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AND A STUDY MODULE ON CD!**

Health

Pass the
TEXES

Science

First Edition

Technology

FOR TEXAS TEACHERS.

*A test prep manual for the TExES Health Science Technology
exam #173 for grades 8-12.
Seminar and tutoring available.*

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**Also
available from
Ed Publishing:
Pass the TExES PPR**

Steps for Success

NOTE: It is recommended that 3-4 weeks is allowed to complete this study program process. There are certain exercises that you may not have time for. However, choose the parts of the program that you feel you can realistically accomplish, set some goals, and plot them on a calendar.



STEP ONE (ACTIVE STUDY):

To begin your test preparation you will need the ETS/SBEC official study manual which is found on the Internet and on the CD with this book. (If you have time, there are recommended resources listed in the ETS/SBEC manual in Section V.) The ETS/SBEC study manual is also available online at www.texas.ets.org, and we have included the study material from the manual in the back of this book in Appendix III. We call the bulleted study information in the ETS/SBEC manual “Descriptors”. This is key conceptual information, although the statements are sometimes difficult to understand and study because of their length and wordiness. The study outlines we have presented in this manual are an expansion of these Descriptors. We have “fleshed them out” to provide more detailed study information for you. Our **Descriptor Exercise** will help you understand the concepts more clearly. Follow these instructions for “Active Study”:

EXAMPLE:

“Knows the typical stages of cognitive, social, physical, and emotional development of students in early childhood through grade 12.”

The paraphrase for this bullet point is “stages of development”

Taken from bullet 1, Comp. 1, PPR EC-12

- **Review:** Review the *Outlined Study Material* for the first Competency in this manual. Study the *Key Titles*, *Descriptor Highlights*, and *Key Words*. Use your highlighter to highlight key information, and we suggest using the Internet to quickly look up information you need further clarification about and write additional notes in the margins of the book.
- **Descriptor Exercise:** Before you move on to Competency 2, do the *Descriptor Exercise* for Competency 1. This exercise is a great tool to help you understand what the SBEC wants you to know, and one that will help you retain that information more efficiently and more effectively. This exercise will require you to study and analyze the bulleted descriptive statements under each Competency definition in the ETS/SBEC manual (not just passively read them), and synthesize them down to phrase that is meaningful to you and that will concisely state what the bullet point is really saying. The Descriptor Exercise is located on the left side of the Competency study pages in this manual. On the blanks provided you will synthesize or “tag” the bullet points. Keep your phrase at five words or less; put one phrase on each blank. For the first bullet point, write your phrase on the first blank. For the second bullet point, write that on the second blank, and so on. Then transfer all of these phrases to Worksheet 4 in Appendix I of this manual for easier study. You can carry Worksheet 4 with you during the day for quick reference as well. This exercise is designed so that when you read your phrases, the information that you left out will come back to you. In the example at left, the important information that we left out were the stages of development: “cognitive, social, physical, and emotional”. This is what you will hopefully recall when you read the phrase “stages of development”.

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STEP TWO (MEMORIZATION):

Do Worksheets 1-5 in Appendix I. The goal is to memorize as much of the details or concepts for each Competency as possible. Memorization begins with the use of our acronym exercise in Appendix I. **IMPORTANT:** Make several copies of the worksheets before you write on them. View the study module on the CD which will assist you in memorizing the Competency definitions. Eventually you will be able to write down everything you can remember about each Competency in order.



WE RECOMMEND: On the test booklet before the test write down your acronym (see Appendix I), then your key titles, and brief Competency information by each title. As you answer each question, if needed, refer to this Competency information to refresh your memory. You can also write down the Competency number by each exam question. The SBEC writers have listed the Competency numbers beside the sample test answer key for a reason. Each question refers back to a particular Competency.

Steps for Success, cont'd

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STEP THREE (ASSESSMENT):

Answer the practice test questions provided in this manual in Appendix III, and any practice test questions, using our **PRACTICE TEST METHOD** (see Appendix I). The seven italicized questions you see in our sample test represent a very methodical thought process we recommend. Our practice test method is a critical part of this program and your success. By following this method carefully while working each question, you will better connect the test question to the Competencies which is key to choosing the best answer. This process will give you legitimate reasons for choosing answers, which will guide you on the actual test. Choosing correct answers based on incorrect reasoning only sets you up for failure. In the seventh step of this process, you are analyzing for yourself why the test writers chose the answers they did, and that is KEY, especially on the more subjective questions. Doing this important analysis will help you understand the point of view of the test writers, as well as strengthen your analysis skills...skills that you will need on the actual test.

