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Intended to assist teachers in either basic or continuing education programs to convey knowledge, techniques, and attitudes pertaining to drugs, the pamphlet outlines instruction which is estimated to require 70 to 100 hours of which 50 to 80 should be scheduled for classroom work and 20 hours for clinical work. Three units containing concepts fundamental to the use of drugs should be presented early in the program in association with some supervised clinical experiences. The remaining units concern concepts for the use of specific drugs such as disinfectants, and drugs that affect the skin and mucous membrane and drugs that affect the circulatory system and the blood, the respiratory system, the gastrointestinal system, the urinary system, the nervous system, and the endocrine and reproduction systems, and should be correlated with teaching in the clinical area and supervised experiences with patients. Each unit outline includes time allotment, objectives, subjects for discussion, and suggested teaching methods. Included are a bibliography and a list of pharmaceutical companies from which teaching materials are available. (JK)

PRACTICAL NURSING EDUCATION

PAMPHLET NUMBER 4

A GUIDE FOR TEACHING BASIC CONCEPTS AND SKILLS IN THE USE OF DRUGS

Developed by
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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Pamphlet No. 4—A Guide for Teaching Basic Concepts and Skills in the Use of Drugs	$1.50

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CONTENTS

How to Use This Pamphlet

This document is intended to help teachers of practical/vocational nursing in either basic programs or continuing education programs to teach the knowledge, techniques, and attitudes pertaining to drugs and their administration that are essential for many licensed practical/vocational nurses today. Its preparation has resulted from the recognition by the National Association for Practical Nurse Education and Service that the activities of licensed practical/vocational nurses have been increasing tremendously with respect to both the administration of drugs and the observation of patients to whom drugs have been administered. As a consequence of this increased responsibility, considerably more instruction in the use of drugs is being provided in the curriculums of many basic programs in practical/vocational nursing. Also, inservice education programs and other supplementary courses in drug administration are being provided for licensed practical/vocational nurses who, in their basic programs, received less preparation in this area than is being offered in today's basic programs.

The materials presented here can be used in either type of educational offering. They suggest appropriate content and teaching methods for both classroom instruction and the learning experiences in the clinical laboratory. The estimate of the time required is 70-100 hours, of which about 50-80 hours are scheduled for classroom instruction and 20 hours for clinical laboratory experiences.

The classroom content has been divided into thirteen units. The first three units include content which is considered foundational—the characteristics of the various classifications of drugs, pharmacological terminology and measurements, and the principles and other abilities (including arithmetic ability) basic to drug administration. This content should be presented early in the program in association with some supervised clinical experiences. The content in Units IV through XIII should be correlated with teaching in the clinical laboratory and supervised experiences with patients. A recommended general pattern for these clinical learning experiences will be found immediately preceding Unit IV.

These materials were developed and have been tested in the Dayton (Ohio) School of Practical Nursing. It should be emphasized, however, that they are not being issued with the idea that they should be followed in every detail by any program; rather, they should be adapted to the particular program in which they are being used. In basic programs especially, the faculty will doubtless want to arrange for the integration or close correlation of the content in Units IV through XIII with that in the various nursing courses, and in so doing, may change its sequence. Correlation of experiences in administering drugs with the other care measures a student is using with her assigned patients may be facilitated by the use of a nursing care plan. In inservice programs, the content suggested for these units might well be supplemented by a review of relevant knowledge from anatomy and physiology as well as a review of the patient problems and needs for which the use of drugs is indicated.

Likewise, the suggested time allotment should be regarded as only a guide to help faculties or inservice education instructors who are planning to introduce

this content into their programs. The allotment for clinical experience, in particular, should be flexible enough to permit these experiences to be related to the other learning experiences that the students are having with patients. In instances where a review of previously learned content is needed, additional time should be allowed for this activity.

Also, some faculties may wish to augment the content in accordance with the objectives of their programs. For example, in programs that prepare the student for practice in a psychiatric setting, more emphasis might be given to the use of ataractic drugs.

