Pharmacology Terminology

Course

Medical Terminology

Unit XV

Diagnostic Procedures and Pharmacology

Essential Question

What medical terms are used in pharmacology?

TEKS

130.203 (c)(1) (A), (B), (C), (F). 2(B), 4 (A), (B), 5 (B), (C),(D), (E)

Prior Student Learning

Basic medical terminology: roots, prefixes and suffixes

Estimated time

6 hours

Rationale

Healthcare professionals must have a comprehensive medical vocabulary in order to communicate effectively with other health professionals. They should be able to use terminology related to Pharmacology when discussing medications.

Objectives

Upon completion of this lesson, the student will be able to:

- Identify the various routes of drug administration
- Differentiate among the various classes of drugs
- Define and decipher common terms associated with pharmacology
- Analyze unfamiliar terms using the knowledge of word roots, suffixes and prefixes gained in the course

Engage

Go to youtube.com and show the *Medication Administration: Safe Practices* video clip (3 min, 18 sec). There are actually about 18 videos in this series. Explain to your class that they will be learning terms related to medications and the administration of medications.

Key Points

Please note that the outline of this lesson plan is written to correspond with the Pharmacology power point presentation which is provided.

I. Drugs
   a. Used to prevent or treat diseases or medical conditions
   b. Derived from plants
   c. Obtained from yeast, molds and fungi
   d. Obtained from animals
   e. Synthesized in the laboratory

II. Pharmacist
   a. Prepares and dispenses drugs
      i. Pharmacy or drugstore
      ii. Prescribed by a physician
   b. Takes about 7 years of study to receive a Doctor of Pharmacy degree
   c. Consults with health care professionals concerning drugs
   d. Answers patients' questions about prescription needs

III. Pharmacy technician
   a. Helps licensed pharmacists provide medications and other health care products
   b. Certification Pathways

Levels	Certification Type	Duration	Average Cost
1	Certificate	1-4 months	$500-$2,000
2	Diploma	12 months	$4,000-$8,000
3	Degree	2-3 years	$12,000-$22,000

IV. Pharmacologist
    a. MD (doctor of medicine)
    b. PhD (doctor of medicine)
    c. Specializes in pharmacology

V. Pharmacology – study of preparation, properties, uses and action of drugs; has many subdivisions of study
    a. Medicinal chemistry
        i. Study of new drug synthesis
        ii. Studies the relationship between chemical structure and biological effects
    b. Pharmacodynamics
        i. The study of drug effects in the body
            1. Both biochemical and physiological effects of drugs on the body, or microorganism or parasites within or on the body
            2. Studies the relationship between drug concentration and effect
        ii. Studies drug absorption
            1. How drugs pass into the bloodstream
        iii. Distribution into body compartments
        iv. Metabolism: changes that drugs undergo within the body
        v. Excretion: removal of the drug from the body
    c. Pharmacokinetics
        i. The mathematical description of drug disposition in the body over time
        ii. Appearance and disappearance
    d. Molecular pharmacology
        i. Involves the interaction of drugs and subcellular entities such as DNA, RNA and enzymes
        ii. Provides important information about the mechanism of action of drugs
    e. Chemotherapy
        i. The study of drugs that destroy microorganisms, parasites or malignant cells within the body
        ii. Includes treatment of infectious disease and cancer
    f. Toxicology
        i. Study of the harmful effects of drugs and chemicals on the body

ii. Studies in animals are required by law before new drugs can be tested in humans

VI. Chemical Name
   a. Specifies the chemical makeup of a drug
   b. The chemical name is often long and complicated

VII. Generic name
   a. Shorter and less complicated
   b. Identifies the drug legally and scientifically
   c. Becomes public property after 17 years of use by the original manufacturer
   d. Only one generic name for each drug

VIII. Brand name
   a. Trademark name is the private property of the individual drug manufacturer and no competitor may use it
   b. Often has the super script ® after or before the name, indicating that it is a registered brand name
   c. Drugs can have several brand names, because each manufacturer producing the drug gives it a different name
      i. Example: Aspirin is a registered trademark owned by Bayer
      ii. Bayer® Aspirin
   d. Specific Prescriptions
      i. When a specific brand name is ordered on a prescription by a physician, it must be dispensed by the pharmacist
      ii. No other brand name may be substituted

IX. Standards
   a. Food and Drug Administrations (FDA)
      i. Has legal responsibility for deciding if a drug may be distributed or sold
      ii. Strict standards for effectiveness and purity
      iii. Requires extensive experimental testing in animals and humans before it approves a new drug
   b. United States Pharmacopeia (USP)
      i. An independent committee of doctors, pharmacologist, pharmacists and manufacturers
      ii. Review the available commercial drugs and appraises their effectiveness
      iii. To be approved the drug must be safe, clinically useful and available in pure form
      iv. If a drug has USP after is name, it has met the standards of the Pharmacopeia

X. References
   a. Hospital Formulary
      i. Most complete and up-to-date listings of drugs
      ii. Gives information about the characteristics of drugs and their clinical usage as approved by that particular

hospital
iii. Published yearly

b. *Physician's Desk Reference* (PDR)
i. Published by a private firm
ii. Drug manufacturers pay to have their products listed
iii. Useful reference with several indexes to identify drugs
iv. List precautions, warnings about side effects and information about the recommended dosage and administration of each drug
v. Published yearly