THE OVERALL APPROACH

The overall approach you are following when using the Pass the TExES study program of study is in two parts:

Part One: Knowledge and Comprehension

Part Two: Critical Thinking Skill Development



According to Bloom's Taxonomy knowledge and comprehension material must be mastered before one can apply these concepts in the test questions. The Pass the TExES program encourages the development of higher level thought processes such as application, evaluation, analysis and synthesis...processes Bloom's Taxonomy categorizes at the top end of learning. The exercises we employ are designed to exercise and increase these higher-level thought processes, thus allowing for greater success on the exam. That is why this method includes both lower level memorization activities and then moves into exercises using the higher level thought processes. The goal, of course, is to know this material well and be able to analyze test questions and choose correct answers on the test.



This program has made all the difference for many teachers since 1999. Read testimonials and purchase additional copies of this book and other books at www.passthetexes.com. Seminars may be available to the general public and they are always available for Texas universities, school districts, Alternative Certification Programs, and Education Service Centers.

NOTE: By carefully following this program of study we feel that you will be well-prepared for your TExES exam. However, we do not guarantee a passing grade on the exam. We encourage you to contact us during your study time should you have any questions. Should you attend one of our seminars and fail your exam, you may contact us for a free tutoring session by phone with our staff. If you purchase a book and decide you cannot use it, please contact us within one week of receipt to request a full refund.

Domain I:

Academic Foundations

Competencies 1-3

(19% of the test)

Health Science Technology Education 8–12 Standard I:

Academics: The health science technology education teacher is proficient in the academic subjects needed to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) for Health Science Technology Education.



1. Health Care Trends

Key Descriptors:

NOTE: Refer to the bullet points under each Competency in the ETS/SBEC study guide. Analyze each bullet point, and synthesize it down to a paraphrase that is meaningful to you, using 2-5 words. List those phrases in order on the lines above. When complete, record them again on Worksheet 4 in Appendix I.

Key Words:

- History
- Economics
- Influences
- Prevention
- Allocation

D E S C R I P T O R	H I G H L I G H T S
<ul style="list-style-type: none">• Teacher knows history of health care and its impact on society.• Teacher understands the economics of health care.• Teacher describes factors that influence health care delivery.• Teacher compares and contrasts cultural strategies to address health problems.	<ul style="list-style-type: none">• Teacher describes how individuals and agencies address disease prevention and containment in a global society.• Teacher analyzes the impact of technology on health care.

1. Health Care Trends

Competency 1:

The teacher understands major trends in the history of health care and the impact of health care on society.

A. History

Major trends in the history of health care, including:

- public health/sanitation advances, including sterile/aseptic technique, quality standards for food and water distribution, public health education, and vaccination;
- improved understanding of the causes of disease and prevention initiatives, including public health education and vaccination;
- improved treatments, including antibiotics and improved surgical techniques;
- changes in practice patterns, including increased self-care and healthier lifestyle.

B. Economics

Economic impact of health services on society:

- Reduced availability of resources (e.g., due to hospital closing, physician retirement, physician attrition from specialties at high risk of litigation such as obstetrics) causes decreased utilization, but can increase cost. (Postponed care is more costly than prevention and early intervention.)
- Changes in practice patterns (“drive-through” hospital stays, use of urgent care facilities, ambulatory surgery centers, and assisted living facilities) reduce cost.
- Trends in patient preferences for nontraditional health care (birthing centers/home birth, self-care, alternative health care) reduce cost.
- The evolution of health insurance has reduced cost to consumers:
- Massachusetts Health Insurance of Boston offered first comprehensive group benefits in 1847.