In any event, because of the frequent appearance of new types of drugs and the decreasing use of other types, faculties should undertake a periodic review of the content and, when indicated, revise it in the light of current pharmaceutical materials and practices. In any such revision, faculties should take into consideration the varying practices in the situations in which the graduates of their programs may be employed and should not delete content merely because it would not be essential for the licensed practical/vocational nurses who practice in the hospital or hospitals which they utilize as a learning field. For example, in many hospitals the hospital pharmacy computes the exact dosage of drugs that are to be administered. However, upon graduation some of the students may be practicing in hospitals or nursing homes that have not adopted this procedure; therefore they should be taught to compute fractional doses.

It should also be pointed out that many of the drugs about which information is taught in the classroom will not be administered by the licensed practical/vocational nurse; her need for knowledge about them stems from the fact that she should be able to make intelligent observations of, and reports on, patients to whom they have been administered. It therefore behooves the instructor to give careful thought to the selection of the medicines which the students administer in the clinical laboratory, and these medicines should be given only under her supervision.

In conclusion, it is urged that in teaching the use of drugs to either basic students or licensed practical/vocational nurses emphasis should be placed on the principles involved. This policy, which is of course applicable in all areas of nursing education, is particularly important in this area because of the frequency with which changes occur in it. The licensed practical/vocational nurse who has a sound understanding of the scope of her participation in the administration of drugs and the basic principles underlying this administration can, it is thought, be relied on to incorporate these activities into her nursing care of patients.

Objectives of the Instruction

CENTRAL OBJECTIVE:

To assist the student of practical/vocational nursing (basic student or licensed practical/vocational nurse) to participate appropriately in the total process involved in the administration of a drug to a patient, including the observation, recording, and reporting of the effects of the drug.

CONTRIBUTORY OBJECTIVES:

1. To assist the student to develop an appreciation of the fact that the administration of drugs is a part of total patient care.

2. To instill in the student an awareness of the fact that a drug should be administered only on the basis of sound knowledge of its possible actions, both favorable and unfavorable, and that any such administration should be followed by alert and intelligent observation and recording of the effects of the drug and a reporting of any untoward effects.

3. To inculcate in the student a knowledge of the extent, including the limitations, of a licensed practical/vocational nurse's responsibilities for the preparation and administration of drugs.

4. To assist the student to develop the knowledge and skills essential for performing the functions associated with the administration of drugs which might properly be assigned to a licensed practical/vocational nurse.

5. To assist the student to become familiar with reliable sources of information about current drugs and newly developed techniques in drug administration.

6. To assist the student to become thoroughly familiar with regulations that are associated with prescribing, storing, dispensing, administering, and possessing drugs.

Concepts Fundamental to the Use of Drugs
UNIT I: Introduction and Orientation

TIME ALLOTMENT: 3-5 hours

OBJECTIVES:

To assist the student:

1. To acquire an understanding of the requisites of the course.

2. To become familiar with the terminology of pharmacology.

3. To become familiar with sources of information about drugs and their administration.

4. To develop an introductory knowledge of the legal regulations governing the use of drugs.

5. To understand fully the scope and the seriousness of the responsibility involved in the administration of drugs and the danger of administering a drug to herself or to others without direction from a physician.

6. To develop an appreciation of the extent of her responsibility in the administration of drugs.

Content	Teaching Methods
A. Introduction and orientation	Lecture
1. Objectives and requirements	Discussion
2. Text, supplementary materials, and references	
3. Methods of evaluation	
B. Terminology	Library assignment:
1. Pharmacology	Definition of terms
2. Materia medica	
3. Therapeutics	
4. Toxicology	
5. Pharmacy	
6. Drug	
7. Proprietary	
8. Generic	
C. History and source of drugs	Samples of crude drugs
1. Plant kingdom	
2. Animal kingdom	
3. Mineral kingdom	
4. Synthetic drugs	