XI. Administration of Drugs

a. Route
i. How the drug is taken into the body
ii. Determines how well it is absorbed into the blood
iii. Determines the speed and duration of action of the drug
iv. Oral Administration
1. Given by mouth
2. Slowly absorbed into the bloodstream through the stomach or intestines
3. Convenient for the patient
4. Disadvantages include:
a. May be destroyed in the digestive tract
b. If unable to pass through the intestinal wall, it will be ineffective
c. Slow to act
v. Sublingual Administration
1. Placed under the tongue
2. Dissolves in the saliva
3. Rapid absorption
vi. Rectal Administration
1. Suppositories and aqueous solutions are inserted into the rectum
2. Used when oral administration is difficult
vii. Parenteral Administration
1. Injection of a drug from a syringe through a hollow needle
2. There are several types of Parenteral injections and instillation
a. Intracavity instillation: injection into a body cavity
b. Intradermal injection: shallow injection made into the upper layers of the skin
c. Subcutaneous Injection (SC)
i. Small needle is introduced into the subcutaneous tissue
ii. Usually on the upper arm, thigh or abdomen

d. Intramuscular injection
    i. Used for large volume of solution injections
    ii. Buttock or upper arm is the usual site for IM injections
e. Intrathecal instillation: injection in the space under the membranes surrounding the spinal cord and brain
f. Intravenous injection (IV)
    i. Injection given directly into a vein
    ii. Used when an immediate effect is desired
g. Pumps
    i. Battery-powered pumps may be used for continuous administration of drugs by SC or IV
h. Inhalation
    i. Gases taken into the nose or mouth
    ii. Absorbed into the bloodstream through the thin walls of air sacs in the lungs
    iii. Aerosols
        1. Particles of drug suspended in air
        2. Administered by inhalation
i. Topical application
    i. Drugs applied locally on the skin or mucous membranes
        1. Antipruitics (against itching)
        2. Antiseptics (Against infection)
        3. Transdermal patches
            a. Hormone replacement therapy
            b. Pain meds
            c. Many others

XII. Vehicles for drug administration
- a. Hypodermic syringes
- b. Ampule
    - i. Small glass or plastic container containing a single dose of drug
- c. Vial
    - i. Glass container with a metal-enclosed rubber seal
- d. Capsules: small soluble containers used for a dose of medication for swallowing
- e. Tablets: small solid pills containing a dose of medication
- f. Caplets: coated like a capsule, but solid like a tablet

XIII. Drug Actions and Interactions
    a. Receptor
        i. The target substance with which the drug interacts to produce its effects
        ii. Drug may cross the cell membrane to reach it's intracellular receptor
        iii. Drug may react with a receptor on the cell's surface
    b. Dose
        i. Amount of drug administered
        ii. Usually measured in milligrams or grams
    c. Schedule
        i. Exact timing and frequency of drug administration
    d. Additive Action
        i. The combination of two similar drugs is equal to the sum of the effects of each
        ii. Example: if drug A kills 10% of the infection and drug B kills 20% of the infection, then using A and B together would kill 30% of the infection
    e. Synergism
        i. Response
            1. Desired and beneficial effect of a drug
    f. Tolerance
        i. Effects of a given dose diminish as treatment continues
        ii. Increasing amounts are needed to produce the same effect
    g. Addiction
        i. Physical and psychological dependence on and craving for a drug
        ii. Presence of clear unpleasant effects when the drug is withdrawn
    h. Controlled substances
        i. Drugs that produce tolerance and dependence
        ii. Have potential for abuse or addiction
        iii. Class (Schedule) I: most dangerous drugs that have no recognized medicinal use
        iv. Class (Schedule) II: dangerous substance with general medical indications and high potential for abuse and addiction
        v. Class (Schedule) III: carries less potential for abuse, but casual use can lead to psychological addiction and dependence
        vi. Class (Schedule) IV: carries low potential for abuse but a risk of psychological or limited physical dependence
        vii. Class (Schedule) V: least dangerous drugs
XIV. Drug Toxicity
    a. The poisonous and potentially dangerous effects of some drugs

b. Idiosyncrasy
    i. An example of an unpredictable type of drug toxicity
    ii. Unexpected effect that appears in the patient after administration of a drug
c. Iatrogenic
    i. Produced by treatment
    ii. Mistakes in drug use
    iii. Due to unrecognized individual sensitivity to a certain agent
d. Side effects
    i. Toxic effects that result routinely result from the use of a drug
    ii. Often occur with the usual therapeutic dosage of a drug
    iii. Generally tolerable or acceptable
e. Contraindications
    i. Factors in a patient's condition that make the use of a drug dangerous
    ii. Reason's not to use the drug in question

