CHAPTER 7
RESPIRATORY SYSTEM

CHAPTER CONTENTS

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MEDIA LIBRARY

Student DVD-ROM
• Twelve different interactive learning games
• Flash card generator
• Audio Glossary
• Professional Profile video—Respiratory Therapist
• Body Rhythms
• Terminology Translator

Companion Website
• Multiple Choice, True/False, and Fill-in-the-Blank practice questions
• Labeling exercises
• Case Study

IRDVD
• Animations
• 3D interactive animation of respiratory system anatomy
• Drag-and-drop labeling activity for respiratory system anatomy

• Additional Professional Profile information
• New York Times link for research into specific pathologies
• Web Destination activities
• Audio Glossary
• Link to VangoNotes
• Link to drug updates
OBJECTIVE 1
Identify and define the combining forms and suffixes introduced in this chapter.

Text page 208; PowerPoint slides: 6–10

LECTURE NOTES
Combining Forms
alveol/o  alveolus; air sac
anthrac/o coal
atel/o incomplete
bronch/o bronchus
bronchi/o bronchus
bronchiol/o bronchiole
coni/o dust
diaphragmat/o diaphragm
epiglott/o epiglottis
laryng/o larynx
lob/o lobe
nas/o nose
orth/o straight, upright
ox/o, ox/i oxygen
pharyng/o pharynx
pleut/o pleura
pneum/o lung, air
pneumon/o lung, air
pulmon/o lung
rhin/o nose
sinus/o sinus, cavity
spit/o breathing
trache/o trachea, windpipe

Suffixes
-capnia carbon dioxide
-ectasis dilated, expansion
-osmia smell

TEACHING STRATEGIES
• Encourage and remind students to add new word parts to their flash cards.

Medical Terminology Bee
• Create PowerPoint flash cards of new combining forms and suffixes presented in this chapter; have all students stand and then define word part; if student is correct, he or she remains standing; if student is wrong, he or she sits down; continue until only one student is standing.

LEARNING ACTIVITIES
Worksheet 7A
• New Combining Form and Suffix Handout

Text
• Practice Exercises

Student DVD-ROM
• Learning games
• Make flash cards

CW
• Practice questions

ASSESSMENTS
Quiz 7A—New Word Parts Quiz
Test Bank—Fill-in-the-Blank questions
OBJECTIVE 2
Correctly spell and pronounce medical terms and major anatomical structures relating to the respiratory system.

LECTURE NOTES
Pronunciation for medical terms in this chapter can be found:
- In parentheses following key terms
- In the Audio Glossary on Student DVD-ROM
- In the Audio Glossary at Companion Website

TEACHING STRATEGIES
Emphasize to students:
- The importance of correctly spelling terms.
- How sounding out terms can assist in learning how to spell terms.
Say each new term in class and have students repeat it.

Pop Questions
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension of spelling strategies

LEARNING ACTIVITIES
Worksheet 7B
- Medical Term Analysis

Terminology Checklist
- Can be used to practice pronunciation using the Audio Glossary as a reference

Text
- Practice Exercises

Flash cards
- Look at definition and write out/pronounce terms

Student DVD-ROM
- Audio Glossary
- Spelling Challenge game
- Crossword and Word Search puzzles

ASSESSMENTS
Quiz 7B—Spelling Quiz
Suggested terms:
1. histoplasmosis
2. eustachian
3. epiglottis
4. bronchioles
5. mediastinum
6. diaphragm
7. bronchiectasis
8. laryngectomy
9. nasopharyngitis
10. pneumoconiosis
OBJECTIVE 3
Locate and describe the major organs of the respiratory system and their functions.
Text pages: 210–214; PowerPoint slides: 11–47

LECTURE NOTES

- Organs of respiratory system includes **nasal cavity**, **pharynx**, **larynx, trachea, bronchial tubes**, and **lungs**
- Function together to perform mechanical unconscious mechanism of respiration
- Cells of body require continuous delivery of oxygen and removal of carbon dioxide; respiratory system works in conjunction with cardiovascular system to deliver oxygen to cells
- Process of respiration can be subdivided into three distinct parts: **ventilation, external respiration, and internal respiration**
  - **Ventilation**—flow of air between outside environment and the lungs; **inhalation** is flow of air into lungs bringing fresh oxygen \((O_2)\) into the air sacs; **exhalation** is flow of air out of lungs removing carbon dioxide \((CO_2)\) from
  - **External respiration**—exchange of oxygen and carbon dioxide that takes place in lungs; gases diffuse in opposite directions between air sacs of lungs and bloodstream; oxygen enters bloodstream from the air sacs to be delivered throughout body; carbon dioxide leaves bloodstream and enters air sacs to be exhaled
  - **Internal respiration**—oxygen and carbon dioxide exchange at cellular level; oxygen leaves bloodstream and is delivered to tissues; oxygen is needed for cell metabolism; by-product of metabolism is formation of dioxide, a waste product; carbon dioxide enters bloodstream from tissues and is transported back to lungs

Nasal Cavity

- Ventilation begins with nasal cavity
- Air enters through two external openings in nose called **nares**
- Nasal cavity divided down middle by **nasal septum**, a cartilaginous plate
- **Palate** in roof of mouth separates nasal cavity above from mouth below
- Walls of nasal cavity and nasal septum are made up of flexible cartilage covered with **mucous membrane** (see Figure 7.1); much of respiratory tract is covered with mucous membrane, which secretes a sticky fluid, **mucus**, that helps cleanse air by trapping dust and bacteria; since this membrane is also wet, it moisturizes inhaled air as it passes by surface of cavity

TEACHING STRATEGIES

Visual Aids
- Use full-size anatomical charts and models to illustrate organs.

Pop Questions
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

IRDVD
- See PowerPoint presentation on the Instructor's Resource DVD for a 3D animation of the respiratory system organs.
- See PowerPoint presentation on the Instructor's Resource DVD for a drag-and-drop anatomy activity; display on screen and have students discuss and place labels during class.

LEARNING ACTIVITIES

Worksheet 7C
- Chapter Review
  - Practice Exercises

Student DVD-ROM
- Labeling exercises
- Learning games

CW
- Labeling exercise
- Practice questions

Quizzes 7C & 7D
- May be used as worksheets

Test Bank—questions
• Small hairs or cilia line opening to nose (as well as much of the airways) and filter out large dirt particles before they enter lungs
• Capillaries in mucous membranes warm inhaled air as it passes through airways
• Several paranasal sinuses or air-filled cavities are located within facial bones; act as echo chamber during sound production and give resonance to voice

Pharynx
• Air next enters pharynx, also called throat; used by both respiratory and digestive systems; at end of pharynx, air enters trachea while food and liquids are shunted into esophagus
• Roughly 5-inch-long tube consisting of three parts: upper nasopharynx, middle oropharynx, and lower laryngopharynx (see Figure 7.1)
• Three pairs of tonsils, collections of lymphatic tissue, located in pharynx; strategically placed to help keep pathogens from entering body through either air breathed or food and liquid swallowed; nasopharynx, behind nose, contains adenoids or pharyngeal tonsils; oropharynx, behind mouth, contains palatine tonsils and lingual tonsils; tonsils are part of lymphatic system and were discussed in Chapter 6
• Opening of eustachian or auditory tube is also found in nasopharynx; other end of tube is in middle ear; each time you swallow, this tube opens to equalize air pressure between middle ear and outside atmosphere