Content	Teaching Methods
D. Drug standards and references 1. *United States Pharmacopeia* (U.S.P.) 2. *National Formulary* (N.F.) 3. *New Drugs* 4. *Physicians' Desk Reference* (P.D.R.)	Lecture Book display
E. Legislation and drugs 1. Federal Food, Drug, and Cosmetic Act 2. Harrison Narcotic Act 3. Special state laws	Review Guest speaker: Pharmacist
F. Personnel responsible for drug therapy 1. Physician 2. Pharmacist 3. Nurse a. Preparing drugs for administration (1) Equipment (2) Procedure b. Preparing the patient c. Administering medication d. Observing, recording, reporting effects e. Teaching the patient	Samples of: Prescription Kardex Medicine ticket Equipment Film (Suggestion: "No Margin for Error," W. S. Merrell Co.)
G. Prescriptions	
H. Storage and care of drugs 1. Placement in medicine cabinets 2. Stock drugs 3. Locked drugs 4. Emergency drugs 5. Care and cleaning of cabinet 6. Drugs requiring refrigeration	Assignment: Be prepared to discuss hospital policy in relation to: Drug storage Narcotics Hypnotics Emergency drugs Clinical assignment
I. Major problems 1. Availability of drugs 2. Self-medication 3. Protection of public against patent medicines	Discussion
J. Cost of drugs	Assignment: Prepare list of most frequently used drugs in clinical laboratory and list cost. QUIZ

UNIT II: Drugs and Solutions and Measurements

TIME ALLOTMENT: 10-16 hours

OBJECTIVES:

To assist the student:

1. To realize the seriousness of the effects of drugs and the importance of accuracy in dealing with drugs.

2. To become familiar with common symbols and abbreviations used in drug therapy.

3. To gain an understanding of the various systems used in weighing and measuring drugs and to learn how to convert from one system to another.

4. To learn to calculate dosage.

5. To gain understanding of the factors which may modify drug dosage.

Content	Teaching Methods
A. Review of Arabic and Roman numerals	Lecture
B. Review of abbreviations and symbols	Refer to text
C. Arithmetic review	Blackboard demonstration
1. Common fractions	
2. Decimals	
3. Percent	
4. Ratio and proportion	
D. Common drug abbreviations and symbols	Tables
E. Weights and measurements	Table of equivalents
1. Metric system—dry and liquid	Assignment: Solve problems involving conversion of weights and measurements and temperatures from one system to another
2. Apothecary system—dry and liquid	
F. Fahrenheit and centigrade temperatures	
G. Posology	
1. Terminology of dosage	
2. Measurement of dosage	Problem-solving: Blackboard practice
a. Strengths of simple solutions	
b. Oral dosage from stock solution	
c. Fractional dosages	
3. Conditions modifying dosage	
a. Age, weight, sex, etc.	
b. Pathologic conditions (both physical and emotional)	
	QUIZ

UNIT III: Pharmaceutical Preparations, Drug Action, and Routes of Administration

TIME ALLOTMENT: 2-4 hours

OBJECTIVES:

To assist the student:

1. To develop an appreciation of the extent of her responsibility in the administration of drugs.

2. To acquire knowledge of the various types of pharmaceutical preparations.

3. To acquire knowledge of the channels and techniques of drug administration and to develop an understanding of the necessity of administering the correct drug by the right route.

4. To help the student to develop skill in certain techniques of administration.

Content	Teaching Methods
A. Pharmaceutical preparations	Lecture
1. Liquids	Sample exhibit
2. Solids and semisolids	
3. Others—vials, ampules, etc.	
B. Types of drug action	Discussion
1. Local effect	
2. Systemic effect	Definitions and examples
a. Selective	
b. Untoward	
c. Idiosyncratic.	
d. Cumulative	
e. Antagonistic	
f. Synergistic	
3. Emotional effect	
C. Channels or routes of administration	Samples of drugs and equipment for each type of administration
1. Channels	
a. Oral	Illustrations of techniques and demonstrations where indicated
b. Rectal	
c. Vaginal	
d. Sublingual	

Content	Teaching Methods
e. Parenteral (1) Intradermal (2) Subcutaneous (3) Intramuscular (4) Hypodermoclysis (5) Intraperitoneal (6) Intravenous (7) Intracardial (8) Intrapleural (9) Intraspinal (10) Implants f. Inhalation g. Inunction h. Instillation	Samples of drugs and equipment for each type of administration Illustrations of techniques and demonstrations where indicated
2. Factors influencing choice of channel	
3. Responsibility, including limitations, of the licensed practical/vocational nurse with respect to each type of administration a. Measurement b. Preparation of the patient and equipment c. Administration d. Observing, recording, and reporting e. Teaching the patient	QUIZ COMPREHENSIVE REVIEW OF UNITS I-III

Concepts Essential for the Use of Specific Drugs Instruction Included in Each of Units IV—XIII

So that repetition may be avoided, objectives, content, and learning experiences in the clinical laboratory which apply to each unit in this group are listed here.

