MODULE 3

Airway

Lesson 3-1

Airway

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

3-1.1 Identify the primary structures and function of the respiratory system. (C-2)
3-1.2 Define what is meant by one respiratory cycle. (C-1)
3-1.3 Define tidal volume and estimate the average amount in cubic centimeters (cc). (C-1)
3-1.4 Identify the importance of maintaining adequate tidal volume in a patient in respiratory distress. (C-3)
3-1.5 Explain the need to maintain adequate tidal volume when ventilating a patient in respiratory arrest. (C-2)
3-1.6 Define dead space, its average volume, and list all respiratory structures that make up that space. (C-1)
3-1.7 Estimate the portion of tidal volume available for gas exchange in an adult patient at rest. (C-1)
3-1.8 List the signs of adequate respirations. (C-1)
3-1.9 List the signs of inadequate respirations. (C-1)
3-1.10 Describe anatomical and physiological differences between the airway of pediatrics and adults. (C-1)
3-1.11 Describe important respiratory problems encountered with infants and children. (C-1)
3-1.12 Differentiate between respiratory distress, impending respiratory failure and respiratory arrest in adult, child and infants. (C-2)
3-1.13 Explain the need for providing rescue breaths, in accordance with current AHA guidelines, when ventilating a patient in respiratory arrest. (C-2)
3-1.14 Describe the steps in performing the head-tilt chin-lift. (C-1)
3-1.15 Relate mechanism of injury to opening the airway. (C-3)
3-1.16 Describe the steps in performing the jaw thrust. (C-1)
3-1.17 Describe how to identify and manage a foreign body airway obstruction for adults. (C-1)
3-1.18 Describe how to identify and manage a foreign body airway obstruction for a child. (C-1)
3-1.19 Describe how to identify and manage a foreign body airway obstruction for an infant. (C-1)
3-1.20 Describe the techniques of suctioning. (C-1)
3-1.21 Summarize the importance of having a suction unit available for immediate use when providing emergency care to a patient. (C-2)

3-1.22 Describe the technique involved in the use of the laryngoscope. (C-1)
3-1.23 Describe the technique involved in the use of the Magill forceps. (C-1)
3-1.24 Describe the technique involved in providing cricoid pressure (Sellick Maneuver). (C-1)
3-1.25 Describe how to artificially ventilate a patient with a pocket mask. (C-1)
3-1.26 Describe the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask while using the jaw thrust. (C-1)
3-1.27 List the parts of a bag-valve-mask system. (C-1)
3-1.28 Describe the steps in performing the skill of assisting ventilations with a bag-valve-mask for one and two rescuers. (C-1)
3-1.29 Describe the signs of adequate artificial ventilation when using the bag-valve-mask. (C-1)
3-1.30 Describe the signs of inadequate artificial ventilation when using the bag-valve-mask. (C-1)
3-1.31 Explain the need for providing oxygen to a patient in respiratory arrest. (C-2)
3-1.32 Differentiate between the techniques utilized to provide assisted ventilations to a child or infant versus an adult patient in respiratory arrest. (C-3)
3-1.33 Describe the steps in artificially ventilating a patient with a flow restricted, oxygen-powered ventilation device. (C-1)
3-1.34 List the steps in performing the actions taken when providing mouth-to-mouth and mouth-to-stoma artificial ventilation. (C-1)
3-1.35 Describe how to measure and insert an oropharyngeal (oral) airway. (C-1)
3-1.36 Describe how to measure and insert a nasopharyngeal (nasal) airway. (C-1)
3-1.37 Explain the need for utilizing airway adjuncts to maintain an open airway for a patient in respiratory arrest. (C-1)
3-1.38 Contrast the appropriate use of a nasopharyngeal airway with that of an oropharyngeal airway to maintain an open airway. (C-3)
3-1.39 Describe the components of an oxygen delivery system. (C-1)
3-1.40 Explain the need for providing oxygen to a patient in respiratory distress. (C-2)
3-1.41 Evaluate the need to utilize supplemental oxygen for a patient who is in respiratory distress. (C-3)
3-1.42 Compare the rationale for the appropriate use of various devices utilized to administer oxygen to a patient in respiratory distress. (C-3)
3-1.43 Explain the rationale for providing adequate oxygenation through high inspired oxygen concentrations to patients in respiratory distress. (C-3)
3-1.44 Differentiate between the techniques utilized to provide supplemental oxygen to a child or infant versus an adult patient in respiratory distress. (C-3)
3-1.45 Identify a nonrebreather face mask and state the oxygen flow requirements needed for its use. (C-1)