XV. Classes of Drugs
a. Analgesics: alges/=sensitivity to pain
    i. Drug that lessens pain
    ii. Mild
    iii. Narcotic
    iv. Nonsteroidal Anti-inflammatory drugs (NSAIDs)
b. Anesthetics
    i. Agent that reduces or eliminates sensation
        1. General anesthetic
        2. Local anesthetic
c. Antibiotics
    i. A chemical substance produced by a microorganism: bacterium, yeast, or mold
    ii. Vagina: moniliasis or candidiasis
d. Antiviral
    i. Used against infections due to viruses
        1. Herpes viruses
        2. Epstein-Barr virus
        3. Cytomegalovirus
        4. HIV
e. Anticoagulants
    i. Prevent clotting of blood
    ii. Prevent formation of clots or breakup clots in blood vessels
        1. Heparin: a natural anticoagulant
        2. Warfarin (Coumadin); manufactured; blocks vitamin K
        3. Tissue-type plasminogen activator (tPS) dissolves clots

f. Antiplatelet drugs
    i. Reduce the tendency of platelets to stick together
        1. Aspirin (ASA)
        2. Plavix
g. Anticonvulsants
    i. Prevents or reduces the frequency of convulsions in some types of epilepsy
    ii. Depresses abnormal spontaneous activity of the brain, without affecting normal brain function
h. Antidepressants
    i. Treat symptoms of depression
    ii. Elevate mood and increase physical activity
    iii. Increase mental alertness
    iv. Improve appetite and sleep patterns
i. Anti-Alzheimer drugs
    i. Used to treat symptoms of Alzheimer disease
    ii. Act by aiding brain neurotransmitters
j. Antidiabetic drugs
    i. Used to treat diabetes mellitus
    ii. Insulin
    iii. Insulin pump
    iv. Oral antidiabetic drugs
k. Antihistamines
    i. Drugs that block the action of histamine
        1. Histamine causes allergic symptoms (Hives, bronchial asthma , hay fever)
    ii. Cannot cure the allergic reaction; only relieves its symptoms
    iii. Many have strong antiemetic qualities (used to prevent nausea)
l. Antiosteoporosis Drugs
    i. Used to treat osteoporosis (bone loss)
m. Cardiovascular Drugs
    i. Act on the heart or blood vessels to treat a variety of conditions; hypertension, angina, MI, CHF and others
    ii. Some help the heart to beat more effectively
    iii. Angiotensive-converting enzyme (ACE)
        1. Dilate blood vessels to lower blood pressure, improve the performance of the heart and reduce its workload
    iv. Angiotensive II receptor blockers (ARBs)
        1. Lower blood pressure by preventing angiotensive from acting on receptors in blood vessels
    v. Antiarrhythmics
        1. Reverse abnormal heart rhythms
        2. Slow the response of heart muscle to nervous system stimulation

3. Slow the rate the nervous system impulses are carried through the heart

vi. Beta-blockers
   1. Decrease muscular tone in blood vessels
   2. Decrease output of the heart
   3. Decrease blood pressure

vii. Calcium channel blockers
   1. Dilate blood vessels
   2. Lowers blood pressure
   3. Used to treat angina and arrhythmias

viii. Cholesterol-binding drugs
   1. Bind to dietary cholesterol and prevent its uptake from the GI track

ix. Cholesterol-lowering drugs (statins)
   1. Used to control high levels of cholesterol in the blood
   2. Lowers cholesterol by reducing its production in the liver

x. Diuretics
   1. Reduce the volume of blood in the body by promoting the kidneys to remove water and salt through urine
   2. Used to treat hypertension and CHF

n. Endocrine Drugs
   i. Androgens: normally made by the testes and adrenal glands
      1. Used for male hormone replacement
      2. Used to treat endometriosis and anemia
   ii. Antiandrogens: interfere with the production of androgens or interfere with their binding in tissues
      1. Used to treat prostate cancer
   iii. Estrogens: female hormones normally produced by the ovaries
      1. Used for symptoms associated with menopause and postmenopausal osteoporosis
   iv. Aromatase inhibitors
      1. Reduce the amount of estrogen in the blood
      2. Are effective against breast cancer
   v. Selective estrogen receptor modulator (SERM)
      1. Has estrogen-like effects on bone and on lipid metabolism
      2. Used to treat postmenopausal osteoporosis and breast cancer
   vi. Thyroid hormone: used to treat low output of hormone from the thyroid gland
      1. Calcitonin: used to treat osteoporosis
      2. Glucocorticoids help reduction of inflammation as

well as arthritis, skin allergic conditions, GI ailments, and malignant conditions

vii. Parathyroid hormone (PTH)
    1. Used to treat osteoporosis
    2. Stimulates new bone formation

viii. Growth hormone release-inhibiting factor
    1. Can be manufactured and given to treat GI symptoms associated with acromegaly and other tumors
    2. Inhibits the production of natural growth hormone

o. Gastrointestinal Drugs
    i. Antacids
        1. Neutralize the hydrochloric acid in the stomach
        2. Used to relieve symptoms of peptic ulcer, esophagitis and reflux
    ii. Antiulcer Drugs
        1. Blocks secretion of acid by cells in the lining of the stomach
        2. Used to treat gastric and duodenal ulcers and Gastroesophageal reflux disease (GERD)
    iii. Antidiarrheal medications
        1. Relieve diarrhea and diminishes colon peristalsis
    iv. Cathartics: relieve constipation and promote defecation
        1. Laxatives: mild cathartics
        2. Purgatives: strong cathartics