Objectives

1. To assist the student to acquire knowledge concerning the characteristics of the commonly used drugs in the area with which the unit deals and to apply this knowledge to the care of patients.

2. To assist the student to develop a thorough understanding of the role of the licensed practical/vocational nurse, including the limitations of this role, in the administration of the drugs studied in the unit.

3. To inculcate in the student the importance of being alert to signs or symptoms of untoward effects and reporting these immediately.

Content to Be Reviewed

Each unit should include a review of the knowledge required for measuring drugs, with special application to the drugs studied in the unit.

In many instances, particularly in basic programs, the content in this section will be integrated in or closely correlated with courses in which the students learn to care for patients of various types. When this is not the case, the unit should include:

1. A review of the relevant anatomy and physiology.

2. A review of the patient problems and needs for which each type of drug is used.

New Content

Instruction should include appropriate information about the commonly used drugs of each type, including:

Name
   a. Generic name
   b. Proprietary, or brand, name
Source
Mode of action
Usual dosage(s)
Usual method(s) of administration
Why given—desired action(s)
Common side effects
Untoward reaction(s) to which student should be alert
How excreted

New Content (cont.)

Nursing measures

Responsibilities which the licensed practical/vocational nurse may be expected to assume

a. Measurement
b. Preparation of the patient and equipment
c. Administration
d. Observing, recording, and reporting
e. Patient teaching

Variations occasioned by the patient's age, socioeconomic background, attitudes, and so on.

Before each unit, the students should be given a reading assignment that is pertinent to the content of the unit.

Learning Experiences in the Clinical Laboratory

TIME ALLOTMENT: 20 hours (distributed throughout Units IV-XIII)

OBJECTIVES:

1. To familiarize the student with hospital policies regarding drugs.

2. To make the student aware of the importance of the correct interpretation of the physician's orders and exactness in following these orders.

3. To help the student to develop an understanding of the principles of the techniques used in drug administration and to develop skill in the techniques which she, as a licensed practical/vocational nurse, may be expected to use.

Content and Techniques	Teacher and Student Activities
A. Preparation of medication for administration	Demonstration and practice
1. Calculation and preparation of correct medication and dosage for the right patient	
2. Rules and safety measures	
B. Nurse's responsibility regarding drug order	Demonstration and practice
1. Checking the physician's order	
2. Transferring physician's orders	
a. Kardex	Illustrate the Kardex
(1) Transferring orders	
(2) Checking with medicine card	
b. Medicine tickets—information required	Illustrate with sample ticket Demonstrate proper information
3. Method and procedure of re-ordering	Demonstration and practice

Content and Techniques	Teacher and Student Activities
4. Requisitioning drugs from pharmacy	Practice
a. For individual	
b. For stock supply	
5. Narcotic record	Practice using forms
6. Medication charting forms and records	Practice
C. Procedures and techniques for administering medicines	Review and practice
1. Oral	
2. Rectal	
3. Vaginal	
4. Parenteral	
5. Eye and nose	
D. Special techniques	Discussion
1. Aged and senile patients	Problem-solving: Examples of problems of individual patients (actual or hypothetical)
2. Infants	
3. Disturbed patients	
4. Others	

UNIT IV: Antiseptics, Disinfectants, and Drugs That Affect the Skin and Mucous Membrane

TIME ALLOTMENT: 3-5 hours

OBJECTIVES: See page 13 for Objectives 1-3

4. To assist the student to learn the methods of preparing simple solutions that are used in carrying out functions which might be expected of the licensed practical/vocational nurse.

