ask any Voc. Ed. Volunteer that has been here for a year or more, and he will confirm this as fact.

This is where the idea of Secondary Activities comes in. Many Voc. Ed. Volunteers, after they have become familiarized with their job at school, fall into a routine of preparing lessons, teaching, socializing with a few teachers, and then repeating the same activities. Believe it or not, this routine can become monotone and confining. Because it is difficult in Tunisia to have contact with students outside the classroom, you might very well discover that you have a limited amount of contact with your community.

Secondary activities may provide an outlet to learn more about your town, and therefore about Tunisian culture. The activities may also give you the opportunity to meet people outside the school milieu and broaden your personal contacts. It is a way to both release a lot of creative energy and to be of greater service to your town. A valuable secondary activity may also lead to a summer project, and eventually to full-time Peace Corps involvement. The bottom line is, however, that a secondary activity will add a dimension to your experience here in Tunisia, and get you out of the routine of your job.

The difficulties or obstacles in doing secondary activities are threefold. First, as previously stated, there is the problem of time for a first year teacher. However, once again, most volunteers agree that after the first six months, Voc. Ed. teachers do have time available for another activity. Second, there is the problem of entry, especially, into an area outside of school. If a volunteer wanted to do a project requiring the approval of officials from another Ministry, there might be resistance. Third, many of the activities might require additional training, funding, materials, or other support.

In light of these difficulties, here are some proposed guidelines for secondary activities:

1. Projects which use the school as a base. Such projects, which could be done through the school, would eliminate the problem of credibility. Examples include organizing clubs for woodworking, metalworking, repair, etc. or undertaking projects in or outside of school which use the students. A proviseur would likely be receptive to projects involving the students.

2. Projects using your technical skills. Since all Voc. Ed. Volunteers possess a solid technical skill, uses could probably be found for the skills outside of school. Examples of such projects could be developing a prototype for a solar heater or perhaps doing it in conjunction with another agency (as has already been done by several Voc. Ed. Volunteers).

3. Projects which use other skills or interests that you have outside the field of your primary job. Such skills include water safety or agricultural skills that could be utilized in your communities. You might also have an interest in working with handicapped kids or with school leavers. The possibilities are endless.

Many of the above projects could be done on a formal or informal basis. This means that a Volunteer could work in a school for the handicapped as well as on a one-to-one basis at a child's home. Whether or not a Volunteer chooses to do a project through an existing structure is dependent on the activity, on the situation in the community, and on the Volunteer's personal disposition.

Areas for Secondary Activities

Below are some concrete ideas for potential secondary activities:

1. Building a prototype of a solar heater, or other examples of appropriate technology i.e. solar heater. This would involve finding funding and either building it as a school project in or outside of school.

2. Teaching an elementary vocational skill to handicapped people. This could be done either through a school for the handicapped or on a more informal one-to-one basis. Contacts should be made with the head of the local schools for the handicapped (if one exists in your town), through local officials of the Ministry of Social Affairs, or through the Peace Corps office to identify children who are not in school. In addition to teaching vocational skills to the handicapped, a Volunteer could also teach other things such as arts and crafts.

3. Organizing technical clubs at school. The Volunteer could be a coordinator and could teach students who are from other disciplines (leeters, math/science, etc.); This project would require approval of the school director.

4. Construction of playground equipment and other teaching aids for pre-schools. This would require some funding, possible use of Voc. Ed. students, and the agreement of the local representative of the Ministry of Youth and Sports located in the capital of the Gouvernorat in which you work.

5. orking with another Voluntary Agency such as CARE, Project Hope, or Save the Children. What Volunteers do would depend on the needs of the agency and the skills. An example would be doing some on-the-job training of an auto-mechanic or metal worker who worked for one of these agencies. The possibilities are great here and would require the agreement of the agency.

6. Acting as a hobby resource person in a hospital. Many hospitals have children who are bed-ridden for long periods of time and have nothing to do to occupy themselves. A Volunteer could perhaps organize a program of activities. This would require agreement by the director of the local hospital.

7. Organizing activities for school dropouts or disadvantaged kids at the Maison des Jeunes that is located in most towns. This would involve coordinating some activities such as sports or elementary vocational teaching for the children. The initial contact would be the head of the Maison des Jeunes in your town or the mayor.

8. Teaching Red-Cross type training such as CPR. This would involve identifying those who need such training, such as the national guard, and organizing a program. Contact should be made with the délégué in your town.

9. Teaching swimming or other sports to special groups i.e. handicapped. This would involve having a pool in your town, identifying the target population, and getting local approval.

10. Running an arts and crafts program for adults and for handicapped people. To do this, you would have to find out about existing programs, seek out those who would be interested, get approval from municipal officials, find a place to hold classes, and get materials.

11. Improving firing facilities in Sejnane for pottery through introduction of more sophisticated kilns. This would require interest by the local potters as well as information and materials on kilns. Although this project is particular to Sejnane, similar possibilities of local crafts people may exist in other towns.

A summary of the resources that might be available in your town is as follows:

1. The school
   a. Proviseur
   b. Chef de Travaux
2. Pre-School Centers
3. Hospital
4. Schools for the handicapped
5. Municipality
   a. Délégué
   b. Mayor
6. Maison des Jeunes
7. Volunteers working in fields other than education
8. Other foreign assistance agencies: CARE, CRS, Project HOPE, Save the Children, AID
9. Local representatives of government ministries
10. Peace Corps Office - a. Information
    b. materials.

F. Resources

The following resource material is either provided for you or is available to you through the P.C. office in Tunis:

1. Technical books

During training you will be given two dictionaries, including a standard French-English, English-French dictionary, and an excellent set of technical dictionaries that translates words, phrases and terms both from French to English and from English to French. This set of dictionaries is probably the best there is and covers all technical fields.