p. Respiratory Drugs
    i. Bronchodilators
        1. Open bronchial tubes
        2. Administered by injection or aerosol inhalers
    ii. Steroid drugs: reduce chronic inflammation in respiratory passageways
    iii. Leukotriene modifiers: prevent asthma attacks

q. Sedative-Hypnotics
    i. Used to treat insomnia and sleep disorders
    ii. Depress the CNS and promote drowsiness (sedatives) and sleep (Hypnotics)
    iii. Barbiturates and benzodiazepines are two major categories of sedative-hypnotics

r. Stimulants
    i. Act on the brain to speed up vital processes (heart and respirations)
    ii. Increase alertness and inhibit hyperactive behavior
    iii. Amphetamines: used to prevent narcolepsy (seizures of sleep), suppresses appetite and calms hyperkinetic children
    iv. Caffeine: cerebral stimulant: used to treat headaches

s. Tranquilizers

i. Useful for controlling anxiety
ii. Benzodiazepines: minor tranquilizers
iii. Phenothiazines
iv. Major tranquilizers

XVI. Vocabulary

Term	Meaning
addiction	Physical and psychological dependence on and craving for a drug
additive action	Drug action in which the combination of two similar drugs is equal to the sum of the effects of each
aerosol	Particles of drug suspended in air
anaphylaxis	Exaggerated hypersensitivity reaction to a previously encountered drug or foreign protein
antagonistic action	Combination of two drugs gives less than an additive effect (action)
antidote	Agent given to counteract an unwanted effect of a drug
brand name	Commercial name for a drug; trademark or trade name
chemical name	Chemical formula for a drug
contraindications	Factors that prevent the use of a drug or treatment
controlled substances	Drugs that produce tolerance and dependence and have a potential for abuse or addiction
dependence	Prolonged use of a drug that may lead to physiologic need for its actions in the body
dose	Amount of drug administrated, usually measured in milligrams
food and drug administration (FDA)	U.S government agency having the legal responsibility for enforcing proper drug manufacture and clinical use
generic name	Legal noncommercial name of a drug
iatrogenic	Condition caused by treatment (drug or procedures) given by physicians or medical personnel
idiosyncratic reaction	Unexpected effect produced in particularly sensitive patient but not seen in most people
inhalation	Administration of drugs in gaseous or vapor from through the nose of mouth
medicinal chemistry	study of new drugs synthesis; relationship between chemical structure and biological effects
molecular pharmacology	Study of interaction of drugs and their target molecules such as enzymes, or cell surface receptors
oral administration	Drugs given by mouth

parenteral administration	Drugs are given by injection into the skin, muscles, or veins (any route other than the digestive tract). Examples are subcutaneous, Intradermal, intramuscular, intravenous, intrathecal, and intracavity injections
pharmacist	Specialist in preparing and dispensing drugs
pharmacy	Location for preparing and dispensing drugs. Also the study of preparing and dispensing drugs
pharmacodynamics	Study of the effects and strengths of a drug within the body
pharmacokinetics	Study of drug concentrations in tissues and body fluids over a period of time.
Pharmacologist	Specialists who develop and test drugs for medicinal use.
Pharmacology	Study of the preparation, properties, uses and actions of drugs.
Physician's Desk Reference	(PDR) Reference book that lists drug products
Receptor	Target substance with which a drug interacts in the body
Rectal administration	Drugs are inserted through the anus into the rectum
Resistance	Lack of beneficial response
Response	Desired and beneficial effect of a drug
Schedule	Exact timing and frequency of drug administration
Side effect	Adverse reaction, usually minor, that routinely results from the use of a drug
Sublingual administration	Drugs are given by placement under the tongue
Synergism	Combination of two drugs causes an effect that is greater than the sum of the individual effects of each drug alone
Syringe	Instrument for introducing or withdrawing fluids from the body
Tolerance	Larger and larger drug doses must be given to achieve the desired effect
Topical application	Drugs are applied locally on the skin or mucous membranes of the body (ointments, creams, lotions)
Toxicity	Harmful effects of a drug
Toxicology	Study of the harmful chemicals and their effects on the body
Transport	Movement of a drug across a cell membrane into body cells
United States Pharmacopeia	Authoritative list of drugs, formulas and preparations that sets a standard for drug

	manufacturing and dispensing
Vitamin	Substance found in foods and essential in small quantities for growth and good health