Content	Teaching Methods
A. Factors which determine germicidal efficiency and essentials of a good disinfectant	Assigned reading
B. Definition of terms 1. Aseptic 2. Antiseptic 3. Disinfectant 4. Germicide 5. Deodorant	Lecture
C. Commonly used antiseptics and disinfectants 1. Methods of action 2. Uses	Lecture
3. Preparation	Practice preparing simple solutions at various strengths
D. Drugs that affect the skin or mucous membrane	Define terms
1. Soothing substances a. Emollients b. Demulcents c. Antipruritics d. Protectives	Assignment: Students make a list of preparations in each category used in the clinical laboratory. Discuss in class.
2. Astringents	
3. Irritants a. Counterirritants b. Rubefacients c. Vesicants	Illustrative material
4. Keratolytics	
5. Anodynes	QUIZ

UNIT V: Drugs Used in Nutritional Deficiencies

TIME ALLOTMENT: 3-5 hours

OBJECTIVES: See page 13

Content	Teaching Methods
A. Vitamins	Bulletin board display
1. Characteristics	Lecture
2. Common misconceptions	Discussion of students' conceptions
3. Types	
a. Fat-soluble	
b. Water-soluble	
4. Cost	
B. Minerals	Lecture
1. Types and abbreviations	Samples of types used in clinical laboratory
2. Use in maintenance of fluid and electrolyte balance	
C. Tissue-building hormones (anabolics)	Lecture
D. Drugs used in the treatment of anemias	Lecture
1. Liver preparations	
2. Vitamin B_{12}	Practice in intramuscular administration
3. Iron	
4. Folic acid	
5. Hydrochloric acid (HC1)	
6. Stomachics	
E. Blood transfusion	Demonstration of equipment
1. Licensed practical/vocational nurse's responsibilities	Practice in observing technique
	QUIZ

UNIT VI: Drugs That Affect the Circulatory System and the Blood

TIME ALLOTMENT: 4-6 hours

OBJECTIVES: See page 13

Content	Teaching Methods
A. Drugs that affect the heart	Lecture
1. Cardiac stimulants	Films and other materials from Heart Association
2. Cardiac depressants	Assigned readings
	Drug samples
B. Drugs that act on the blood vessels	Assignment: Prepare a list of cardiac drugs used in the clinical laboratory
1. Vasoconstrictors	
2. Vasopressors	
3. Vasodilators	
C. Drugs that act on the blood	Discuss important observations during therapy
1. Coagulants	Review "coagulation time"
2. Anticoagulants	
D. Drugs that modify the reaction of the blood	
1. To treat alkalosis	
2. To treat acidosis	
E. Drugs used in diagnostic procedures, including drugs used as x-ray contrast media	QUIZ

UNIT VII: Anti-infective Drugs

TIME ALLOTMENT: 3-5 hours

OBJECTIVES: See page 13

Content	Teaching Methods
A. Antibiotics	Lecture Assigned reading Samples of commonly used antibiotics
B. Sulfonamides C. Antisyphilitic drugs D. Antimalarial drugs E. Serums and vaccines F. Antihistamines	Lecture QUIZ

UNIT VIII: Drugs That Affect the Respiratory System

TIME ALLOTMENT: 3-5 hours

OBJECTIVES: See page 13 for Objectives 1-3

4. To assist the student to learn the techniques used in inhalation therapy for which the licensed practical/vocational nurse may be responsible.

Content	Teaching Methods
A. Expectorants	Define terms
1. Depressants	Show drug samples
2. Stimulants	Discussion
B. Pulmonary antiseptics	
C. Respiratory detergents	
D. Antispasmodics	
E. Steroids	
F. Inhalation therapy	
1. Oxygen	Discussion
a. Equipment used	Demonstration of equipment
(1) Tents	
(2) Masks	
(3) Other	
b. Intermittent positive pressure breathing (IPPB)	Observation experience in IPPB and use of nebulizers
c. Safety measures	Discussion
2. Vaporizers used with hot or cold steam	Discussion
a. Types	
b. Equipment used	Demonstration of equipment
G. Drugs used in treating tuberculosis	Drug samples
1. Streptomycin	
2. Para-aminosalicylic acid (PAS)	
3. Isoniazid	
H. Drugs used in diagnostic procedures, including drugs used as x-ray contrast media	QUIZ