3-1.46 Identify a nasal cannula and state the flow requirements needed for its use. (C-1)
3-1.47 Describe the indications for using a nasal cannula versus a nonrebreather face mask. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:
3-1.48 Explain the rationale for basic life support artificial ventilation and airway protective skills taking priority over most other basic life support skills. (A-3)
3-1.49 Explain the rationale for providing adequate oxygenation through high inspired oxygen concentrations to patients who, in the past, may have received low concentrations. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:
3-1.50 Demonstrate the steps in performing the head-tilt chin-lift for an adult, child and infant patient. (P-1,2)
3-1.51 Demonstrate the steps in performing the jaw thrust. (P-1,2)
3-1.52 Demonstrate the steps in foreign body airway obstruction removal for an adult, child and infant patient. (P-2)
3-1.53 Demonstrate the techniques of suctioning for an adult, child and infant patient. (P-1,2)
3-1.54 Demonstrate the technique involved in the use of the laryngoscope. (C-1)
3-1.55 Demonstrate the technique involved in the use of the Magill forceps. (C-1)
3-1.56 Demonstrate the technique involved in providing cricoid pressure (Sellick Maneuver). (C-1)
3-1.57 Demonstrate the steps in providing mouth-to-mouth artificial ventilation with body substance isolation (barrier shields). (P-1,2)
3-1.58 Demonstrate how to use a pocket mask to artificially ventilate a patient. (P-1,2)
3-1.59 Demonstrate the assembly of a bag-valve-mask unit. (P-1,2)
3-1.60 Demonstrate the operation of oxygen tanks and regulators. (P-2)
3-1.61 Demonstrate the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask for one and two rescuers, for an adult, child and infant patient. (P-1,2)
3-1.62 Demonstrate the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask while using the jaw thrust for an adult, child and infant patient. (P-1,2)
3-1.63 Demonstrate artificial ventilation of a patient with a flow restricted, oxygen-powered ventilation device.(P-1,2)
3-1.64 Demonstrate how to artificially ventilate a patient with a stoma.(P-1,2)

3-1.65	Demonstrate how to measure and insert an oropharyngeal (oral) airway for an adult, child and infant patient. (P-1,2)
3-1.66	Demonstrate how to measure and insert a nasopharyngeal (nasal) airway. (P-1,2)
3-1.67	Demonstrate the correct operation of oxygen tanks and regulators. (P-1,2)
3-1.68	Demonstrate the use of a nonrebreather face mask and state the oxygen flow requirements needed for its use.(P-1,2)
3-1.69	Demonstrate the technique involved in administering supplemental oxygen via a nasal cannula. (P-1,2)
3-1.70	Demonstrate the technique involved in administering supplemental oxygen via a nonrebreather face mask. (P-1,2)
3-1.71	Demonstrate the technique of “blow by” administration of oxygen. (P-1)
3-1.72	Assess the need for providing supplemental oxygen for a patient who is in respiratory distress. (P-3)
3-1.73	Conduct an assessment to identify whether a patient is in respiratory distress versus arrest on various patients, including adults, children and infants. (P-3)
3-1.74	Demonstrate how to administer supplemental oxygen for a child and an infant patient. (P-2)
3-1.75	Demonstrate how to provide assisted ventilations for a child and an infant patient. (P-2)

PREPARATION

Motivation:	A patient without a patent (open) airway, is a dead patient.
Prerequisites:	BLS and Preparatory.

MATERIALS

AV Equipment:	Utilize various audio-visual materials relating to airway management. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the program. Materials should be edited to assure the objectives of the curriculum are met.
EMS Equipment:	Pocket mask, bag-valve-mask, flow restricted, oxygen-powered ventilation device, oral airways, nasal airways, suction units, suction catheters, laryngoscope, magill forceps, oxygen tank, regulator, nonrebreather mask, nasal cannula, tongue blade, and lubricant.

PERSONNEL

Primary Instructor: One EMT-Basic instructor knowledgeable in airway management.

Assistant Instructor: The instructor-to-student ratio should be 1:6 for psychomotor skill practice. Individuals used as assistant instructors should be knowledgeable in airway techniques and management.