Larynx
• Larynx or voice box is muscular structure located between pharynx and trachea
• Contains vocal cords (see Figures 7.1 and 7.2); not actually cord-like in structure, but rather they are folds of membranous tissue that produce sound by vibrating as air passes through glottis, the opening between two vocal cords
• Flap of cartilaginous tissue, epiglottis, sits above glottis and provides protection against food and liquid being inhaled into lungs; covers larynx and trachea during swallowing and shunts food and liquid from pharynx into esophagus
• Walls of larynx are composed of several cartilage plates held together with ligaments and muscles; one of these cartilages, thyroid cartilage, forms Adam’s apple; thyroid cartilage is generally larger in males than in females; helps produce deeper male voice

Trachea
• Trachea, also called windpipe, is passageway for air that extends from pharynx and larynx down to main bronchi (see Figure 7.3)
• Approximately 4 inches in length
• Composed of smooth muscle and cartilage rings
• Lined by mucous membrane and cilia; also assists in cleansing, warming, and moisturizing air as it travels to lungs

Bronchial Tubes
• Distal end of trachea divides to form left and right main (or primary) bronchi
• Each bronchus enters one lung and branches repeatedly to form secondary bronchi
• Each branch becomes narrower until narrowest branches, bronchioles, are formed (see Figure 7.4)
• Each bronchiole terminates in a small group of air sacs, called alveoli; each lung has approximately 150 million alveoli; walls of alveoli are elastic giving them ability to expand to hold air and then recoil to their original size.

• Network of pulmonary capillaries from pulmonary blood vessels tightly encases each alveolus (see Figure 7.5); walls of alveoli and capillaries are so tightly associated with each other they are referred to as a single unit, respiratory membrane; exchange of oxygen and carbon dioxide between air within alveolus and blood inside capillaries, takes place across respiratory membrane.

### Lungs

• Total collection of bronchi, bronchioles, and alveoli.

• Spongy to touch because contain air.

• Protected by double membrane called pleura; outer pleural membrane is parietal pleura, also lines wall of chest cavity; inner membrane or visceral pleura adheres to surface of lungs; pleural membrane is folded in such a way that it forms sac around each lung referred to as pleural cavity; there is slippery, watery serous fluid between two layers of pleura that reduces friction when two layers rub together as lungs repeatedly expand and contract.

• Lungs contain divisions or lobes; three lobes in larger right lung and two in left lung.

• Pointed superior portion of each lung is apex; broader lower area is base.

• Entry of structures like bronchi, pulmonary blood vessels, and nerves into each lung occurs along its medial border in area called hilum.

• Protected from puncture and damage by ribs.

• Area between right and left lung is called mediastinum and contains heart, aorta, esophagus, thymus gland, and trachea.

• See Figure 7.6 for illustration of lungs within chest cavity.

### OBJECTIVE 4

List and describe the lung volumes and capacities.

Text pages: 214–215; PowerPoint slides: 48–50

**Lecture Notes**

• For some types of medical conditions, like emphysema, is important to measure volume of air flowing in and out of lungs to determine lung capacity.

• Lung volumes measured by respiratory therapists to aid in determining functioning level of respiratory system.

• Collectively, measurements are called pulmonary function tests.

• Table 7.1 lists and defines four lung volumes and four lung capacities.

**Teaching Strategies**

• Have students pay attention to their own breathing pattern for tidal volume; then have students perform different breathing patterns (inspiratory reserve volume and expiratory reserve volume) as they are described.

**Visual Aids**

• Use charts to illustrate how different lung volumes and how volumes are added together to produce lung capacities.

**Pop Questions**

• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.
### TABLE 7.1 Lung Volumes and Capacities

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal volume (TV)</td>
<td>amount of air that enters lungs in a single inhalation or leaves lungs in a single exhalation of quiet breathing; in an adult normally 500 mL.</td>
</tr>
<tr>
<td>Inspiratory reserve volume (IRV)</td>
<td>air that can be forcibly inhaled after a normal respiration has taken place; also called <em>complemental air</em>; generally measures around 3,000 mL.</td>
</tr>
<tr>
<td>Expiratory reserve volume (ERV)</td>
<td>amount of air that can be forcibly exhaled after normal quiet respiration; also called <em>supplemental air</em>; approximately 1,000 mL.</td>
</tr>
<tr>
<td>Residual volume (RV)</td>
<td>air remaining in lungs after forced exhalation; about 1,500 mL.</td>
</tr>
<tr>
<td>Inspiratory capacity (IC)</td>
<td>volume of air inhaled after normal exhale</td>
</tr>
<tr>
<td>Functional residual capacity (FRC)</td>
<td>air that remains in lungs after normal exhalation</td>
</tr>
<tr>
<td>Vital capacity (VC)</td>
<td>total volume of air that can be exhaled after a maximum inhalation; equal to the sum of TV, IRV, and ERV</td>
</tr>
<tr>
<td>Total lung capacity (TLC)</td>
<td>volume of air in lungs after maximal inhalation</td>
</tr>
</tbody>
</table>

*There is a normal range for measurements of volume of air exchanged; the numbers given are for average measurements.*

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### OBJECTIVE 5

**Describe the process of respiration.**

*Text pages: 215–216; PowerPoint slides: 51–57*

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### LECTURE NOTES

**Respiratory Muscles**

- Air moves in and out of lungs due to difference between atmospheric pressure and pressure within chest cavity
- Difference in pressure produced by **diaphragm**; muscle separating abdomen from thoracic cavity
- Diaphragm contracts and moves downward; this increases thoracic cavity volume and causes decrease in pressure, or negative thoracic pressure, within chest cavity; air then flows into lungs, inhalation, to equalize pressure
- **Intercostal muscles** between ribs assist in inhalation by raising rib cage to further enlarge thoracic cavity
- See Figure 7.7 for illustration of role of diaphragm in inhalation
- When diaphragm and intercostal muscles relax, thoracic cavity becomes smaller; produces an increase in pressure within cavity, or positive thoracic pressure; air flows out of lungs, resulting in exhalation

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### TEACHING STRATEGIES

**IRDVD**

- See PowerPoint presentation on the Instructor’s Resource DVD for a video on the topic of respiratory rate.

**Pop Questions**

- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

### LEARNING ACTIVITIES

**Worksheet 7C**

- Chapter Review

**Text**

- Practice Exercises

**Student DVD-ROM**

- Learning games

**CW**

- Practice tests

**ASSESSMENTS**

**Quiz 7G**—Chapter Review

**Test Bank**—questions
tion; quiet, unforced exhalation is passive process since it does not require any muscle contraction
- When forceful inhalation or exhalation required, additional chest and neck muscles become active to create larger changes in thoracic pressure

**Respiratory Rate**
- Respiratory rate (measured in breaths per minute) is one of our vital signs (VS), along with heart rate, temperature, and blood pressure
- Respiratory rate regulated by level of CO₂ in blood; when CO₂ level is high, breathe more rapidly to expel excess; when CO₂ levels drop, respiratory rate will also drop
- When respiratory rate falls outside range of normal, it may indicate illness or medical condition; for example, when patient is running elevated temperature and has shortness of breath (SOB) due to pneumonia, respiratory rate may increase dramatically; brain injury or some medications, such as those for pain, can cause decrease in respiratory rate
- See Table 7.2 for normal respiratory rate ranges for different age groups

**TABLE 7.2 Respiratory Rates for Different Age Groups**

<table>
<thead>
<tr>
<th>Age</th>
<th>Respirations per Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>30–60</td>
</tr>
<tr>
<td>1-year-old</td>
<td>18–30</td>
</tr>
<tr>
<td>16-year-old</td>
<td>16–20</td>
</tr>
<tr>
<td>Adult</td>
<td>12–20</td>
</tr>
</tbody>
</table>

**OBJECTIVE 6**

Build and define respiratory system medical terms from word parts.