UNIT IX: Drugs That Affect the Gastrointestinal System

TIME ALLOTMENT: 3-5 hours

OBJECTIVES: See page 13

Content	Teaching Methods
A. Drugs that act on the stomach	Lecture
1. Antacids	Assigned reading
2. Anticholinergics	Discussion
3. Digestants	Drug samples
4. Antinauseants (antiemetics)	Define terms
5. Carminatives	
6. Emetics	
B. Drugs that act on the intestines	
1. Cathartics (various types)	Assignment: Identify cathartics commonly used in clinical laboratory
2. Antidiarrheics	
3. Sedatives and antispasmodics	
4. Antihelminthics	
C. Drugs used in diagnostic procedures, including drugs used as x-ray contrast media	Guest speaker from radiology department to stress proper preparation and after care
	Use of x-ray films to illustrate
	QUIZ

UNIT X: Drugs That Affect the Urinary System

TIME ALLOTMENT: 2-4 hours

OBJECTIVES: See page 13

Content	Teaching Methods
A. Diuretics B. Urinary antiseptics C. Bladder sedatives	Lecture Assigned reading Review fluid and electrolyte balance Assignment: Report on patients receiving drugs
D. Drugs used to change composition of urine 1. Drugs that decrease acidity 2. Drugs that increase acidity	Discuss possible effects as a result of combinations of drugs
E. Drugs used in diagnostic procedures, including drugs used as x-ray contrast media	QUIZ

UNIT XI: Drugs That Affect the Nervous System

TIME ALLOTMENT: 8-10 hours

OBJECTIVES: See page 13 for Objectives 1-3

4. To help the student to become thoroughly familiar with the legal regulations that are associated with prescribing, storing, dispensing, administering, and possessing such drugs as hypnotics and narcotics.

Content	Teaching Methods
A. Drugs that affect the central nervous system	Lecture
1. Types	Assigned readings
a. Stimulants	Film
b. Depressants	
(1) Danger of suicides and accidental deaths	Discussion of nurse's opportunity to help forestall suicides
c. Antidepressants	Discussion of habit-forming and hallucinatory characteristics of certain drugs
d. Hypnotics and sedatives	
(1) Barbiturates	Assignment: Prepare list of narcotics and hypnotics commonly used in clinical laboratory
(2) Bromides	
(3) Chloral hydrate	
e. Analgesics	
(1) Opium and derivatives	
(2) Synthetics	
(3) Salicylates	
f. Tranquilizers	
g. Antispasmodics	
h. Anticonvulsants	
i. Muscle relaxants (including review of steroids)	
j. Anesthetics	
(1) General	
(2) Local	
2. Legal regulations concerning habit-forming drugs	Discussion of legal regulations concerning drugs and the equipment used with some of them
B. Drugs that affect the autonomic nervous system	Samples of drugs
1. Adrenergic agents	
2. Cholinergic agents	QUIZ

UNIT XII: Drugs That Affect the Endocrine and Reproductive Systems

TIME ALLOTMENT: 4-6 hours

OBJECTIVES: See page 13

Content	Teaching Methods
A. Hypoglycemic agents	Lecture
1. Types	
a. Insulin	
b. Other agents	
2. Techniques of administration	Student practice in measuring dose of insulin and in subcutaneous injection
3. Duration of action	Lecture
4. Measures for counteracting untoward effects	
B. Drugs used for thyroid condition	Lecture
1. Hyperthyroidism	
a. Iodine and iodide	
b. Lugol's solution	
c. Radioactive iodine (I^{131})	
2. Hypothyroidism	
a. Thyroid extract	
b. Thyroxin	
3. Other agents	
a. Natural	
b. Synthetic	
C. Drugs that affect the reproductive system	Lecture
1. Male sex hormones	Illustrations from drug company materials which show the effects of drugs on the reproductive system
a. Natural	
b. Synthetic	
2. Female sex hormones	
a. Natural	
b. Synthetic	
3. Ecbolics and oxytocics	
4. Pituitary hormones	QUIZ