PRESENTATION

Declarative (What)

I. Anatomy and physiology of the respiratory system
  A. Respiratory
    1. Nasal cavity - humidifies, warms and filters air
    2. Oral cavity – airway passage
    3. Pharynx – airway passages
      a) Oropharynx – posterior to oral cavity
      b) Nasopharynx - posterior to nasal cavity
    4. Epiglottis - a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing
    5. Trachea – airway passage and protection of the vocal cords
    6. Larynx – protects vocal cords
      a) Thyriod cartilage – cartilage ring forming the superior portion of the larynx
      b) Cricoid cartilage - cartilage ring forming the lower portion of the larynx
    7. Bronchi - two major branches of the trachea moving air into the lungs
    8. Bronchioles - smaller divisions of the bronchi serving as air passage
    9. Alveoli - single cell membrane structures where gas exchange occurs; interface with capillary beds
    10. Diaphragm
      a) Inhalation (active phase)
        (1) Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity
          (a) Diaphragm moves slightly downward, flares lower portion of rib cage
          (b) Ribs move upward/outward
        (2) Air flows into the lungs
      b) Exhalation (passive phase)
        (1) Diaphragm and intercostal muscles relax, decreasing the size of the thoracic cavity
          (a) Diaphragm moves upward

(b) Ribs move downward/inward
(2) Air flows out of the lungs
c) Respiratory cycle
(1) Consists of one inhalation and one exhalation

11. Respiratory physiology and gas exchange
a) Tidal volume
(1) The volume of air normally inhaled/exhaled during each respiratory cycle
(2) Estimated to be approximately 500 cc of air in an adult (12-14cc/lb)
(3) Maintaining an adequate tidal volume in patients with respiratory distress will help to exchange greater volumes of oxygen and carbon dioxide
(4) Adequate tidal volume is paramount when performing assisted ventilations for patients in severe respiratory distress and respiratory arrest
b) Dead space
(1) The volume of air within specific respiratory structures that is not available for gas exchange
(2) Areas making up dead space include all structures from the nasal cavity and oral cavity down through and including the bronchioles
(3) Estimated dead space volume for an adult is 150 cc (calculated as 1cc/lb)
c) Volume of air available for gas exchange - approximately 350 cc (tidal volume – dead space = air available for gas exchange)
d) Alveolar/capillary exchange
(1) Oxygen-rich air enters the alveoli during each inspiration
(2) Oxygen-poor blood in the capillaries passes into the alveoli
(3) Oxygen enters the capillaries as carbon dioxide enters the alveoli
e) Capillary/cellular exchange
(1) Cells give up carbon dioxide to the capillaries
(2) Capillaries give up oxygen to the cells
f) Adequate respiratory rates
(1) Normal Rate
(a) Adult - 12-20/minute
(b) Child - 15-30/minute
(c) Infant - 25-50/minute
(2) Rhythm
(a) Regular
(b) Irregular
(3) Quality

(a) Breath sounds - present and equal
(b) Chest expansion - adequate and equal
(c) Minimum effort of breathing - use of accessory muscles - predominantly in infants and children

(4) Depth (tidal volume) – adequate

g) Inadequate breathing
(1) Rate – slower or faster than normal ranges
(2) Rhythm – irregular
(3) Quality
(a) Breath sounds - diminished or absent
(b) Chest expansion - unequal or inadequate
(c) Increased effort of breathing - use of accessory muscles predominantly in infants and children
(4) Depth (tidal volume) - inadequate/shallow
(5) The skin may be pale or cyanotic (blue) and cool and clammy
(6) There may be retractions above the clavicles, between the ribs and below the rib cage, especially in children
(7) Nasal flaring may be present, especially in children
(8) In infants, there may be "seesaw" breathing where the abdomen and chest move in opposite directions
(9) Agonal respirations (occasional gasping breaths) may be seen just before death
(10) Respiratory distress versus respiratory arrest

12. Infant and child anatomy considerations
a) Mouth and nose - in general: All structures are smaller and more easily blocked by secretions and airway swelling
b) Pharynx - infants' and children's tongues take up proportionally more space in the mouth than adults, and can block the upper airway
c) Trachea
(1) Infants and children have narrower tracheas that are obstructed more easily by swelling
(2) The trachea is softer and more flexible in infants and children
(3) Positioning the airway is different in infants and children, do not hyperextend the neck (consider use of a folded towel placed under shoulder blades to maintain a “sniffing-position”)

d) Cricoid cartilage - like other cartilage in the infant and child, the cricoid cartilage is less developed and less rigid
e) Diaphragm - chest wall is softer, infants and children tend to depend more heavily on the diaphragm for breathing
f) Infants are obligate nose breathers. Suctioning may aid to decrease breathing problems in infants.
g) Children can compensate well for short periods of time
(1) Compensate by increasing breathing rate and increased effort of breathing
(2) Compensation is followed rapidly by decompensation due to rapid respiratory muscle fatigue and general fatigue