Text pages: 217–218; PowerPoint slides: 58–69

**LECTURE NOTES**

**Combining Form**
- **bronch/o**
  - bronchogram
  - bronchitis
  - bronchoplasty
  - bronchogenic
  - bronchoscope
  - bronchospasm
- **bronchi/o**
  - bronchial
  - bronchiectasis
- **diaphragmat/o**
  - diaphragmatic
- **laryng/o**
  - laryngectomy
  - laryngitis

**Definition**
- record of bronchus
- inflammation of bronchus
- surgical repair of bronchus
- produced by bronchus
- instrument to view inside bronchus
- involuntary muscle spasm of bronchus
- pertaining to bronchus
- dilated bronchus
- pertaining to diaphragm
- removal of voice box
- inflammation of voice box

**TEACHING STRATEGIES**
- Reinforce how many words in the respiratory system can be constructed from word parts.
- Read aloud respiratory system words that are made up of word parts; have students identify parts and define terms, either aloud or individually on paper.
- Write sentences on the board using common words; have students substitute correct medical terms.

**Pop Questions**
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.
laryngoplasty  surgical repair of voice box
laryngoscope  instrument to view voice box
laryngeal  pertaining to voice box
laryngoplegia  paralysis of voice box
lob/o  lobectomy  removal of (lung) lobe
ox/i  oximeter  instrument to measure oxygen
ox/o  anoxia  condition of no oxygen
hypoxemia  insufficient oxygen in blood
hypoxia  condition of insufficient oxygen
pleur/o  pleurocentesis  puncture of pleura to withdraw fluid
pleurectomy  removal of pleura
pleurodynia  pleural pain
pharyng/o  pharyngitis  throat inflammation (i.e., sore throat)
pharyngeal  pertaining to throat
nasopharyngitis  nose and throat inflammation (i.e., common cold)
pulmon/o  pulmonologist  lung specialist
pulmonary  pertaining to lung
rhin/o  rhinitis  inflammation of nose
rhinomycosis  abnormal condition of nose fungus
rhinoplasty  surgical repair of nose
rhinorrhagia  rapid flow (of blood) from nose
rhinorrhea  nose discharge (i.e., runny nose)
sinus/o  pansinusitis  inflammation of all sinuses
thorac/o  thoracalgia  chest pain
thoracic  pertaining to chest
thoracotomy  incision into chest
trache/o  endotracheal  pertaining to inside trachea
tracheotomy  incision into trachea
tracheostenosis  narrowing of trachea

Suffix  Medical Term  Definition
-aphonia  aphony  no voice
-aphonia  dysphonia  abnormal voice
-acapnia  acapnia  lack of carbon dioxide
-hypercapnia  excessive carbon dioxide
-anosmia  anosmia  lack of (sense of) smell
-apnea  apnea  not breathing
-bradypnea  slow breathing
dyspnea  difficult, labored breathing
eupnea  normal breathing
-hyperpnea  excessive (deep) breathing
-hypopnea  insufficient (shallow) breathing
orthopnea  (sitting) straight breathing
tachypnea  rapid breathing
-thorax  hemothorax  blood in chest
-pyothorax  pus in chest
-pneumothorax  air in chest

LEARNING ACTIVITIES
Worksheet 7A
- New Combining Form and Suffix Handout
Worksheet 7B
- Medical Term Analysis
Worksheet 7C
- Chapter Review
Quiz 7E
- May be used as worksheet
Text
- Practice Exercises
- Terminology Checklist
Student DVD-ROM
- Learning games
- Flash cards
CW
- Practice questions

ASSESSMENTS
Quiz 7E—Word Building Quiz
Quiz 7G—Chapter Review
Test Bank—questions

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**OBJECTIVE 7**
Identify and define respiratory system vocabulary terms.
Text pages: 218–220; PowerPoint slides: 70–76

### LECTURE NOTES

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>asphyxia</td>
<td>lack of oxygen that can lead to unconsciousness and death if not corrected immediately; also called asphyxiation or suffocation; common causes include drowning, foreign body in respiratory tract, poisoning, and electric shock</td>
</tr>
<tr>
<td>aspiration</td>
<td>withdrawing fluid from body cavity using suction; for example, using long needle and syringe to withdraw fluid from pleural cavity or using vacuum pump to remove phlegm from airways; also refers to inhaling food, liquid, or foreign object into airways; leads to development of pneumonia</td>
</tr>
<tr>
<td>Cheyne–Stokes respiration</td>
<td>abnormal breathing pattern; there are long periods (10 to 60 seconds) of apnea followed by deeper, more rapid breathing</td>
</tr>
<tr>
<td>clubbing</td>
<td>abnormal widening and thickening of ends of fingers and toes associated with chronic oxygen deficiency; seen in patients with chronic respiratory conditions or circulatory problems</td>
</tr>
<tr>
<td>cyanosis</td>
<td>bluish tint of skin that is receiving insufficient amount of oxygen or circulation</td>
</tr>
<tr>
<td>epistaxis</td>
<td>nosebleed</td>
</tr>
<tr>
<td>hemoptysis</td>
<td>cough up blood or blood-stained sputum</td>
</tr>
<tr>
<td>hyperventilation</td>
<td>breathing both too fast (tachypnea) and too deep (hyperpnea)</td>
</tr>
<tr>
<td>hypoventilation</td>
<td>breathing both too slow (bradypnea) and too shallow (hypopnea)</td>
</tr>
<tr>
<td>internal medicine</td>
<td>branch of medicine involving diagnosis and treatment of diseases and conditions of internal organs such as respiratory system; physician is an internist</td>
</tr>
<tr>
<td>nasal cannula</td>
<td>two-pronged plastic device for delivering oxygen into nose; one prong is inserted into each naris</td>
</tr>
<tr>
<td>orthopnea</td>
<td>dyspnea that is worsened by lying flat; patient is able to breathe easier when sitting straight up</td>
</tr>
<tr>
<td>otorhinolaryngology</td>
<td>branch of medicine involving diagnosis and treatment of conditions and diseases of ear, nose, and throat region; also called otorlaryngology; physician is otorhinolaryngologist</td>
</tr>
<tr>
<td>patent</td>
<td>open or unblocked, such as patent airway</td>
</tr>
<tr>
<td>percussion</td>
<td>use of fingertips to tap on surface to determine condition beneath surface; determined by feel of surface as it is tapped and sound generated</td>
</tr>
<tr>
<td>phlegm</td>
<td>thick mucus secreted by membranes that line respiratory tract; when phlegm is coughed through mouth, it is called sputum; examined for color, odor, and consistency</td>
</tr>
</tbody>
</table>

### TEACHING STRATEGIES
- Write sentences on the board using common words; have students substitute correct medical terms.
- **Jeopardy Game**
  - Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Pathology, Diagnostic, and Therapeutic terms.
- **IRDVD**
  - See PowerPoint presentation on the Instructor’s Resource DVD for videos on the topic of:
    - Respiratory Therapy
    - Nasal cannulas
- **Pop Questions**
  - Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

### LEARNING ACTIVITIES

#### Worksheet 7C
- Chapter Review

#### Text
- Practice Exercises
- Terminology Checklist
- Medical Record Analysis
- Chart Note Transcription

#### Student DVD-ROM
- Learning games
- Flash cards

#### CW
- Practice questions
- Case Study

### ASSESSMENTS

#### Quiz 7G—Chapter Review

#### Test Bank—questions
pleural rub: grating sound made when two layers of pleura rub together during respiration; caused when one surface becomes thicker as a result of inflammation or other disease conditions; rub can be felt through fingertips when they are placed on chest wall or heard through stethoscope.