- In 1929, Dallas teachers formed first modern group health insurance plan by contracting with Baylor Hospital for room, board, and medical services.
- In 1932, Blue Cross and Blue Shield promised increased volume and prompt payment to negotiate contracts with physicians and hospitals. Insurance companies proliferated in 1930s and 1940s .
- Employee benefit plans were accelerated by wage freezes during WWII (1939-1945).
- Appearance of government health care programs
- 1954: Social Security Disability
- 1965: Medicare and Medicaid
- 1993 Health Care Reform Plan, intended to provide health care coverage to all Americans, was opposed by Congress due to cost.
- 1996: Health Care Parity Act required some employers to offer mental health benefits. Health Insurance Portability and Accountability Act (HIPAA) protected coverage when individuals changed jobs.

C. Influences

Age and cultural influences impact health care delivery.

- A culture’s view of illness (accepting the sick role or encouraging stoicism) is a predisposing factor that affects the likelihood individuals will seek care.
- Growing elderly population, and aggressive treatment of the functional changes and illnesses associated with aging, is correlated with increased use of resources.

Continued

1. Health Care Trends

D. Prevention

Roles of individuals and organizations in the prevention and containment of disease in a global society

- Individual
- Community-based
- State
- Texas Health and Human Services
- Department of State Health Services oversees broad range of public health programs including adolescent health, birth defect epidemiology and surveillance, Office of Border Health, cardiovascular health & wellness program, case management, center for health statistics, center for policy innovation, childhood lead poisoning prevention program (CLPPP), community mental health contracts programs and initiatives, organ donor awareness/registry program, EMS, epidemiology, family planning, health facility monitoring, immunization, indigent health care, infectious disease control, maternal and child health, National Electronic Disease Surveillance System for Texas (NEDSS), newborn screening, professional licensure, school health, State Public Health System Assessment (SPHSA), Texas Center for Infectious Disease (TCID), Texas Comprehensive Cancer Control Program, Vital Statistics, WIC, and others.
- Federal
- U.S. Department of Health and Human Services
- Centers for Disease Control and Prevention (CDC) founded in 1946 to help control malaria. Activities of CDC now include:
- Administering national programs for prevention and containment of communicable and vector-borne diseases, including directing quarantine;
- Developing/implementing environmental health programs;
- Conducting epidemiological research;
- Maintaining morbidity, mortality, and health statistics.

- Global
- World Health Organization (WHO)
- United Nations health agency founded in 1948 to promote the attainment of the highest possible level of health. Defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”

E. Allocation

The teacher identifies the impact of technological resources on health care.

- Bioethics of allocating limited resources

Teachers must have a firm foundation in the academic subject areas needed to teach health science technology. They must possess knowledge of health care history, and understand the economics of health care delivery. Teachers must be sensitive to the age and cultural influences that impact health care delivery, identify the roles of individuals and organizations in disease prevention and containment, and understand the impact of technological advances on health care. Finally, they must be able to analyze the allocation of limited technological resources.

2. Scientific Methods

Competency 2:

The teacher applies academic skills to health science, understands scientific methods and the impact of scientific research on the health sciences, and organizes and communicates valid conclusions from experimental data.

I. Multidisciplinary Analysis of Health Science Problems

Health science problems are complex, and often require multidisciplinary analysis. The application of the principles of biology (to be addressed in later Competencies), mathematics, physics, chemistry, to health science to issues related to health care comprise biomedical science. The multidisciplinary nature of biomedical science provides a broad base of core knowledge that can be used to assess problems and propose solutions.

A. Mathematics

The application of health sciences relies heavily on mathematics. Students must gain competence in solving mathematical problems relating to the health sciences. These computations and measurements required health science professionals include:

- units and measurements; for example, measurement of oral medication may be made in ounces, drams, cubic centimeters or milliliters, minims, teaspoons, or drops.
- ratios; for example, to use comparison to evaluate results of health care screening or vaccination programs.
- solutions; for example, calculating amount of solvent to add to solute for intravenous administration.
- dosages; for example, calculating the appropriate dose of a medication using mg/kg and patient weight.