13. Infant and child – other considerations
a) Airway obstructions
(1) Partial airway obstruction - infant or child who is alert and sitting
(a) Stridor (inspiratory vs. expiratory), crowing, or noisy
(b) Retractions on inspiration
(c) Pink
(d) Good peripheral perfusion
(e) Still alert, not unconscious
(f) Emergency medical care
(i) Allow position of comfort, assist younger child to sit up, rather than supine. Consider having parent hold infant/child.
(ii) Offer oxygen
(iii) Transport
(iv) Do not agitate child
(v) Limited exam. Do not assess blood pressure.
(2) Complete obstruction and altered mental status or cyanosis and partial obstruction
(a) No crying or speaking and cyanosis
(i) Child's cough becomes ineffective
(ii) Increased respiratory difficulty
(iii) Accompanied by stridor
(iv) Victim loses consciousness
(v) Altered mental status
(b) Clear airway
(3) Attempt artificial ventilations with a bag-valve-mask and good seal
b) Recognize signs of increased effort of breathing
(1) Nasal flaring

(2) Intercostal retraction (neck muscles), supraclavicular, subcostal retractions
(3) Stridor
(4) Neck and abdominal muscles – retractions
(5) Audible wheezing
(6) Grunting

c) The presence of signs of symptoms of early respiratory distress and any of the following:
(1) Respiratory rate greater than 60
(2) Cyanosis
(3) Decreased muscle tone
(4) Severe use of accessory muscles
(5) Poor peripheral perfusion
(6) Altered mental status
(7) Grunting

d) Respiratory arrest
(1) Breathing rate less than 10 per minute
(2) Limp muscle tone
(3) Unconscious
(4) Slower, absent heart rate
(5) Weak or absent distal pulses

B. Adequate and inadequate artificial ventilation
1. An EMT-Basic is artificially ventilating a patient adequately when:
a) The chest rises and falls with each artificial ventilation
b) The rate is sufficient, approximately 12 per minute for adults and 20 times per minute for children and infants
c) Heart rate returns to normal with successful artificial ventilation
2. Artificial ventilation is inadequate when:
a) The chest does not rise and fall with artificial ventilation
b) The rate is too slow or too fast
c) Heart rate does not return to normal with artificial ventilation

II. Opening the Airway
A. Head-tilt chin-lift when no neck injury suspected - review technique learned in BLS course for adults and pediatrics
B. Jaw thrust when EMT-Basic suspects spinal injury - review technique learned in BLS course for adults and pediatrics
C. Do not hyperextend the neck of an infant or child
D. Assess need for suctioning

III. Clearing complete airway obstructions
A. Adults – over 8 years old
1. Abdominal thrusts
2. Foreign body removal
3. Attempt to ventilate

B. Children – 1-8 years old
   1. Abdominal thrusts
   2. Visualize for foreign body removal
   3. Attempt to ventilate
C. Infants <1 year old
   1. Backblows/chest thrusts
   2. Visual foreign body removal
   3. Attempt to ventilate

IV. Techniques of Suctioning
A. Body substance isolation
B. Purpose
   1. Remove blood, other liquids and food particles from the airway
   2. Some suction units are inadequate for removing solid objects like teeth, foreign bodies and food
   3. A patient needs to be suctioned immediately when a gurgling sound is heard with artificial ventilation
C. Types of units
   1. Suction devices
      a) Mounted
      b) Portable
         (1) Electrical
         (2) Hand operated
   2. Suction catheters
      a) Hard or rigid ("tonsil tip")
         (1) Used to suction the mouth and oropharynx of an unresponsive patient
         (2) Should be inserted only as far as you can see
         (3) Use rigid catheter for infants and children, but take caution not to touch back of airway
      b) Soft (French)
         (1) Useful for suctioning the nasopharynx and in other situations where a rigid catheter cannot be used
         (2) Should be measured so that it is inserted only as far as the base of the tongue
D. Techniques of Use
   1. Suction device should be inspected on a regular basis before it is needed. A properly functioning unit with a gauge should generate 300 mmHg vacuum (120 mmHg for infants and children). A battery operated unit should have a charged battery.
   2. Attach a catheter
      a) Use rigid catheter when suctioning mouth of an infant or child
      b) Often will need to suction nasal passages; should use a bulb suction or French catheter with low to medium suction