pulmonology: branch of medicine involved in diagnosis and treatment of diseases and disorders of respiratory system; physician is a pulmonologist.

tales: abnormal crackling sound made during inspiration; indicates presence of fluid or mucus in airways.

rhonchi: musical sound during expiration, often found in asthma or infection; caused by spasms of bronchial tubes; also called wheezing.

respiratory therapy: allied health specialty that assists patients with respiratory and cardiopulmonary disorders; duties of respiratory therapist include conducting pulmonary function tests, monitoring oxygen and carbon dioxide levels in blood, administering breathing treatments, and ventilator management.

shortness of breath (SOB): indicates that patient is having some difficulty breathing; also called dyspnea; causes can range from mild SOB after exercise to SOB associated with heart disease.

sputum: mucus or phlegm coughed up from lining of the respiratory tract.

stridor: harsh, high-pitched, noisy breathing sound made when there is obstruction of bronchus or larynx; found in conditions such as croup in children.

thoracic surgery: branch of medicine involving diagnosis and treatment of conditions and diseases of respiratory system by surgical means; physician is thoracic surgeon.

OBJECTIVE 8
Identify and define selected respiratory system pathology terms.

Text pages: 220–223; PowerPoint slides: 77–92

LECTURE NOTES

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Respiratory System</td>
<td></td>
</tr>
<tr>
<td>croup</td>
<td>acute respiratory condition found in infants and children; characterized by barking cough or stridor</td>
</tr>
<tr>
<td>diphtheria</td>
<td>bacterial upper respiratory infection; characterized by formation of thick membranous film across throat and high mortality rate; rare now due to DPT (diphtheria, pertussis, tetanus) vaccine</td>
</tr>
</tbody>
</table>

TEACHING STRATEGIES

- Select two students to do 5-minute presentations of their Internet research in class.
- Write sentences on the board using common words; have students substitute correct medical terms.

Jeopardy Game

- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Diagnostic, & Therapeutic terms.
pertussis, commonly called whooping cough, due to whoop sound made when coughing; infectious bacterial disease of upper respiratory system; children receive immunization against as part of DPT shots

Bronchial Tubes
asthma, disease caused by various conditions, like allergens; results in constriction of bronchial airways, dyspnea, coughing, and wheezing; can cause violent spasms of bronchi (bronchospasms) but is generally not life-threatening; medication can be very effective

bronchiectasis, abnormal enlargement of bronchi; may be result of lung infection; irreversible and results in destruction of bronchial walls; major symptoms include coughing up large amount of purulent sputum, rales, and hemoptysis

bronchogenic carcinoma, malignant tumor originating in bronchi; usually associated with history of cigarette smoking

Lungs
adult respiratory distress syndrome (ARDS), acute respiratory failure in adults; characterized by tachypnea, dyspnea, cyanosis, tachycardia, and hypoxemia; may follow trauma, pneumonia, or septic infections; also called acute respiratory distress syndrome

anthracosis, type of pneumoconiosis; develops from collection of coal dust in lung; also called black lung or miner’s lung

asbestosis, type of pneumoconiosis; develops from collection of asbestos fibers in lungs; may lead to development of lung cancer

atelectasis, alveoli in portion of lung collapse; prevents respiratory exchange of oxygen and carbon dioxide; caused by variety of conditions, including pressure on the lung from tumor or other object; term also used to describe failure of newborn’s lungs to expand

chronic obstructive pulmonary disease (COPD), progressive, chronic, and usually irreversible group of conditions, like emphysema, in which lungs have diminished capacity for inspiration (inhalation) and expiration (exhalation); may have dyspnea upon exertion and cough

cystic fibrosis (CF), hereditary condition causing exocrine glands to malfunction; produces very thick mucus that causes severe congestion within lungs and digestive system; due to advanced treatment, many children now live into adulthood with this disease

IRDVD
• See PowerPoint presentation on the Instructor’s Resource DVD for videos on the topics of:
  • Asthma
  • Chronic obstructive pulmonary disease
  • Cystic fibrosis
  • Tuberculosis

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES
Internet Research
• Have students select a specific pathology and use Internet resources to research its symptoms, diagnosis, and treatments.

Worksheet 7C
• Chapter Review

Text
• Practice Exercises
• Terminology Checklist
• Medical Record Analysis
• Chart Note Transcription

Student DVD-ROM
• Learning games
• Flash cards

CW
• Practice questions
• Case Study
• Web Destination activity on emphysema and asthma
• New York Times link for research into specific pathologies

ASSESSMENTS
Quiz 7G—Chapter Review
Test Bank—questions
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>emphysema</td>
<td>Condition characterized by destruction of walls of alveoli; results in fewer over-expanded air sacs; can occur as result of long-term heavy smoking; air pollution worsens disease; patient may not be able to breathe except in sitting or standing position</td>
</tr>
<tr>
<td>histoplasmosis</td>
<td>Infection caused by fungus, <em>Histoplasma capsulatum</em>, found in dust and in droppings of pigeons and chickens</td>
</tr>
<tr>
<td>infant respiratory distress syndrome (IRDS)</td>
<td>Most commonly found in premature infants; characterized by tachypnea and respiratory grunting; caused by lack of surfactant necessary to keep lungs inflated; also called <em>hyaline membrane disease</em> (HMD) and respiratory distress syndrome of the newborn</td>
</tr>
<tr>
<td>influenza</td>
<td>Viral infection; characterized by chills, fever, body aches, and fatigue; commonly called <em>flu</em></td>
</tr>
<tr>
<td>Legionnaire's disease</td>
<td>Severe, often fatal bacterial infection; characterized by pneumonia and liver and kidney damage; named after people who came down with it at an American Legion convention in 1976</td>
</tr>
<tr>
<td><em>Mycoplasma</em> pneumonia</td>
<td>Less severe but longer lasting form of pneumonia; caused by <em>Mycoplasma pneumoniae</em> bacteria; also called walking pneumonia</td>
</tr>
<tr>
<td>pneumoconiosis</td>
<td>Result of inhaling environmental particles that become toxic; can be the result of inhaling coal dust (anthracosis) or asbestos (asbestosis)</td>
</tr>
<tr>
<td><em>Pneumocystis carinii</em> pneu- monia (PCP)</td>
<td>Pneumonia with nonproductive cough, very little fever, and dyspnea caused by fungus, <em>Pneumocystis carinii</em>; opportunistic infection often seen in those with weakened immune systems, such as AIDS patients</td>
</tr>
<tr>
<td>pneumonia</td>
<td>Inflammatory condition of lung that can be caused by bacterial and viral infections, diseases, and chemicals; results in filling of alveoli and air spaces with fluid</td>
</tr>
<tr>
<td>pulmonary edema</td>
<td>Lung tissue retains excessive amount of fluid, especially in alveoli; results in dyspnea</td>
</tr>
<tr>
<td>pulmonary embolism</td>
<td>Blood clot or air bubble in pulmonary artery or one of its branches; may cause infarct in lung tissue</td>
</tr>
<tr>
<td>pulmonary fibrosis</td>
<td>Formation of fibrous scar tissue in lungs; leads to decreased ability to expand lungs; may be caused by infections, pneumoconiosis, autoimmune diseases, and toxin exposure</td>
</tr>
</tbody>
</table>
severe acute respiratory syndrome (SARS) acute viral respiratory infection; begins like flu but quickly progresses to severe dyspnea; high fatality rate; first appeared in China in 2003

silicosis type of pneumoconiosis; develops from inhalation of silica (quartz) dust found in quarrying, glass works, sandblasting, and ceramics

sleep apnea condition in which breathing stops repeatedly during sleep long enough to cause drop in oxygen levels in blood

sudden infant death syndrome (SIDS) unexpected and unexplained death of apparently well infant under one year of age; child suddenly stops breathing for unknown reasons

tuberculosis (TB) infectious disease caused by bacteria, *Mycobacterium tuberculosis*; commonly affects respiratory system; causes inflammation and calcification in lungs; incidence is on increase and is seen in many patients with weakened immune systems; multidrug-resistant tuberculosis is particularly dangerous form of disease because bacteria have developed resistance to standard drug therapy