XVII. Classes of Drugs and Related Terms

Term	Meaning
ACE inhibitor	Lowers blood pressure
amphetamine	Central nervous system stimulant
analgesic	Relieves pain
androgen	Male hormone
anesthetic	Reduces or eliminates sensation (general or locally)
angiotensin II receptor blocker	Lowers blood pressure by preventing angiotensive from acting on receptors in blood vessels
antacid	Neutralizes acid in the stomach
antiandrogen	Slows the uptake of androgens or interferes with their effect in tissues
antiarrhythmic	Treats abnormal heart rhythms
antibiotic	Chemical substance, produced by a plant or microorganism, that has the ability to inhibit or destroy foreign organisms in the body
anticoagulant	Prevents blood clotting
anticonvulsant	Prevents convulsions
antidepressant	Relieve symptoms of depression
antidiabetic	Drug given to prevent or treat diabetes mellitus
antidiarrheal	Prevents diarrhea
antiemetic	Prevents nausea and vomiting
antihistamine	Blocks the action of histamine and helps prevent symptoms of allergy
antinauseant	Relieves nausea and vomiting; antiemetic
antiplatelet	Reduces the tendency of platelets to stick together and form a clot
antiulcer	Inhibits the secretion of acid by cells lining the stomach
antiviral	Acts against viruses such as herpes viruses and HIV
aromatase inhibitor	Reduces estrogen in the blood by blocking the enzyme Aromatase
bactericidal	Kills bacteria
bacteriostatic	Inhibits bacterial growth
beta-blocker	Blocks the action of epinephrine at sites on receptors of heart muscle cells, muscle lining of blood vessels, and bronchial tubes
bisphosphonate	Prevents bone loss in osteoporosis and osteopenia

caffeine	Central nervous system stimulant
calcium channel blocker	Blocks the entrance of calcium into heart muscle and muscle lining of blood vessels; also called calcium antagonist
cardiac glycoside	Increases the force of contraction of the heart
cardiovascular drug	Acts on the heart and blood vessels
cathartic	Relieves constipation
cholesterol-binding drug	Binds to dietary cholesterol and prevents its uptake from the gastrointestinal tract
cholesterol-lowering drug	Lowers cholesterol by preventing its production by the liver; statin
diuretic	Increases the production of urine and thus reduces the volume of fluid in the body; antihypertensive
emetic	Promotes vomiting
endocrine drug	A hormone or hormone-like drug
gastrointestinal drug	Relieves systems of diseases in the gastrointestinal tract
glucocorticoid	Hormone from the adrenal cortex that raises blood sugar and reduces inflammation
hypnotic	Produces sleep or a trance-like state
laxative	Weak cathartic
narcotic	Habit-forming drug that relieves pain by producing stupor or insensibility
progestin	Female hormone that stimulates the uterine lining during pregnancy and is also used in treatment of abnormal uterine bleeding and for hormone replacement therapy
purgative	Relieves constipation (strong cathartic)
respiratory drug	Treats asthma, emphysema, and infections of the respiratory system
sedative	A mildly hypnotic drug that relaxes without necessarily producing sleep
stimulant	Excites and promotes activity
thyroid hormone	Stimulates cellular metabolism
tranquilizer	Controls anxiety and severe disturbances of behavior

XVIII. Combining Forms

Combining Form	Meaning
aer/o	Air
alges/o	Sensitivity to pain
bronch/o	Bronchial tube
chem./o	Drug
cras/o	Mixture

cutane/o	skin
derm/o	Skin
erg/o	Work
esthes/o	Feeling, sensation
hist/o	Tissue
hypn/o	Sleep
iatr/o	treatment
lingu/o	Tongue
myc/o	Mold, fungus
narc/o	Stupor
or/o	Mouth
pharmacy/o	Drug
prurit/o	Itching
thec/o	Sheath
pyret/o	Fever
tox/o	Poison
toxic/o	Poison
vas/o	Vessel
ven/o	Vein
vit/o	life

XIX. Prefixes

Prefix	**Meaning**
Ana-	Upward, excessive, again
Anti-	against

XX. Abbreviations

Abbreviation	**Meaning**
a.c., ac	Before meals
ACE	Angiotensive-converting enzyme
ad lib	Freely, as desired
APAP	Acetaminophen (Tylenol)
ARB	Angiotensin II receptor blocker
b.i.d., bid	Two times a day
$\overline{c}$	with
Caps	Capsules
Cc	Cubic centimeter
FDA	US Food and Drug Administration
gm, g	Gram
gtt	Drops
h	Hour

h.s., hs	At bedtime
H_2 blocker	Histamine H_2 receptor antagonist
HRT	Hormone Replacement therapy
IM	Intramuscular
INH	Isoniazid – antituberculosis agent
IV	Intravenous
MAOI	Monoamine oxidase inhibitor
mg	Milligram
mil, ml	Milliliter
NPO	Nothing by mouth
NASID	Nonsteroidal anti-inflammatory drug
$\overline{p}$	After (post)
p.c., pc	After meals
PCA	Patient-controlled analgesia
PDR	*Physician's Desk Reference*
PO, p.o., po	By mouth
p.r.n., prn	As needed; as necessary
Pt	Patient
q	Every
q.h., qh	Every hour
q2h	Every 2 hours
q.i.d., qid	Four times a day
q.s., qs	Sufficient quantity
qAM	Every morning
qPM	Every evening
Rx	Prescription
$\overline{s}$	Without
SERM	Selective estrogen receptor modulator
Sig.	Directions – how to take the medication
SL	Sublingual
s.o.s.	If it is necessary
SSRI	Selective serotonin reuptake inhibitor
SQ	Subcutaneous
tab	Tablet
TCA	Tricyclic antidepressant
t.i.d., tid	Three times daily

Activity

I. Make flash cards of pharmacology terms and practice putting the terms together with prefixes and suffixes to make new terms.