3. Turn on the suction unit
4. Insert the catheter into the oral cavity without suction, if possible. Insert only to the base of the tongue.
5. Apply suction. Move the catheter tip side to side.
6. Suction for no more than 15 seconds at a time for adults
   a) In infants and children, shorter suction time should be used
   b) If the patient has secretions or emesis that cannot be removed quickly and easily by suctioning, the patient should be log rolled and the oropharynx should be cleared
   c) If patient produces frothy secretions as rapidly as suctioning can remove, suction for 15 seconds, artificially ventilate for two minutes, then suction for 15 seconds, and continue in that manner. Consult medical direction for this situation.
7. If necessary, rinse the catheter and tubing with water to prevent obstruction of the tubing from dried material

V. Laryngoscope and Magill Forceps – used by the EMT-Basic to visualize and remove foreign body airway obstruction
   A. Use appropriate body substance isolation precautions
   B. Hold the Magill forceps so the handle does not obstruct the view of the pharynx
   C. Choose adult or pediatric blade and attach to handle; light should illuminate. Hold in left hand.
   D. Place the patient's head in the "Sniffing Position"
   E. Insert blade in right side of mouth from above head and displace tongue to left by moving blade to midline. With infants, support chin with ring and little fingers of left hand for leverage.
   F. Lift tongue in direction of long axis of the handle without prying on teeth or gums
   G. Visualize obstruction
   H. While holding the Magill forceps in the right hand, remove obstruction

VI. Sellick Maneuver (cricoid pressure) –prevents aspiration by restricting flow of vomitus from esophagus into trachea and lungs. Utilized to prevent gastric distension. (Refer to AHA Guidelines)
   A. Locate cartilage structure of larynx on anterior neck
   B. Apply firm, downward pressure and maintain

VII. Techniques of Artificial Ventilation – See Oxygen Administration section as reference
   A. In order of preference, the methods for ventilating a patient by the EMT-Basic are as follows (note: although the national standard curriculum discusses the use of mouth-to-mouth ventilations, per current AHA Guidelines, the use of safer techniques described below, are recommended due to body substance isolation concerns). Note: All devices should include high flow oxygen administration.

1. Mouth-to-mask
2. Two-person bag-valve-mask
3. Flow restricted, oxygen-powered ventilation device
4. One-person bag-valve-mask

B. Body substance isolation

C. Mouth-to-mouth - review technique learned in BLS course. See above recommendation.

D. Mouth-to-mask
1. Review technique learned in BLS course for the adult, child and infant
2. The mask should be connected to high flow oxygen - 15 liters per minute

E. Bag-valve-mask – oxygen delivery device utilized to assist ventilations in patients with severe respiratory distress or in full respiratory arrest
1. The bag-valve-mask consists of a self-inflating bag, one-way valve, face mask, oxygen reservoir. It needs to be connected to oxygen to perform most effectively.
2. Bag-valve-mask issues
   a) Volume of approximately 1,600 milliliters available for adults
   b) Provides less volume than mouth-to-mask
   c) Single EMT-Basic may have difficulty maintaining an airtight seal
   d) Two EMT-Basics using the device will be more effective
   e) Position self at top of patient's head for optimal performance
   f) Adjunctive airways (oral or nasal) may be necessary in conjunction with bag-valve-mask
   g) The bag-valve-mask should have:
      (1) A self-refilling bag
      (2) A non-jam valve that allows a maximum oxygen inlet flow of 15/lpm
      (3) No pop-off valve, or the pop-off valve must be disabled. Failure to do so may result in inadequate artificial ventilations.
      (4) Standardized 15/22 mm fittings
      (5) An oxygen inlet and reservoir to allow for high concentration of oxygen
      (6) A true valve for nonrebreather
      (7) Should perform in all environmental conditions and temperature extremes
      (8) Available in infant, child and adult sizes. Selection of appropriate size ensures proper mask seal as well as delivery of recommended tidal volumes.
3. Use when no trauma is suspected

a) After opening airway, select correct mask size (adult, infant or child)
b) Position thumbs over top half of mask, index and middle fingers over bottom half
c) Place apex of mask over bridge of nose, then lower mask over mouth and upper chin. If mask has large round cuff surrounding a ventilation port, center port over mouth.
d) Use ring and little fingers to bring jaw up to mask
e) Connect bag to mask if not already done
f) Have assistant squeeze bag with two hands until chest rises, squeezing the bag slowly and evenly. For infants and children, squeeze only enough to make chest rise adequately.
g) If alone, form a "C" around the ventilation port with thumb and index finger; use middle, ring and little fingers under jaw to maintain chin lift and complete the seal
h) Repeat a minimum of every 5 seconds for adults and every 3 seconds for children and infants
i) If chest does not rise and fall, re-evaluate
    (1) If chest does not rise, reposition head
    (2) If air is escaping from under the mask, reposition fingers and mask
    (3) Check for obstruction
    (4) If chest still does not rise and fall, use alternative method of artificial ventilation, e.g., pocket mask, manually triggered device
j) If necessary, consider use of adjuncts
    (1) Oral airway
    (2) Nasal airway