**Pleural Cavity**

empyema pus within pleural space; usually associated with bacterial infection; also called *pyothorax*

pleural effusion accumulation of fluid in pleural cavity; prevents lungs from fully expanding; physicians detect presence of fluid by tapping chest (percussion) or listening with stethoscope (auscultation)

pleurisy inflammation of pleura; characterized by sharp chest pain with each breath; also called *pleuritis*

pneumothorax collection of air or gas in pleural cavity; may result in collapse of lung

---

**OBJECTIVE 9**

Identify and define selected respiratory system diagnostic procedures.

Text pages: 223–224; PowerPoint slides: 93–100

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**LECTURE NOTES**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Laboratory Test</strong></td>
<td></td>
</tr>
<tr>
<td>arterial blood gases (ABGs)</td>
<td>testing for gases present in blood; used to assist in determining levels of oxygen (O₂) and carbon dioxide (CO₂) in blood</td>
</tr>
</tbody>
</table>

---

**TEACHING STRATEGIES**

- Write sentences on the board using common words; have students substitute correct medical terms.
- Review actual chest X-ray films.
sputum culture and sensitivity (C&S)  

testing sputum by placing it on a culture medium and observing any bacterial growth; specimen is then tested to determine antibiotic effectiveness

sputum cytology  

examining sputum for malignant cells

**Diagnostic Imaging**

bronchography  

X-ray of lung after radiopaque substance has been inhaled into trachea or bronchial tube; resulting X-ray is called bronchogram

chest X-ray (CXR)  

radiographic picture of lungs and heart from the back and sides

pulmonary angiography  

injecting dye into blood vessel for purpose of taking X-ray of arteries and veins of lungs

ventilation-perfusion scan  

nuclear medicine diagnostic test; especially useful in identifying pulmonary emboli; radioactive intravenous injection shows whether blood is flowing to all parts of lung

**Endoscopic Procedures**

bronchoscopy (Bronch)  

visual examination of inside of bronchi; uses instrument called bronchoscope

laryngoscopy  

examination of interior of larynx with lighted instrument called laryngoscope

**Pulmonary Function Tests**

oximetry  

measures oxygen level in blood using an oximeter, placed on patient's fingertip or ear lobe

pulmonary function test  

group of diagnostic tests that give information regarding air flow in and out of lungs, lung volumes, and gas exchange between lungs and bloodstream

spirometry  

procedure to measure lung capacity using a spirometer

**Additional Diagnostic Procedures**

polysomnography  

monitoring patient while sleeping to identify sleep apnea; also called sleep apnea study

sweat test  

test for cystic fibrosis; patients with this disease have abnormally large amount of salt in sweat

tuberculin skin tests (TB test)  

applying tuberculin purified protein derivative (PPD) under surface of skin to determine if patient has been exposed to tuberculosis; also called a Tine or Mantoux test

IRDVD  

- See PowerPoint presentation on the Instructor's Resource DVD for videos on the topics of:  
  - Oximetry  
  - Spirometry

**Jeopardy Game**  

- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Pathology, & Therapeutic terms.

**Pop Questions**  

- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**LEARNING ACTIVITIES**

**Worksheet 7C**  

- Chapter Review

**Text**

- Practice Exercises
- Terminology Checklist
- Medical Record Analysis
- Chart Note Transcription

**Student DVD-ROM**

- Learning games
- Flash cards

**CW**

- Practice questions
- Case Study
- *New York Times* link for research into specific diagnostic procedures

**ASSESSMENTS**

**Quiz 7G**—Chapter Review  

**Test Bank**—questions
OBJECTIVE 10
Identify and define selected respiratory system therapeutic procedures.

Text pages: 225–226; PowerPoint slides: 101–111

LECTURE NOTES

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Therapy</td>
<td></td>
</tr>
<tr>
<td>aerosol therapy</td>
<td>medication suspended in mist that is intended to be inhaled; delivered by nebulizer, which delivers mist for period of time while patient breaths or a metered dose inhaler (MDI), which delivers a single puff of mist</td>
</tr>
<tr>
<td>endotracheal intubation</td>
<td>placing tube through mouth, through glottis, and into trachea to create patent airway</td>
</tr>
<tr>
<td>intermittent positive pressure breathing (IPPB)</td>
<td>method for assisting patients in breathing using mask that is connected to machine that produces increased positive thoracic pressure</td>
</tr>
<tr>
<td>postural drainage</td>
<td>drainage of secretions from bronchi by placing patient in position that uses gravity to promote drainage; used for treatment of cystic fibrosis and bronchiectasis</td>
</tr>
<tr>
<td>supplemental oxygen therapy</td>
<td>providing patient with additional concentration of oxygen to improve oxygen levels in bloodstream; oxygen may be provided by mask or nasal cannula</td>
</tr>
<tr>
<td>ventilator</td>
<td>machine that provides artificial ventilation for patient unable to breathe on his or her own; also called a respirator</td>
</tr>
<tr>
<td>Surgical Procedures</td>
<td></td>
</tr>
<tr>
<td>thoracentesis</td>
<td>surgical puncture of chest wall for removal of fluids; also called thoracocentesis</td>
</tr>
<tr>
<td>thoracostomy</td>
<td>insertion of tube into chest for purpose of draining off fluid or air; also called chest tube</td>
</tr>
<tr>
<td>tracheostomy</td>
<td>surgical procedure often performed in emergency that creates opening directly into trachea; allows patient to breathe easier; also called tracheotomy</td>
</tr>
<tr>
<td>Additional Procedures</td>
<td></td>
</tr>
<tr>
<td>cardiopulmonary resuscitation (CPR)</td>
<td>emergency treatment provided by persons trained in CPR and given to patients when their respirations and heart stop; CPR provides oxygen to brain, heart, and other vital organs until medical treatment can restore normal heart and pulmonary function</td>
</tr>
<tr>
<td>Heimlich maneuver</td>
<td>technique for removing foreign body from trachea or pharynx by exerting diaphragmatic pressure</td>
</tr>
</tbody>
</table>

TEACHING STRATEGIES

• Write sentences on the board using common words; have students substitute correct medical terms.

Jeopardy Game
• Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Pathology, & Diagnostic terms.

IRDVD
• See PowerPoint presentation on the Instructor’s Resource DVD for videos on the topics of:
  • Nebulizers
  • Metered dose inhaler
  • Endotracheal intubation

Demonstration
• Bring examples of nasal cannula, oxygen masks, and metered dose inhalers.

Guest Speaker
• Invite a respiratory therapist to speak to the class about respiratory diagnostic tests and therapeutic procedures.