II. Complete the Pharmacology Combining Forms Worksheet.

III. Complete the Pharmacology Vocabulary Worksheet.

IV. Complete the Classes of Drugs Worksheet

V. Review media terms with the students using review games such as the "Fly Swatter Game" or the "Flash Card Drill" (see the Medical Terminology Activity Lesson Plan -- http://texashste.com/documents/curriculum/principles/medical_terminology_activities.pdf)

Assessment

Successful completion of the activities

Materials

Computer and data projector
Index cards
Classes of drugs worksheet and key
Markers
Pharmacology combining forms, prefixes & abbreviation worksheet & Key
Pharmacology vocabulary worksheet & Key

Accommodations for Learning Differences

For reinforcement, the student will practice terms using flash cards related to pharmacology.

For enrichment, the students will research various medications and report back to the class the drug type, uses, therapeutic effects, and side effects of the medication.

National and State Education Standards

National Healthcare Foundation Standards and Accountability Criteria:

Foundation Standard 2: Communications
2.21 Use roots, prefixes, and suffixes to communicate information
2.22 Use medical abbreviations to communicate information

TEKS

130.203 (c) (1) The student recognizes the terminology related to the health science industry. The student is expected to:

- (A) identify abbreviations, acronyms, and symbols;
- (B) identify the basic structure of medical words;
- (E) recall directional terms and anatomical planes related to the body structure
- (F) define and accurately spell occupationally specific terms such as those relating to the body systems, surgical and diagnostic procedures, diseases, and treatments.

130.203 (c) (2) (B) employ increasingly precise language to communicate

130.203 (c) (4) The student interprets medical abbreviations. The student is expected to:

- (A) distinguish medical abbreviations used throughout the health science industry; and
- (B) translate medical abbreviations in simulated technical material such as physician progress notes, radiological reports, and laboratory reports.

130.203(c)(5)(B) translate medical terms to conversational language to facilitate communication;

- (C) distinguish medical terminology associated with medical specialists such as geneticist, pathologists, and oncologist ;
- (D) summarize observations using medical terminology; and
- (E) correctly interpret contents of medical scenarios.

Texas College and Career Readiness Standards

English and Language Arts,

Understand new vocabulary and concepts and use them accurately in reading, speaking, and writing.

1. Identify new words and concepts acquired through study of their relationships to other words and concepts.
2. Apply knowledge of roots and affixes to infer the meanings of new words.
3. Use reference guides to confirm the meanings of new words or concepts.

Cross-Disciplinary Standards,

I. Key Cognitive Skills D. Academic Behavior: 1. Self-monitor learning needs and seek assistance when needed, 3. Strive for accuracy and precision, 4. Persevere to complete and master task. E. Work habits: 1. Work independently, 2. Work collaboratively

II. Foundation Skills A. 2. Use a variety of strategies to understand the meaning of new words. 4. Identify the key information and supporting details.

PHARMACOLOGY WORKSHEET

Combining Forms

Combining Form	Meaning
aer/o	
alges/o	
bronch/o	
chem./o	
cras/o	
cutane/o	
derm/o	
erg/o	
esthes/o	
hist/o	
hypn/o	
iatr/o	
lingu/o	
myc/o	
narc/o	
or/o	
pharmacy/o	
prurit/o	
thec/o	
pyret/o	
tox/o	
toxic/o	
vas/o	
ven/o	
vit/o	

Prefixes

Prefix	Meaning
Ana-	
Anti-	

Abbreviations

Abbreviation	Meaning
a.c., ac	
ACE	
ad lib	
APAP	
ARB	
b.i.d., bid	
c̄	
Caps	
Cc	
FDA	

gm, g	
gtt	
h	
h.s., hs	
H_2 blocker	
HRT	
IM	
INH	
IV	
MAOI	
mg	
mil, ml	
NPO	
NASID	
$\overline{p}$	
p.c., pc	
PCA	
PDR	
PO, p.o., po	
p.r.n., prn	
Pt	
q	
q.h., qh	
q2h	
q.i.d., qid	
q.s., qs	
qAM	
qPM	
Rx	
$\overline{s}$	
SERM	
Sig.	
SL	
s.o.s.	
SSRI	
SQ	
tab	
TCA	
t.i.d., tid	

PHARMACOLOGY WORKSHEET
KEY

Combining Forms -- Key

Combining Form	Meaning
aer/o	Sir
alges/o	Sensitivity to pain
bronch/o	Bronchial tube
chem./o	Drug
cras/o	Mixture
cutane/o	Skin
derm/o	Skin
erg/o	Work
esthes/o	Feeling, sensation
hist/o	Tissue
hypn/o	Sleep
iatr/o	Treatment
lingu/o	Tongue
myc/o	Mold, fungus
narc/o	Stupor
or/o	Mouth
pharmacy/o	Drug
prurit/o	Itching
thec/o	Sheath
pyret/o	Fever
tox/o	Poison
toxic/o	Poison
vas/o	Vessel
ven/o	Vein
vit/o	Life