In addition, you will be given technical books (in French, of course) written specifically for your particular field. These books, chosen by a concensus of former Voc. Ed. Volunteers, are the best available in their field, and cover subjects that are required by the Ministry of Education. These will be your basic reference books when you are preparing lessons and exercises for your shop classes.

2. PCC Files

The P.C. office in Tunis has been amassing lessons and exercises written by current and former volunteers for the last two years. These lessons are catalogued according to specialty and to the yar of study. The files are now fairly complete and are available to you upon request. Whenever you want an idea for a project or a specific exercise during the school year, all you need do is come to the office and scan through the material, or if that is logistically impossible, you can call the office, and the material or lessons that you request will be photo-copied and mailed to you.

3. Tunis Bookstores

Peace Corps provides money for additional books that you deem necessary for your job. There are several excellent bookstores in Tunis where you can find technical material. The best of these is the technical bookstore located on Rue Zarkoun in the Médina in Tunis. If what you want exists in Tunisia, you will most likely find it at this bookstore. Several other noteworthy bookstores that carry technical writing goods, stationary, and technical resource books, can be found on Avenue Habib Bourguiba, near the entrance to the Médina.

4. Ministry Seminars

From time to time the Ministry of Education, through its regional inspectors, holds seminars for teachers of particular specialties. These seminars are usually pedagogical in nature, but are sometimes technically oriented also. Usually, if such a seminar is going to be held in your region for your specialty, you will be contacted either by letter or by a surveillant at your school. Keep your eyes and ears open: These seminars are more often than not quite informative, and give you a chance to see what other teachers in your specialty are doing. They give you a chance to create a dialogue between yourself and your colleagues, thus setting up an exchange of ideas which can be significant to all concerned. If you discover that such a seminar is being given, you are urged to attend it.

5. In-Service P.C. Conference

At least once a year Peace Corps hosts a Vocational Education weekend conference, which usually takes place at a very comfortable, centrally located hotel, sometime toward the end of November. These are informational conferences with seminars held on subjects that have been chosen by current Voc. Ed. Volunteers. Indeed, much of the material for this handbook has come from notes taken and observations made at previous conferences.

G. Glossary of Terms

administration	administration
atelier	shop
avertissement	most severe of disciplinary notes for a student. Possible expulsion for a determined number of days
baccalauréat	degree given only to outstanding students in the "long" secondary program
BHN	Basic Human Needs
billet d'entrée	student re-entry slip
bleue	blueprint
bon	official request form for ordering supplies in the shop
brevet	final practical test for third year terminal technical students
cahier d'atelier	student's large format notebook for shop exercises
cahier de texte	administration notebook on day to day content of each class
calque	blueprint
carnet d'atelier	student's small format notebook for theory given in a shop class
chef de classe	student who is responsible for his class. Responsible for carrying the cahier de texte and the roll-book from class to clas
Chef de travaux	the immediate administrative supervisor for all shops, all shop teachers, and all material of a given school
classe terminale	the third and final year in the three year technical secondary cycle
coefficient	numerical importance (multiplier) of a given class subject
coopérant(e)	a contracted teacher in the Tunisian scho system
collège secondaire professionnel (CSP)	secondary school most often concerned wit three year technical programs, although longer technical programs are sometimes offered
Délégué	political boss of a given region or gouverr rat
demande de congé	teacher's written excuse when he has bee absent from school
devoir	major practical exam in the shop
diplôme professionnel	diploma given to technical students who successfully complete their course of stuc
directeur	the principal of a collège

école primaire ..... primary (grade) school
emploi de temps..... schedule
enseignement secondaire professionel..... vocational education secondary program
exclu ..... expelled from class
exercise..... practical exercise
externat ..... day student who does not room and board at school
gamme d'usinage..... print-out, including design, instructions, and all pertinent facts of a practical exercise

Inspecteur..... regional pedagogical inspector for a given specialty
internat..... live-in student who rooms and boards at the school

Jardin d'enfants ..... nursery school (pre-primary)

lancement d'exercise... introduction to a new technical procedure
librairie ..... bookstore, stationary store
livret scolaire..... administration's master grade dossier for each student
Lycée Mixte..... our equivalent of a junior-senior high school. Most students in "long" academic programs.
Lycée Technique..... technical secondary school usually offering both "short" three year technical program, and "long" technical program

magasin ..... storeroom
magasinier..... chef of the storeroom
Ministère ..... ministry
Ministère de l'Education Nationale. ministry of national education
note ..... grade

observation..... official written disciplinary notice to administration

papier de calque..... blueprint paper
permanence..... study-hall for disciplined students or for internats whose teacher is absent
proviseur ..... principal of a lycée

rang..... students' rank, according to grade average among the rest of his class
registre de classe..... attendance book
responsable ..... one who is responsible, or in charge

stagiaire.....	first year teacher (Tunisian)
surveillant	hall guard or monitor. Administrations disciplinarian;
surveillant d'externat ..	administrator in charge of all day students
surveillant général.....	head disciplinarian
surveillant d'internat...	administrator in charge of all live-in students
test	short practical exercise or written test
technologie générale...	technical theory class
tirage.....	blueprint
travaux pratiques	technical shop classes

GPO 893-802

Since 1961 when the Peace Corps was created, more than 80,000 U.S. citizens have served as Volunteers in developing countries, living and working among the people of the Third World as colleagues and co-workers. Today 6000 PCVs are involved in programs designed to help strengthen local capacity to address such fundamental concerns as food production, water supply, energy development, nutrition and health education and reforestation.

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