B. Physics

Physics is the study of matter and energy, and the interactions between them. First developed during the Manhattan Project, health

physics is the science of reducing exposure to and effects of radiation. The principles of physics can be used to analyze health science problems. Additionally, health physics is the basis for the following careers:

- Research
 - Environmental levels of radiation
 - Effects of radiation on living systems
- Medical Radiation Safety Officer (RSO) Master's or doctoral preparation for health career focusing on:
 - Radiation physics and biology
 - Supervision of radiation equipment in hospitals
 - Teaching radiation physics and biology, radiation control procedures/risk management
 - Radiation emergency management
- Environmental Health Physicist
 - Associate-doctoral career preparation
 - May specialize in nuclear engineering, physics, biophysics, medical physics, or radiation biology.
 - Environmental surveillance
 - Decontamination and decommissioning of radioactive materials
 - Instrument design, radiochemical technique development, quality assurance

C. Chemistry

Chemistry is the science of the composition of matter and its interactions. Founded in early alchemy, modern chemistry was founded by Antoine Lavoisier (1743-1794). It is broken down into the following branches, each of which is useful in the analysis of problems relating to the health sciences:

Continued

2. Scientific Methods

- organic chemistry, the study of carbon-containing compounds;
- inorganic chemistry, the study of non-carbon-containing compounds;
- biochemistry, the study of makeup and interaction of substances in living things; and
- pharmacology, the study of the structure of drug, and their origin, nature, properties and effects on living things.

II. Inquiry

The use of science inquiry skills allows for logical problem-solving and analysis of technical data related to health care, as well as permit responsible choices in selecting everyday products and services using scientific information. Scientific inquiry skills include:

- observation-the use of senses to gather information;
- classification-organizing objects or events according to their traits;
- making inferences-using logical reasoning to reach conclusions about observations and information;
- comparing-identifying ways that objects and events are alike and different;
- prediction-using observations and experiences to make statements about future events;
- using numbers-including measuring, estimating, recording numbers, comparing numbers, and displaying numbers;
- using time-space relationships-identifying relationships among objects and events;
- measuring-identifying height, temperature, volume, and other measurable traits to achieve precise answers;
- interpreting data-making inferences from observations and measurements collected in an investigation.

III. Critical Thinking Skills

Critical thinking is a disciplined process of logically conceptualizing, applying, analyzing, and evaluating observations and experiences in a way that guides actions, including the formation of testable questions for experimentation. In 1956, Benjamin Bloom developed a classification of intellectual learning in three overlapping domains: cognitive, psychomotor, and affective. The cognitive (thinking) domain is further broken down into knowledge, comprehension, application, analysis, synthesis, and evaluation. As you read the skills in these categories, notice that although they increase in complexity, there are often overlapping skills.

A. Knowledge

Knowledge skills help students recall dates, describe events or places, list vocabulary, identify key ideas, or label parts of diagram. They include basic thinking skills such as:

- collect
- define
- describe
- list
- identify
- match
- retell
- reproduce
- examine
- read
- tabulate/tally
- show

B. Comprehension Skills - Allow students to interpret data, infer cause and consequence, or use characteristics to distinguish among objects or events to classify or group them. They include more complex thinking skills such as:

- compare

2. Scientific Methods

- distinguish
- extend
- interpret
- differentiate
- predict
- contrast
- discuss
- estimate
- classify/group
- sequence/order
- paraphrase
- trace
- explain

C. Application Skills - Help students use information from experimentation to solve problems. They include thinking skills that permit the application of knowledge, such as:

- apply
- classify
- change
- illustrate
- demonstrate
- solve
- collect
- compute
- experiment
- chart
- report
- teach
- use

D. Analysis Skills - Help students recognize and explain patterns and meaning, as well as see parts and wholes. They include many of the previous skills, but are geared toward forming explanations. They include:

- analyze
- arrange
- connect
- divide/separate
- infer

- classify
- correlate
- break down
- diagram
- explain
- sequence/order
- prioritize

E. Synthesis Skills - Facilitate the discussion of “what if” situations and help students form new ideas, make predictions, and draw conclusions. They include skills that permit higher-level thinking geared to bring thoughts together cohesively for further analysis. They include:

- combine
- compare
- decide
- discriminate
- modify
- substitute
- adapt
- anticipate
- collaborate
- compile
- devise
- facilitate
- structure
- reorganize
- validate