Prefixes – Key

Prefix	Meaning
Ana-	Upward, excessive, again
Anti-	Against

Abbreviations – Key

Abbreviation	Meaning
a.c., ac	Before meals
ACE	Angiotensive-converting enzyme
ad lib	Freely, as desired
APAP	Acetaminophen (Tylenol)
ARB	Angiotensin II receptor blocker
b.i.d., bid	Two times a day
$\overline{c}$	with
Caps	Capsules
Cc	Cubic centimeter

FDA	US Food and drug Administration
gm, g	Gram
gtt	Drops
h	Hour
h.s., hs	At bedtime
H_2 blocker	Histamine H_2 receptor antagonist
HRT	Hormone replacement therapy
IM	Intramuscular
INH	Isoniazid – antituberculosis agent
IV	Intravenous
MAOI	Monoamine oxidase inhibitor
mg	Milligram
mil, ml	Milliliter
NPO	Nothing by mouth
NASID	Nonsteroidal anti-inflammatory drug
$\overline{p}$	After (post)
p.c., pc	After meals
PCA	Patient-controlled analgesia
PDR	*Physician's Desk Reference*
PO, p.o., po	By mouth
p.r.n., prn	As needed; as necessary
Pt	Patient
q	Every
q.h., qh	Every hour
q2h	Every 2 hours
q.i.d., qid	Four times a day
q.s., qs	Sufficient quantity
qAM	Every morning
qPM	Every evening
Rx	Prescription
$\overline{s}$	Without
SERM	Selective estrogen receptor modulator
Sig.	Directions – how to take the medication
SL	Sublingual
s.o.s.	If it is necessary
SSRI	Selective serotonin reuptake inhibitor
SQ	Subcutaneous
tab	Tablet
TCA	Tricyclic antidepressant
t.i.d., tid	Three times daily

Pharmacology Vocabulary-Worksheet

Term	Meaning
addiction	
additive action	
aerosol	
anaphylaxis	
antagonistic action	
antidote	
brand name	
chemical name	
contraindications	
controlled substances	
dependence	
dose	
food and drug administration (FDA)	
generic name	
iatrogenic	
idiosyncratic reaction	
inhalation	
medicinal chemistry	
molecular pharmacology	
oral administration	
parenteral administration	
pharmacist	
pharmacy	
pharmacodynamics	
pharmacokinetics	
Pharmacologist	
Pharmacology	
Physician's Desk Reference	
receptor	
rectal administration	
resistance	
response	
schedule	
side effect	
sublingual administration	
synergism	
syringe	
tolerance	
topical application	
toxicity	
toxicology	
transport	
United States	

Pharmacopeia	
vitamin	

Pharmacology Vocabulary -- Key

Term	Meaning
addiction	Physical and psychological dependence on and craving for a drug
additive action	Drug action in which the combination of two similar drugs is equal to the sum of the effects of each
aerosol	Particles of drug suspended in air
anaphylaxis	Exaggerated hypersensitivity reaction to a previously encountered drug or foreign protein
antagonistic action	Combination of two drugs gives less than an additive effect (action)
antidote	Agent given to counteract an unwanted effect of a drug
brand name	Commercial name for a drug; trademark or trade name
chemical name	Chemical formula for a drug
contraindications	Factors that prevent the use of a drug or treatment
controlled substances	Drugs that produce tolerance and dependence and have a potential for abuse or addiction
dependence	Prolonged use of a drug that may lead to physiologic need for its actions in the body
dose	Amount of drug administrated, usually measured in milligrams
food and drug administration (FDA)	U.S government agency having the legal responsibility for enforcing proper drug manufacture and clinical use
generic name	Legal noncommercial name of a drug
iatrogenic	Condition caused by treatment (drug or procedures) given by physicians or medical personnel
idiosyncratic reaction	Unexpected effect produced in particularly sensitive patient but not seen in most people
inhalation	Administration of drugs in gaseous or vapor from through the nose of mouth
medicinal chemistry	study of new drugs synthesis; relationship between chemical structure and biological effects
molecular pharmacology	Study of interaction of drugs and their target molecules such as enzymes, or cell surface receptors
oral administration	Drugs given by mouth
parenteral administration	Drugs are given by injection into the skin, muscles, or veins (any route other than the digestive tract). Examples are subcutaneous, Intradermal, intramuscular, intravenous, intrathecal, and intracavity injections
pharmacist	Specialist in preparing and dispensing drugs
pharmacy	Location for preparing and dispensing drugs. Also the study of preparing and dispensing drugs
pharmacodynamics	Study of the effects and strengths of a drug within the body
pharmacokinetics	Study of drug concentrations in tissues and body fluids over a period of time.
pharmacologist	Specialists who develop and test drugs for medicinal use.