4. Use with suspected trauma
    a) After opening airway, select correct mask size (adult, infant or child)
    b) Immobilize head and neck, e.g., have an assistant hold head manually or use your knees to prevent movement
    c) Position thumbs over top half of mask, index and middle fingers over bottom half
    d) Place apex of mask over bridge of nose, then lower mask over mouth and upper chin. If mask has large round cuff surrounding a ventilation port, center port over mouth.
    e) Use ring and little fingers to bring jaw up to mask without tilting head or neck
    f) Connect bag to mask if not already done
    g) Have assistant squeeze bag with two hands until chest rises

h) Repeat every 5 seconds for adults and every 3 seconds for children and infants, continuing to hold jaw up without moving head or neck
i) If chest does not rise, re-evaluate.
(1) If abdomen rises, reposition jaw
(2) If air is escaping from under the mask, reposition fingers and mask
(3) Check for obstruction
(4) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask
j) If necessary, consider use of adjuncts
(1) Oral airway
(2) Nasal airway

F. Flow Restricted, Oxygen-Powered Ventilation Devices – for adult patients, not intended for children or infants; other contraindications may exist; refer to local protocol
1. Flow restricted, oxygen-powered ventilation devices should provide
a) A peak flow rate of 100% oxygen at up to 40 lpm
b) An inspiratory pressure relief valve that opens at approximately 60 centimeters water and vents any remaining volume to the atmosphere or ceases gas flow
c) An audible alarm that sounds whenever the relief valve pressure is exceeded
d) Satisfactory operation under ordinary environmental conditions and extremes of temperature
e) A trigger positioned so that both hands of the EMT-Basic can remain on the mask to hold it in position
2. Use when no neck injury is suspected
a) After opening airway, insert correct size oral or nasal airway and attach adult mask
b) Position thumbs over top half of mask, index and middle fingers over bottom half
c) Place apex of mask over bridge of nose, then lower mask over mouth and upper chin
d) Use ring and little fingers to bring jaw up to mask
e) Connect flow restricted, oxygen-powered ventilation device to mask if not already done
f) Trigger the flow restricted, oxygen-powered ventilation device until chest rises
g) Repeat every 5 seconds
h) If necessary, consider use of adjuncts
i) If chest does not rise, re-evaluate
(1) If abdomen rises, reposition head
(2) If air is escaping from under the mask, reposition fingers and mask

(3) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask
(4) Check for obstruction

3. Use when there is suspected neck injury
a) After opening airway, attach adult mask.
b) Immobilize head and neck, e.g., have an assistant hold head manually or use your knees to prevent movement
c) Position thumbs over top half of mask, index and middle fingers over bottom half
d) Place apex of mask over bridge of nose, then lower mask over mouth and upper chin
e) Use ring and little fingers to bring jaw up to mask without tilting head or neck
f) Connect flow restricted, oxygen-powered ventilation device to mask, if not already done
g) Trigger the flow restricted, oxygen-powered ventilation device until chest rises
h) Repeat every 5 seconds
i) If necessary, consider use of adjuncts
j) If chest does not rise and fall, re-evaluate
(1) If chest does not rise and fall, reposition jaw
(2) If air is escaping from under the mask, reposition fingers and mask
(3) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask
(4) Check for obstruction

G. Bag-valve to tracheostomy tube
1. Definition of tracheostomy - an artificial opening in the trachea
2. If unable to artificially ventilate, try suction, then artificial ventilation through mouth and nose; sealing stoma may improve ability to artificially ventilate from above or may clear obstruction (note: with a complete tracheostomy, ventilation through the mouth and nose will not be possible; ventilate through stoma)
3. Need to seal the mouth and nose when air is escaping when artificially ventilating at the stoma

H. Bag-valve-mask to stoma - use infant and child mask to make seal. Technique otherwise very similar to artificially ventilating through mouth. Head and neck do not need to be positioned.