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES

Worksheet 7C
• Chapter Review

Text
• Practice Exercises
• Terminology Checklist
• Medical Record Analysis
• Chart Note Transcription

Student DVD-ROM
• Learning games
• Flash cards

CW
• Practice questions
• Case Study
• New York Times link for research into specific treatment procedures

ASSESSMENTS

Quiz 7G—Chapter Review
Test Bank—questions
**OBJECTIVE 11**
Identify and define selected medications relating to the respiratory system.

Text page: 227; PowerPoint slides: 112–115

<table>
<thead>
<tr>
<th>Classification</th>
<th>Action</th>
<th>Generic and Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>antibiotic</td>
<td>kills bacteria causing respiratory infections</td>
<td>ampicillin; amoxicillin, Amoxicil; ciprofloxacin, Ciprofloxacin; fexofenadine, Allegra; loratadine, Claritan; diphenhydramine, Benadryl</td>
</tr>
<tr>
<td>antihistamine</td>
<td>blocks effects of histamine that has been released by body during allergy attack</td>
<td>hydrocodon, Hycodan; dextromethorphan, Vicks Formula 44</td>
</tr>
<tr>
<td>antitussive</td>
<td>relieves urge to cough</td>
<td>hydrocodon, Hycodan; dextromethorphan, Vicks Formula 44</td>
</tr>
<tr>
<td>bronchodilator</td>
<td>relaxes muscle spasms in bronchial tubes; treats asthma</td>
<td>albuterol, Proventil, Ventolin; salmetrol, Serevent; theophyllin, Theo-Dur</td>
</tr>
<tr>
<td>corticosteroids</td>
<td>reduces inflammation and swelling in respiratory tract</td>
<td>fluticasone, Flonase; mometasone, Nasacort; triamcinolone, Azmacort</td>
</tr>
<tr>
<td>decongestant</td>
<td>reduces stuffiness and congestion throughout respiratory system</td>
<td>oxymetazoline, Afrin, Dristan, Sinex; pseudoephedrine, Drixoral, Sudafed</td>
</tr>
<tr>
<td>expectorant</td>
<td>improves ability to cough up mucus from respiratory tract</td>
<td>guaifenesin, Robitussin, Mucinex</td>
</tr>
<tr>
<td>mucolytic</td>
<td>liquefies mucus so it is easier to cough and clear from respiratory tract</td>
<td>N-acetyl-cysteine, Mucomyst</td>
</tr>
</tbody>
</table>

**LECTURE NOTES**

**TEACHING STRATEGIES**

**Pop Questions**
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**LEARNING ACTIVITIES**
- Have students use a PDR and/or the Internet to look up additional information regarding these medications, such as dosage, side effects, and contraindications.

**Worksheet 7C**
- Chapter Review

**Text**
- Practice Exercises
- Terminology Checklist

**Student DVD-ROM**
- Learning games
- Flash cards

**CW**
- Practice tests

**ASSESSMENTS**

**Quiz 7G**—Chapter Review

**Test Bank**—questions
OBJECTIVE 12
Define selected abbreviations associated with the respiratory system.

Text page: 227; PowerPoint slides: 115–120

LECTURE NOTES

ABGs  arterial blood gases
ARDS  adult (or acute) respiratory distress syndrome
Bronch bronchoscopy
CO₂  carbon dioxide
COPD chronic obstructive pulmonary disease
CPR cardiopulmonary resuscitation
C&S culture and sensitivity
CTA clear to auscultation
CXR chest X-ray
DOE dyspnea on exertion
DPT diphtheria, pertussis, tetanus injection
ENT ear, nose, and throat
ERV expiratory reserve volume
FRC functional residual capacity
HMD hyaline membrane disease
IC inspiratory capacity
IPPB intermittent positive pressure breathing
IRDS infant respiratory distress syndrome
IRV inspiratory reserve volume
LLL left lower lobe
LUL left upper lobe
MDI metered dose inhaler
O₂ oxygen
PCP Pneumocystis carinii pneumonia
PFT pulmonary function test
PPD purified protein derivative
R respiration
RA room air
RDS respiratory distress syndrome
RLL right lower lobe
RML right middle lobe
RRT registered respiratory therapist
RV reserve volume
RUL right upper lobe
SARS severe acute respiratory syndrome
SIDS sudden infant death syndrome
SOB shortness of breath
TB tuberculosis
TLC total lung capacity
TPR temperature, pulse, and respiration
TV tidal volume
URI upper respiratory infection
VC vital capacity

TEACHING STRATEGIES

• Emphasize importance of learning abbreviations and their full meanings; point out how some abbreviations, such as COPD, CTA, DPT, and SOB are typically used rather than full terms.
• Obtain a copy of respiratory therapy notes; have students identify all abbreviations and write out medical term for each.
• Encourage students to add abbreviations to their flash cards.

Memory Game
• Have students assist in creating a memory game to be played in class.

Pop Questions
• Use Clicker questions as either pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES

Worksheet 7C
• Chapter Review

Quiz 7F
• May be used as a worksheet

Text
• Practice Exercises

Student DVD-ROM
• Learning games
• Flash cards

CW
• Practice questions

ASSESSMENTS

Quiz 7F—Abbreviations Quiz
Quiz 7G—Chapter Review
Test Bank—questions
**Worksheet 7A**

**New Combining Form and Suffix Handout**

Directions: For each combining form and suffix below, write out its meaning. Then locate a new term from the chapter that uses the new word part.

<table>
<thead>
<tr>
<th>Combining Forms</th>
<th>Meaning</th>
<th>Chapter Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. alveol/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. anthrac/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. atel/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. bronch/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. bronchi/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. bronchiol/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. coni/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. diaphragmat/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. epiglott/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. laryng/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. lob/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. nas/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. orth/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. ox/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. ox/i</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. pharyng/o</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>17. pleur/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. pneum/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. pneumon/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. pulmon/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. rhin/o</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
<table>
<thead>
<tr>
<th>Combining Forms</th>
<th>Meaning</th>
<th>Chapter Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. sinus/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. spir/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. trache/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suffixes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. -capnia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. -ectasis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. -osmia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. -phonia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. -pnea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. -ptysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. -thorax</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Worksheet 7B
### Medical Term Analysis

Directions: Below are terms built from word parts used in this chapter that are not analyzed in the Word Building Table. Many are built from word parts you have learned in previous chapters. Analyze each term presented below and list and define the word parts used to build each term.

<table>
<thead>
<tr>
<th>Medical Term</th>
<th>Word Part Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. paranasal</td>
<td></td>
</tr>
<tr>
<td>2. laryngopharyngeal</td>
<td></td>
</tr>
<tr>
<td>3. nasopharyngeal</td>
<td></td>
</tr>
<tr>
<td>4. visceral</td>
<td></td>
</tr>
<tr>
<td>5. cyanosis</td>
<td></td>
</tr>
<tr>
<td>6. hemoptysis</td>
<td></td>
</tr>
<tr>
<td>7. otorhinolaryngology</td>
<td></td>
</tr>
<tr>
<td>8. fibrosis</td>
<td></td>
</tr>
<tr>
<td>9. atelectasis</td>
<td></td>
</tr>
<tr>
<td>10. pneumoconiosis</td>
<td></td>
</tr>
<tr>
<td>11. cytology</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
<table>
<thead>
<tr>
<th></th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>bronchography</td>
</tr>
<tr>
<td>13</td>
<td>bronchoscopy</td>
</tr>
<tr>
<td>14</td>
<td>angiography</td>
</tr>
<tr>
<td>15</td>
<td>laryngoscopy</td>
</tr>
<tr>
<td>16</td>
<td>oximetry</td>
</tr>
<tr>
<td>17</td>
<td>spirometry</td>
</tr>
<tr>
<td>18</td>
<td>tracheostomy</td>
</tr>
<tr>
<td>19</td>
<td>thoracocentesis</td>
</tr>
<tr>
<td>20</td>
<td>cardiopulmonary</td>
</tr>
</tbody>
</table>
Worksheet 7C
Chapter Review

Anatomy and Physiology

1. The three parts of respiration are: _______________, _______________, and _______________.
2. Inhalation brings in fresh _______________ and exhalation removes _______________ from the body.
3. The nasal cavity and much of the respiratory tract is covered by _______________, which secretes a sticky fluid called _______________.
4. The eustachian tube extends from the _______________ to the _______________.
5. The _______________ is a flap of cartilage that covers the larynx to prevent food from entering the trachea.
6. The smallest bronchial tubes are called _______________.
7. _______________ are the air sacs in the lungs.
8. The bronchi, pulmonary blood vessels, and nerves enter each lung along its medial border in an area called the _______________.
9. _______________ is the volume of air that moves into or out of your lungs during quiet breathing.
10. The vital signs consist of: _______________, _______________, _______________, and _______________.