pharmacology	Study of the preparation, properties, uses and actions of drugs.
Physician's Desk reference	(PDR) Reference book that lists drug products
receptor	Target substance with which a drug interacts in the body
rectal administration	Drugs are inserted through the anus into the rectum
resistance	Lack of beneficial response
response	Desired and beneficial effect of a drug
schedule	Exact timing and frequency of drug administration
side effect	Adverse reaction, usually minor, that routinely results from the use of a drug
sublingual administration	Drugs are given by placement under the tongue
synergism	Combination of two drugs causes an effect that is greater than the sum of the individual effects of each drug alone
syringe	Instrument for introducing or withdrawing fluids from the body
tolerance	Larger and larger drug doses must be given to achieve the desired effect
topical application	Drugs are applied locally on the skin or mucous membranes of the body (ointments, creams, lotions)
toxicity	Harmful effects of a drug
toxicology	Study of the harmful chemicals and their effects on the body
transport	Movement of a drug across a cell membrane into body cells
United States Pharmacopeia	Authoritative list of drugs, formulas and preparations that sets a standard for drug manufacturing and dispensing
vitamin	Substance found in foods and essential in small quantities for growth and good health

Pharmacology-Classes of Drugs and Related Terms

Term	Meaning
ACE inhibitor	
amphetamine	
analgesic	
androgen	
anesthetic	
angiotensin II receptor blocker	
antacid	
antiandrogen	
antiarrhythmic	
antibiotic	
anticoagulant	
anticonvulsant	
antidepressant	
antidiabetic	
antidiarrheal	
antiemetic	
antihistamine	
antinauseant	
antiplatelet	
antiulcer	
antiviral	
aromatase inhibitor	
bactericidal	
bacteriostatic	
beta-blocker	
bisphosphonate	
caffeine	

calcium channel blocker	
cardiac glycoside	
cardiovascular drug	
cathartic	
cholesterol-binding drug	
cholesterol-lowering drug	
diuretic	
emetic	
endocrine drug	
gastrointestinal drug	
glucocorticoid	
hypnotic	
laxative	
narcotic	
progestin	
purgative	
respiratory drug	
sedative	
stimulant	
thyroid hormone	
tranquilizer	

Pharmacology -- Classes of Drugs and Related Terms -- Key

Term	Meaning
ACE inhibitor	Lowers blood pressure
amphetamine	Central nervous system stimulant
analgesic	Relieves pain
androgen	Male hormone
anesthetic	Reduces or eliminates sensation (general or locally)
angiotensin II receptor blocker	Lowers blood pressure by preventing angiotensive from acting on receptors in blood vessels
antacid	Neutralizes acid in the stomach
antiandrogen	Slows the uptake of androgens or interferes with their effect in tissues
antiarrhythmic	Treats abnormal heart rhythms
antibiotic	Chemical substance, produced by a plant or microorganism, that has the ability to inhibit or destroy foreign organisms in the body
anticoagulant	Prevents blood clotting
anticonvulsant	Prevents convulsions
antidepressant	Relieve symptoms of depression
antidiabetic	Drug given to prevent or treat diabetes mellitus
antidiarrheal	Prevents diarrhea
antiemetic	Prevents nausea and vomiting
antihistamine	Blocks the action of histamine and helps prevent symptoms of allergy
antinauseant	Relieves nausea and vomiting; antiemetic
antiplatelet	Reduces the tendency of platelets to stick together and form a clot
antiulcer	Inhibits the secretion of acid by cells lining the stomach
antiviral	Acts against viruses such as herpes viruses and HIV
aromatase inhibitor	Reduces estrogen in the blood by blocking the enzyme Aromatase
bactericidal	Kills bacteria
bacteriostatic	Inhibits bacterial growth
beta-blocker	Blocks the action of epinephrine at sites on receptors of heart muscle cells, muscle lining of blood vessels, and bronchial tubes
bisphosphonate	Prevents bone loss in osteoporosis and osteopenia
caffeine	Central nervous system stimulant
calcium channel blocker	Blocks the entrance of calcium into heart muscle and muscle lining of blood vessels; also called calcium antagonist
cardiac glycoside	Increases the force of contraction of the heart
cardiovascular drug	Acts on the heart and blood vessels
cathartic	Relieves constipation
cholesterol-binding drug	Binds to dietary cholesterol and prevents its uptake from the gastrointestinal tract

cholesterol-lowering drug	Lowers cholesterol by preventing its production by the liver; statin
diuretic	Increases the production of urine and thus reduces the volume of fluid in the body; antihypertensive
emetic	Promotes vomiting
endocrine drug	A hormone or hormone-like drug
gastrointestinal drug	Relieves systems of diseases in the gastrointestinal tract
glucocorticoid	Hormone from the adrenal cortex that raises blood sugar and reduces inflammation
hypnotic	Produces sleep or a trance-like state
laxative	Weak cathartic
narcotic	Habit-forming drug that relieves pain by producing stupor or insensibility
progestin	Female hormone that stimulates the uterine lining during pregnancy and is also used in treatment of abnormal uterine bleeding and for hormone replacement therapy
purgative	Relieves constipation (strong cathartic)
respiratory drug	Treats asthma, emphysema, and infections of the respiratory system
sedative	A mildly hypnotic drug that relaxes without necessarily producing sleep
stimulant	Excites and promotes activity
thyroid hormone	Stimulates cellular metabolism
tranquilizer	Controls anxiety and severe disturbances of behavior