VIII. Airway Adjuncts

A. Oropharyngeal (oral) airways – used to displace tongue away from the oropharynx, allowing air exchange to occur
1. Oropharyngeal airways may be used to assist in maintaining an open airway on unresponsive patients without a gag reflex. Patients with a gag reflex will vomit. Refer to use of nasopharyngeal airways for comparative guide.

2. Select the proper size: Measure from the corner of the patient's lips to the bottom of the earlobe or angle of jaw
3. Open the patient's mouth
4. In adults, to avoid obstructing the airway with the tongue, insert the airway upside down, with the tip facing toward the roof of the patient's mouth
5. Advance the airway gently until resistance is encountered. Turn the airway 180 degrees so that it comes to rest with the flange on the patient's teeth.
6. Another method of inserting an oral airway is to insert it right side up, using a tongue depressor to press the tongue down and forward to avoid obstructing the airway. This is the preferred method for airway insertion in an infant or child.

B. Nasopharyngeal (nasal) airways - used to displace tongue away from the naso and oropharynx, allowing air exchange to occur

1. Nasopharyngeal airways are less likely to stimulate vomiting and may be used on patients who are responsive but need assistance keeping the tongue from obstructing the airway. Even though the tube is lubricated, this is a painful stimulus.
2. Select the proper size: Measure from the tip of the nose to the tip of the patient's ear. Also consider diameter of airway in the nostril.
3. Lubricate the airway with a water soluble lubricant
4. Insert it posteriorly. Bevel should be towards the septum upon insertion.
5. If the airway cannot be inserted into the right nares, then try the left. When inserting airway into left nares, place bevel towards septum, insert approximately 1", rotate 180 degrees, then continue insertion.
6. Rule out head injury/skull fracture prior to placing a nasopharyngeal airway.
7. Nasopharyngeal airways should be utilized with extreme caution with infants and small children due to a huge increase in resistance and therefore work of breathing.

IX. Oxygen

A. Oxygen cylinders

1. Different sizes
   a) D cylinder has 350 liters
   b) E cylinder has 625 liters
   c) M cylinder has 3,000 liters
   d) G cylinder has 5,300 liters
   e) H cylinder has 6,900 liters
2. Need to handle carefully since content is under pressure
3. Tanks should be positioned to prevent falling and blows to the valve-gauge assembly and secured during transport

B. Pressure regulators

1. Full tank approximately 2000 psi. Varies with ambient temperature
2. Dry oxygen not harmful in short term; humidifier needed only for patient on oxygen for a long time. Not generally needed for prehospital care.

C. Operating procedures
1. Remove protective seal
2. Quickly open, then shut, the valve
3. Attach washer and regulator-flowmeter to tank
4. Attach oxygen device to flowmeter
5. Open flowmeter to desired setting
6. Apply oxygen device to patient
7. When complete, remove device from patient, then turn off valve and remove all pressure from the regulator

D. Oxygen Administration – to prevent or decrease hypoxia
1. Supplemental Oxygen – given to diminish hypoxia
2. Assisted Ventilations with oxygen administration – refer to Techniques of Artificial Ventilation section

E. Equipment for Supplemental Oxygen Delivery
1. Nonrebreather
   a) Preferred method of giving oxygen to prehospital patients
   b) Up to 90% oxygen can be delivered
   c) Nonrebreather bag must be fully inflatedbefore mask is placed on patient
   d) Flow rate should be adjusted so that when patient inhales, bag does not collapse (“high flow”, approximately 12-15 lpm)
   e) Patients who are cyanotic, cool, clammy or short of breath need oxygen. Concerns about the dangers of giving too much oxygen to patients with history of chronic obstructive pulmonary disease and infants and children have not been shown to be valid in the prehospital setting. Patients with chronic obstructive pulmonary disease and infants and children who require oxygen should receive high concentration oxygen.
   f) Masks come in different sizes for adult, children and infants. Be sure to select the correct size mask.
2. Nasal cannula
   a) Rarely the best method of delivering adequate oxygen to the prehospital patient
   b) Should be used only when patients will not tolerate a nonrebreather mask, despite coaching from the EMT-Basic
   c) Flow rate should be 1-6 lpm and can deliver up to 44% oxygen

d) Nasal cannula is not well tolerated by infants and younger children

3. Consider utilizing a “blow by” technique when administering oxygen to infants and children

X. Special Considerations

A. Patients with laryngectomies (stomas)

1. A breathing tube may be present. If it is obstructed, suction it. If a back-up tube is available, transport it with the patient.
2. Some patients have a partial laryngectomy. If, upon artificially ventilating stoma, air escapes from the mouth or nose, close the mouth and pinch the nostrils.