F. Evaluation Skills - Help students assess value. They help students make recommendations, assess value and make choices, and critique ideas. These skills include:

- assess
- compare
- decide
- discriminate
- rank
- measure
- test

Continued

2. Scientific Methods

- convince
- explain
- conclude
- judge
- summarize
- support
- criticize
- defend
- persuade
- justify
- reframe
- using some or all of the science inquiry skills to plan and conduct a simple investigation;
- identifying and controlling variables;
- gathering and recording data, using charts, tables, and graphs as appropriate;
- interpreting data, including analyzing data, making inferences, and predicting trends.
- drawing a conclusion based on the data; and
- communicating results-using charts, tables, and graphs as needed.

IV. Scientific Method

The scientific method is an organized process that uses science inquiry skills, critical thinking skills, and prescribed steps to answer a question posed in the form of a hypothesis. It permits the planning and implementation of investigations and analysis of their results.

The steps of the scientific method are:

- making observations and asking a question;
- forming a hypothesis, a scientific testable explanation for your question;

Teachers must have a firm foundation in the academic subject areas needed to teach health science technology. In particular, they must possess knowledge of the disciplines that comprise biomedical science. In addition to the expected biology, they must have a firm grasp of mathematics, physics, chemistry, and be able to systematically use their knowledge, science inquiry skills, critical thinking skills, and the scientific method to answer questions.

3. Terminology

Competency 3:

The teacher understands medical terminology related to health care and uses it appropriately.

The medical and allied health professions use their own jargon, a common “language” used by all of its members-whether in Dallas or New York or Chicago-that eases communication and decreases the chances of misunderstanding. Medical terminology is the jargon of the health professional. Becoming conversant in medical terminology is key for the health science technology teacher.

Many medical terms have origins in Latin, Greek, or other languages. But like any language, medical terminology has its own vocabulary and ways placing these roots, prefixes, and suffixes into an order that is understandable to everyone. In addition, medical and allied professionals share common abbreviations, acronyms, and symbols.

Like any foreign language, medical terminology evolves. As scientific knowledge grows and changes, new words are developed to describe newly-recognized phenomena and name new procedures and drugs. Knowing how to learn word meanings using medical and dental dictionaries, multimedia resources, Internet sites, texts, journals, and reference manuals will prove invaluable as you learn this new “language.”

A. Abbreviations, Acronyms, and Symbols

An acronym is a word formed by using the first letter of the words in a series of words. For example, the acronym radar is formed by using the first letters of the following words: Radio Detecting And Ranging. An abbreviation may also be made up of letters, but does not form a word. They are more common than acronyms.

Both acronyms and abbreviations are used in medical terminology. Their meanings can easily be ascertained by using one of many online

acronym/abbreviation search engines. (See below.) Abbreviations and acronyms include, but are not limited to:

ABD-abdomen
AC-before meals
ADD-Attention Deficit Disorder
ADHD - Attention Deficit Hyperactivity Disorder
ADL-Activity of Daily Living
Ad lib- As desired
AIDS - Acquired Immune Deficiency Syndrome
BID-twice a day
BGH - Bovine Growth Hormone
BMI - Body Mass Index
BMR - Basal Metabolic Rate
BP-Blood Pressure
BRP-Bathroom Privileges
CAD - Coronary Artery Heart Disease
CABG-Coronary artery bypass graft (pronounced as the word “cabbage”)
CC-Cubic Centimeter
CCU-Cardiac Care Unit
c/o-Complains Of
CPR - Cardiopulmonary Resuscitation
CVA-Cerebrovascular Accident (stroke)
DM-Diabetes Mellitus
DNA - Deoxyribonucleic Acid
DNR-Do Not Resuscitate
Dx-Diagnosis
EMT - Emergency Medical Technician
ED-Emergency Department
ER - Emergency Room
FAS - Fetal Alcohol Syndrome
GD - Gestational Diabetes
GLA - Gamma-Linoleic Acid
HDL - High-Density Lipoprotein
(a type of cholesterol)
HEPA - High-Efficiency Particulate Air (Filter)