UNIT XIII: Drugs Used in Neoplastic Diseases

TIME ALLOTMENT: 2-4 hours

OBJECTIVES: See page 13

Content	Teaching Methods
A. Radioactive isotopes B. Alkylating agents 1. Nitrogen mustards 2. Theo-TEPA 3. Myleran 4. 5-Fluorouracil C. Review of drugs used for supportive measures	Lecture Speaker from radiology department, if available, or Cancer Society Films about chemotherapeutic agents for neoplastic diseases from drug companies TERMINAL REVIEW AND EVALUATION OF STUDENT ACHIEVEMENT

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Some Sources of Instructional Materials

Pharmaceutical companies are excellent sources of free illustrative teaching materials pertaining to their products. Information about these materials can be obtained from the field representatives of these companies or by writing to the companies. Some of these companies are listed below. Their addresses can be found in the *Physicians' Desk Reference.*

UNIT IV

Crookes-Barnes Laboratories, Inc.
Eaton Laboratories
Lilly and Company, Eli
Merck Sharp & Dohme
Merrell Co., The Wm. S.
White Laboratories, Inc.
Winthrop Laboratories

UNIT V

Abbott Laboratories
Armour Pharmaceutical Company
Kenwood Laboratories, Inc.
Lederle Laboratories
Lilly and Company, Eli
Mead Johnson Laboratories
Organon, Inc.
Parke, Davis & Company
Roche Laboratories
Roerig & Company, J. B.
Smith Kline & French Laboratories
Squibb & Sons, E. R.
Stuart Company, The
Upjohn Company, The
White Laboratories, Inc.
Winthrop Laboratories

UNIT VI

Burroughs Wellcome & Co., Inc.
Ciba Pharmaceutical Company
Dubin Laboratories, Inc., H. E.
Kenwood Laboratories, Inc.
Lederle Laboratories
Lilly and Co., Eli
Merck Sharp & Dohme
Riker Laboratories, Inc.
Sandoz Pharmaceuticals
Searle & Co., G. D.
Upjohn Company, The
Warner-Chilcott Laboratories
Wyeth Laboratories

UNIT VII

Burroughs Wellcome & Co., Inc.
Lederle Laboratories
Lilly and Co., Eli
Merck Sharp & Dohme
Parke, Davis & Company
Pfizer Laboratories
Pitman-Moore Company
Robins Co., Inc., A. H.
Roche Laboratories
Schering Corporation
Searle & Co., G. D.
Upjohn Company, The
Wyeth Laboratories

UNIT VIII

Ciba Pharmaceutical Company
Endo Laboratories, Inc.
Merck Sharp & Dohme
Pfizer Laboratories
Robins Co., Inc., A. H.
Schering Corporation
Smith Kline & French Laboratories
Upjohn Company, The
Warner-Chilcott Laboratories
Wyeth Laboratories

UNIT IX

Ames Company, Inc.
Fleet Company, Inc., C. B.
Geigy Pharmaceuticals
Mead Johnson Laboratories
Merrell Co., The Wm. S.
Robins Co., Inc., A. H.
Roerig & Company, J. B.
Rorer, Inc., William H.
Searle & Co., G. D.
Squibb & Sons, E. R.
Stuart Company, The
Warner-Chilcott Laboratories
Wyeth Laboratories

UNIT X

Ames Company, Inc.
Hynson, Westcott & Dunning, Inc.
Merck Sharp & Dohme
Pfizer Laboratories
Roche Laboratories
Squibb & Sons, E. R.
Warner-Chilcott Laboratories

UNIT XI

Abbott Laboratories
Breon Laboratories, Inc.
Geigy Pharmaceuticals
Lilly and Company, Eli
Merrell Co., The Wm. S.
Riker Laboratories, Inc.
Robins Co., Inc., A. H.
Roche Laboratories
Sandoz Pharmaceuticals
Smith Kline & French Laboratories
Wallace Laboratories
Winthrop Laboratories

UNIT XII

Armour Pharmaceutical Company
Ayerst Laboratories
Ciba Pharmaceutical Company
Merck Sharp & Dohme
Organon, Inc.
Ortho Pharmaceutical Corporation
Pfizer Laboratories
Ross Laboratories
Schering Corporation
Smith Kline & French Laboratories
Squibb & Sons, E. R.
Warner-Chilcott Laboratories

UNIT XIII

Endo Laboratories, Inc.
Lederle Laboratories
Roche Laboratories