Word Building

Directions: Build a term that means:

1. surgical repair of bronchus _____________________________________________________________
2. inflammation of voice box ____________________________________________________________
3. removal of lobe ______________________________________________________________________
4. condition of no oxygen ________________________________________________________________
5. puncture pleura to withdraw fluid _____________________________________________________
6. nose discharge _______________________________________________________________________
7. inflammation of all sinuses _____________________________________________________________
8. pertaining to throat __________________________________________________________________

(Continued)
9. blood in chest  
10. fast breathing  

Matching

_____ 1. epistaxis  
_____ 2. cyanosis  
_____ 3. hyperventilation  
_____ 4. nasal cannula  
_____ 5. hemoptysis  
_____ 6. patent  
_____ 7. rales  
_____ 8. SOB  
_____ 9. rhonchi  
_____ 10. pertussis  
_____ 11. stridor  
_____ 12. anthracosis  
_____ 13. CF  
_____ 14. emphysema  
_____ 15. histoplasmosis  
_____ 16. PCP  
_____ 17. empyema  
_____ 18. SIDS  
_____ 19. ABGs  
_____ 20. sputum cytology  
_____ 21. laryngoscopy  
_____ 22. polysomnography  
_____ 23. ventilator  
_____ 24. antitussive  
_____ 25. expectorant  

a. cough up blood  
b. wheezing sound  
c. a blood test  
d. dyspnea  
e. test for sleep apnea  
f. harsh, high-pitched breath sound  
g. improves ability to cough up mucus  
h. two pronged plastic device to deliver oxygen  
i. inherited condition  
j. pyothorax  
k. nosebleed  
l. destruction of alveolar walls  
m. opportunistic infection seen in AIDS patient  
n. test looking for malignant cells  
o. breathe too fast and too deep  
p. visual examination of voice box  
q. crackling sound  
r. respirator  
s. whooping cough  
t. open  
u. reduces urge to cough  
v. black lung  
w. unexplained death of apparently well infant  
x. fungal infection  
y. bluish tint to skin
Quiz 7A
New Word Parts Quiz

Directions: Define the combining form or suffix in the spaces provided.

1. bronchiol/o ________________________________________________________________
2. atel/o _____________________________________________________________________
3. coni/o _____________________________________________________________________
4. epiglott/o __________________________________________________________________
5. laryng/o ___________________________________________________________________
6. pharyng/o ___________________________________________________________________
7. trache/o _____________________________________________________________________
8. pulmon/o ____________________________________________________________________
9. pneum/o _____________________________________________________________________
10. ox/i _________________________________________________________________________
11. orth/o _____________________________________________________________________
12. nas/o ______________________________________________________________________
13. anthrac/o __________________________________________________________________
14. pleur/o _____________________________________________________________________
15. sinus/o _____________________________________________________________________
16. spir/o ______________________________________________________________________
17. rhin/o _____________________________________________________________________
18. alveol/o _____________________________________________________________________
19. bronchi/o ___________________________________________________________________
20. diaphragmat/o __________________________________________________________________
21. -capnia _____________________________________________________________________
22. -ectasis ____________________________________________________________________
23. -osmia _____________________________________________________________________
24. -pnea ______________________________________________________________________
25. -ptysis _____________________________________________________________________
Quiz 7B
Spelling Quiz

Directions: Write each term as your instructor pronounces it.

1. __________________________________________
2. __________________________________________
3. __________________________________________
4. __________________________________________
5. __________________________________________
6. __________________________________________
7. __________________________________________
8. __________________________________________
9. __________________________________________
10. __________________________________________
11. __________________________________________
12. __________________________________________
13. __________________________________________
14. __________________________________________
15. __________________________________________
16. __________________________________________
17. __________________________________________
18. __________________________________________
19. __________________________________________
20. __________________________________________
Quiz 7C
Labeling Diagram

Directions: Label the structures of the upper respiratory system.

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________
6. ________________
7. ________________
8. ________________
9. ________________
10. ________________
11. ________________
12. ________________
Quiz 7D
Labeling Diagram

Directions: Label the structures of the lungs.

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
Quiz 7E
Word Building Quiz

Directions: Build a single medical term for each phrase below.

1. surgical repair of bronchus _____________________________

2. instrument to view inside bronchus _____________________________

3. removal of voice box _____________________________

4. paralysis of voice box _____________________________

5. puncture of pleura to withdraw fluid _____________________________

6. condition of insufficient oxygen _____________________________

7. lung specialist _____________________________

8. nose discharge _____________________________

9. abnormal condition of nose fungus _____________________________

10. instrument to measure oxygen _____________________________

11. removal of lobe _____________________________

12. chest pain _____________________________

13. inflammation of all sinuses _____________________________

14. inflammation of nose and throat _____________________________

15. pleural pain _____________________________

16. pertaining to lung _____________________________

17. pertaining to inside trachea _____________________________

18. pertaining to chest _____________________________

19. pertaining to voice box _____________________________

20. no voice _____________________________

21. excessive carbon dioxide _____________________________

22. no smell _____________________________

23. slow breathing _____________________________

24. pus in chest _____________________________

25. normal breathing _____________________________

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## Quiz 7F

### Abbreviation Quiz

**Directions:** Write the medical term for which each abbreviation stands.

1. ABGs
2. ARDS
3. CO₂
4. COPD
5. CTA
6. CXR
7. ENT
8. IPPB
9. IRDS
10. LLL
11. MDI
12. O₂
13. PFT
14. RA
15. RDS
16. RRT
17. SARS
18. SIDS
19. SOB
20. TB
21. TLC
22. TPR
23. TV
24. URI
25. CPR
Quiz 7G
Chapter Review

PART I: Multiple Choice
Directions: Circle the correct answer.

1. The volume of air that can be exhaled after a maximum inhalation is
   a. inspiratory reserve volume.
   b. tidal volume.
   c. total lung volume.
   d. vital capacity.

2. The term for abnormal "crackling" sounds made during inspiration is
   a. pleural rub.
   b. rales.
   c. rhonchi.
   d. stridor.

3. The acute respiratory condition found in infants characterized by a barking cough is
   a. asthma.
   b. bronchitis.
   c. croup.
   d. laryngitis.

4. The name for the condition in which an area of lung tissue collapses is
   a. bronchiectasis.
   b. atelectasis.
   c. emphysema.
   d. asthma.