Continued

3. Terminology

HIPAA - Health Insurance Portability and Accountability Act
HIV - Human Immunodeficiency Virus
HMO - Health Maintenance Organization
HPV - Human Papilloma Virus
HRT - Hormone Replacement Therapy
HS-Hour of Sleep (bedtime)
ICU - Intensive Care Unit
I&O-Intake and Output
IV - Intravenous
L-left
LDL - Low-Density Lipoprotein (a type of cholesterol)
LE-Lower Extremity (leg)
ML-milliliter
MRI - Magnetic Resonance Imaging
MMR-Measles, Mumps, Rubella vaccine
MS - Multiple Sclerosis
Na-Sodium
NICU - Neonatal Intensive Care Unit
NSAID - Nonsteroidal anti-inflammatory drug
OCD - Obsessive-Compulsive Disorder
OD - Overdose
O.D.-Right eye
O.S.-Left Eye
O.U.-both eyes
PC-after meals
PICU - Pediatric Intensive Care Unit
PMS - Premenstrual Syndrome
P.O.-by mouth
PT-Physical Therapy
QH-every hour
QD-every day
QHS-every night at bedtime
QID-four times a day
QOD-every other day
R-Right
RN - Registered Nurse
ROM-Range of Motion
SIDS - Sudden Infant Death Syndrome
SOB-Shortness of Breath
Stat-immediately
STD - Sexually Transmitted Disease

TB - Tuberculosis
TID-three times a day
TMJ - Temporomandibular Joint syndrome
UA-Urinalysis
UE-Upper Extremity (arm)
VS-Vital Signs
Wt-weight
X-times

B. Medical Symbols

Like acronyms and abbreviations, medical symbols allow professionals to communicate efficiently. They also save space in medical documentation. They include, but are not limited to:

\bar{a} before
 \bar{p} - after
 \bar{c} - with
 \bar{s} - without
 \bar{q} -every
@ at
° degrees
+ positive
- negative
= equal
pound
↑ increase
↓ decrease
∅ none/no
1° primary
2° secondary (or due to)
Δ change

C. Medical Prefixes, Suffixes, and Roots

Medical terms are made up of three basic elements: roots, prefixes, and suffixes. Exposure, use, and time will increase your familiarity with these, but no one is expected to know them all-there are many resources you can refer to when unsure. Referring to appropriate resources and practice will help you “translate” medical terminology into understandable, conversational terms.

3. Terminology

1. Roots

The main part of a word is its root. In medical terminology, many roots have Latin or Greek origins, and they often refer to body parts. Common roots include, but are not limited to:

abdomin/o abdominal
aden/o gland
adip/o, fat
adren/o adrenal glands
aer/o air
angi/o vessel
anter/o front, anterior
aort/o aorta
arteri/o artery
arthr/o joint
audi/o sound
bronchi/o, bronch/o bronchus
carcin/o cancer
cardi/o heart
cephal/o head
cerebr/o brain, cerebrum
chondr/o cartilage
col/o, colon/o colon
cost/o ribs
crani/o cranium, skull
cutane/o skin
cyst/o bladder
cyt/o cell
dent/o teeth
derm/o skin
dipl/o double
dist/o far, farthest
dors/o back (of body)
encephal/o brain
enter/o intestine
erythr/o red
esophag/o esophagus
gastr/o stomach
gingiv/o gum
gloss/o tongue
gluc/o, glyc/o sugar, glucose
hema, hemat/o, hem/o blood

hepat/o liver
hidr/o sweat
hist/o tissue
hydr/o water
lapar/o abdominal
laryng/o larynx
leuk/o white
lingu/o tongue
lip/o fat
lith/o stone
lumb/o lower back
lymph/o lymph
melan/o black
mening/o meninges
myc/o fungus
myel/o spinal cord, bone marrow
my/o muscle
nas/o nose
necr/o death
nephr/o kidneys
neur/o nerve
noct/o night
odont/o teeth
olig/o scanty, little
ophthalm/o, ocul/o, opt/o eye
or/o, stomat/o mouth
orth/o straight
oste/o bone
ot/o ear
pelv/o, pelv/i pelvis
phalang/o fingers and toes
pharyng/o pharynx (throat)
phleb/o vein
pleur/o pleura
pneum/o lung
poster/o back (of body), behind, posterior
proxim/o near, nearest
py/o pus
radi/o x-rays, radiation
rhin/o nose
scler/o hardening, white of eye
tend/o tendons
therm/o heat

Continued

3. Terminology

thorac/o chest
thromb/o blood clot
toxic/o, tox/o poison
trache/o trachea (windpipe)
ur/o urine
vascul/o blood vessel
vertebr/o vertebra (backbone)

2. Prefixes

A prefix is a syllable or syllables placed before a word's root to help describe the word. It increases the detail given. Medical prefixes include, but are NOT limited to:

a or an - without
ab- from, away
ad - to, near, toward
alb-white
ambi - both
anti - before
anti - against
bi or di - two
dextro-right
dia-through, throughout
dis - the opposite of
dys - difficult, painful
endo-within, inside
epi- on, upon
hemi-half
hetero-different
homo-same
hyper-above, excessive
hypo- below, beneath
inter-between
intra-within
levo-left
mal-bad, poor
med-middle
mega-big, enlarged
melan-black
micro-small
neo-new
oligo-few, scant

osteo-related to bone
oto-ear
patho-disease
peri - around
poly-many
post-after
pre- or pro- before
pseud-false
quad- quadri-four
retro-backward
supra-above
trans-across

3. Suffixes

A suffix is a syllable or syllables added to the end of the root to modify its meaning. It usually describes what happens to the root. Common suffixes include, but are NOT limited to:

-ac-pertaining to
-al-pertaining to
-algia- pain
-ar-pertaining to
-ary-pertaining to
-ase- enzyme
-asis -condition, state
-asthenia -weakness
-atresia-closure
-capnea- carbon dioxide
-cele- hernia, protrusion
-centesis-procedure to drain fluid
-cidal-killing
-clasia- break
-clasis-break
-crit- separate
-cyte- cell
-eal-pertaining to
-ectasis- stretching out, dilation
-ectomy-excision, cutting out
-ectopia- displacement
-emesis- vomiting
-emia - blood, or its parts
-esthesia- feeling, sensation

3. Terminology

-genic-causing, origin
-genesis- producing
-gram- record, Xray
-graph- instrument used to record
-graphy-process of recording/filming
-ial- pertaining to
-ic- pertaining to
-ictal- seizure, attack
-itis - inflammation
-logy-science/study of
-lysis-reduction, loosening, destruction
-malacia- softening
-mania- madness
-megaly- enlargement
-metry-measurement
-morph-shape
-odia-smell
-odynia- pain
-oid-resembling
-ologist- one who studies; specialist
-oma-tumor, swelling
-opia- vision
-opsy- to view
-orrhoea-abnormal flow
-oscopy-to view
-ostomy- artificial opening
-otomy- cut or incision
-oxia-oxygen
-paresis-slight paralysis
-pathy-disease
-penia-insufficiency
-pexy-surgical fixation
-phagia-eating, swallowing
-philia- love, attraction
-phobia-irrational fear or aversion
-phonia- sound or voice
-phoria- feeling
-plasia-formation, development, growth
-plasm- growth
-plasty- repair
-plegia - paralysis
-pnea-breathing
-poiesis- formation

-prandial- meal
-praxia- in front of
-ptosis-drooping, sagging
-ptysis- spitting
-schisis-split, fissure
-sclerosis- hardening
-scopic- visual exam
-scopy - visual exam
-sepsis- infection
-sis- state of
-spasm- involuntary muscle contraction
-stalsis- contraction
-stasis- stop
-stenosis- narrowing
-thermy-use of heat
-thorax- chest
-tripsy- surgical crushing
-trophy-growth
-ule- little
-uria- urine, urination

D. Resources

Medical terminology grows and changes as the scientific understanding grows and changes. No list is complete, and no practitioner or teacher can be expected to know all acronyms, abbreviations, symbols, or words. An ability to use medical and dental dictionaries, multimedia resources, Internet sites, texts, journals, and reference manuals to learn word meanings is invaluable as you learn this new “language” and maintain your “language” skills.

Teachers must be able to speak the “language” of health care. Knowledge of roots, suffixes, and prefixes allows meaning of terms to be deciphered. In addition, many resources can be used for reference.