5. When lung tissue retains an excessive amount of fluid, this is called
   a. pulmonary edema.
   b. pulmonary embolism.
   c. pleural effusion.
   d. thoracalgia

6. The medical term that means open or un-blocked is
   a. aspirate.
   b. asphyxia.
   c. patent.
   d. rhonchi.

7. Which abbreviation stands for a type of pneumonia?
   a. PCP
   b. SARS
   c. PFT
   d. ARDS

8. A laboratory test for the presence of malignant cells is
   a. sputum culture and sensitivity.
   b. throat culture.
   c. endotracheal intubation.
   d. sputum cytology.

9. The term for using a device to measure the breathing capacity of the lungs is
   a. pulmonary angiography.
   b. intermittent positive pressure breathing.
   c. spirometry.
   d. bronchography.

10. Using the fingertips to tap on a surface to determine the condition beneath is called
    a. auscultation.
    b. palpation.
    c. inspection.
    d. percussion.

(Continued)
PART II: Matching
Directions: Match the term with its definition.

____ 1. nares  
____ 2. glottis  
____ 3. eupnea  
____ 4. aspiration  
____ 5. phlegm  
____ 6. asthma  
____ 7. Mycoplasma  
____ 8. silicosis  
____ 9. ventilation-perfusion scan  
____ 10. antihistamine

da. normal breathing  
b. may cause severe bronchospasms  
c. a type of pneumoconiosis  
d. external openings of the nose  
e. causes walking pneumonia  
f. a nuclear medicine test  
g. thick mucus of respiratory tract  
h. opening through vocal cords  
i. blocks allergy attack  
j. withdraw fluid using suction

PART III: Abbreviations
Directions: Write the full meaning of the following abbreviations.

1. COPD  
2. TPR  
3. URI  
4. SOB  
5. CXR
Chapter 9 Answer Keys

Worksheet 7A Answer Key
1. alveolus, air sac
2. coal
3. incomplete
4. bronchus
5. bronchus
6. bronchiole
7. dust
8. diaphragm
9. epiglottis
10. larynx
11. lobe
12. nose
13. straight, upright
14. oxygen
15. oxygen
16. throat
17. pleura
18. lung, air
19. lung, air
20. lung
21. nose
22. sinus, cavity
23. breathing
24. trachea, windpipe
25. carbon dioxide
26. dilated, expansion
27. smell
28. voice
29. breathing
30. spitting
31. chest

Worksheet 7B Answer Key
1. para- = beside, near; nas/o = nose; -al = pertaining to
2. laryng/o = voice box; pharyng/o = throat; -eal = pertaining to
3. nas/o = nose; pharyng/o = throat; -eal = pertaining to
4. viscer/o = internal organ; -al = pertaining to
5. cyan/o = blue; -osis = abnormal condition
6. hem/o = blood; -ptysis = spitting
7. os/o = ear; rhin/o = nose; laryng/o = voice box; -logy = study of
8. fibr/o = fibers; -osis = abnormal condition
9. atel/o = incomplete; -ectasis = dilation
10. pneum/o = lung; coni/o = dust; -osis = abnormal condition
11. cyt/o = cell; -logy = study of
12. bronch/o = bronchus; -graphy = process of recording
13. bronch/o = bronchus; -scopy = process of viewing
14. angi/o = vessel; -graphy = process of recording
15. laryng/o = voice box; -scopy = process of viewing
16. ox/i = oxygen; -metry = process of measuring
17. spir/o = breathing; -metry = process of measuring
18. trache/o = trachea; -ostomy = to create a new opening
19. thorac/o = chest; -centesis = puncture to withdraw fluid
20. cardi/o = heart; pulmon/o = lung; -ary = pertaining to

Worksheet 7C Answer Key
Anatomy and Physiology
1. ventilation, external respiration, internal respiration
2. oxygen, carbon dioxide
3. mucous membrane, mucus
4. nasopharynx, middle ear
5. epiglottis
6. bronchioles
7. alveoli
8. hilum
9. tidal volume
10. respiratory rate, heart rate, temperature, blood pressure

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Word Building
1. bronchoplasty
2. laryngitis
3. lobectomy
4. anoxia
5. pleurocentesis
6. rhinorrhea
7. pansinusitis
8. pharyngeal
9. hemоторax
10. tachypnea

Matching
1. k
2. y
3. o
4. h
5. a
6. t
7. q
8. d
9. b
10. s
11. f
12. v
13. i
14. l
15. x
16. m
17. j
18. w
19. c
20. n
21. p
22. e
23. r
24. u
25. g

Quiz 7A Answer Key
1. bronchiole
2. incomplete
3. dust
4. epiglottis
5. larynx, voice box
6. pharynx, throat
7. trachea, windpipe
8. lung
9. air, lung
10. oxygen
11. straight
12. nose
13. coal
14. pleura
15. sinus, cavity
16. breathing
17. nose
18. alveoli, air sacs
19. bronchus
20. diaphragm
21. carbon dioxide
22. dilated, expansion
23. smell
24. breathing
25. spitting

Quiz 7B Answer Key
1. histoplasmosis
2. eustachian
3. epiglottis
4. bronchioles
5. mediastinum
6. diaphragm
7. bronchiectasis
8. laryngectomy
9. nasopharyngitis
10. pneumoconiosis
11. asphyxia
12. epistaxis
13. hemoptysis
14. orthopnea
15. phlegm
16. rhonchi
17. diphtheria
18. pertussis
19. polysomnography
20. resuscitation
Quiz 7C Answer Key

1. nares
2. paranasal sinuses
3. nasal cavity
4. pharyngeal tonsil
5. Eustachian tube
6. hard palate
7. soft palate
8. palatine tonsil
9. epiglottis
10. vocal cords
11. esophagus
12. trachea

Quiz 7D Answer Key

1. trachea
2. right upper lobe
3. right middle lobe
4. right lower lobe
5. apex of lung
6. left upper lobe
7. left lower lobe
8. diaphragm

Quiz 7E Answer Key

1. bronchoplasty
2. bronchoscope
3. laryngectomy
4. laryngoplegia
5. pleurocentesis
6. hypoxia
7. pulmonologist
8. rhinorrhea
9. rhinomycosis
10. oximeter
11. lobectomy
12. thoracalgia
13. pansinusitis
14. nasopharyngitis
15. pleurodynia
16. pulmonary
17. endotracheal
18. thoracic
19. laryngeal
20. aphonía
21. hypercapnia
22. anosmia
23. bradypnea
24. pyothorax
25. eupnea

Quiz 7F Answer Key

1. arterial blood gases
2. adult (acute) respiratory distress syndrome
3. carbon dioxide
4. chronic obstructive pulmonary disease
5. clear to auscultation
6. chest X-ray
7. ear, nose, and throat
8. intermittent positive pressure breathing
9. infant respiratory distress syndrome
10. left lower lobe
11. metered dose inhaler
12. oxygen
13. pulmonary function test
14. room air
15. respiratory distress syndrome
16. registered respiratory therapist
17. severe acute respiratory syndrome
18. sudden infant death syndrome
19. shortness of breath
20. tuberculosis

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21. total lung capacity 22. temperature, pulse, and respiration 23. tidal volume
24. upper respiratory infection 25. cardiopulmonary resuscitation

Quiz 7G Answer Key

Multiple Choice
1. D 6. C
2. B 7. A
3. C 8. D
5. A 10. D

Matching
1. d 6. b
2. h 7. e
3. a 8. c
4. j 9. f
5. g 10. i

Abbreviations
1. chronic obstructive pulmonary disease 4. shortness of breath
2. temperature, pulse, and respirations 5. chest X-ray
3. upper respiratory infection