B. Infant and child patients

1. Place head in correct neutral position for the infant and extend a little past neutral for a child, utilizing a folded towel under shoulder blades.
2. Avoid excessive hyperextension of the head
3. Avoid excessive bag pressure - use only enough to make chest rise
4. Ventilate with bag-valve-mask until adequate chest rise occurs. Do not use pop-off valve, must be disabled (placed in closed position) in order to adequately ventilate child or infant.
5. Gastric distention is more common in children
6. An oral or nasal airway may be considered when other procedures fail to provide a clear airway (caution advised when utilizing nasal airways)

C. Facial injuries

1. Because the blood supply to the face is so rich, blunt injuries to the face frequently result in severe swelling
2. For the same reason, bleeding into the airway from facial injuries can be a challenge to manage

D. Obstructions

1. Review the foreign body airway obstruction (FBAO) procedures that the students learned in their BLS training
2. When foreign body airway obstruction persists, EMT-Basics should perform three cycles of the FBAO procedure, then transport, continuing the FBAO procedure en route

E. Dental appliances

1. Dentures - ordinarily dentures should be left in place
2. Partial dentures (plates) may become dislodged during an emergency. Leave in place, but be prepared to remove it if it becomes dislodged.

APPLICATION

Procedural (How)

1. Show diagrams of the airway and respiratory system of adults, children and infants.
2. Show examples of inadequate breathing.
3. Demonstrate the head-tilt chin-lift method of opening the airway.
4. Demonstrate the jaw thrust method of opening the airway.
5. Demonstrate mouth-to-mouth artificial ventilation of a patient.
6. Demonstrate artificial ventilation of a patient with a pocket mask with oxygen.
7. Demonstrate assembly of a bag-valve-mask.
8. Use a bag-valve-mask to demonstrate artificial ventilation of a non-neck injured patient with and without assistance.
9. Use a bag-valve-mask to demonstrate artificial ventilation of a suspected spinal injured patient with and without assistance.
10. Demonstrate artificial ventilation of a non-neck injured patient with a flow restricted, oxygen-powered ventilation device.
11. Demonstrate artificial ventilation of a neck injured patient with a flow restricted, oxygen-powered ventilation device.
12. Demonstrate insertion of an oropharyngeal (oral) airway.
13. Demonstrate insertion of a nasopharyngeal (nasal) airway.
14. Demonstrate proper use of laryngoscope and Magill forceps for removal of FBAO.
15. Demonstrate how to perform cricoid pressure (Sellicks maneuver).
16. Demonstrate the techniques of suctioning.
17. Demonstrate use of a nasal cannula.
18. Demonstrate use of a nonrebreather mask.
19. Demonstrate correct operation of oxygen tanks and regulators.
20. Demonstrate artificial ventilation of a patient with a stoma.
21. Demonstrate artificial ventilation of an infant or child patient.

Contextual (When, Where, Why)

1. Every patient must have a patent airway to survive.
2. When the airway is obstructed, the EMT-Basic must clear it as soon as possible using the methods described in this lesson. The only exceptions to this would be situations where it is unsafe or the airway problem is such that it cannot be treated in the field and the patient must be transported immediately to a hospital.
3. Once the airway has been opened, the EMT-Basic must determine if breathing is adequate.
4. Patients with inadequate breathing must be artificially ventilated using mouth-to-mouth, mouth-to-mask, bag-valve-mask or flow restricted, oxygen-powered ventilation device.
5. If the patient has adequate breathing, the EMT-Basic must decide if oxygen is indicated.

6. If oxygen is necessary, the EMT-Basic must select the appropriate device and follow the procedure for delivery.

STUDENT ACTIVITIES

Auditory (Hear)

1. The student should hear normal and abnormal breath sounds.
2. The student should hear a bag-valve-mask being used on a patient with an open airway.
3. The student should hear a bag-valve-mask being used on a patient with an obstructed airway.
4. The student should hear a flow restricted, oxygen-powered ventilation device being used on a patient with an open airway.
5. The student should hear a flow restricted, oxygen-powered ventilation device being used on a patient with an obstructed airway.
6. The student should hear suction units being operated.
7. The student should hear an oxygen tank and flowmeter in operation.

Visual (See)

1. The student should see audio-visual aids or materials of the airway and respiratory system.
2. The student should see normal breathing in other students.
3. The student should see audio-visual aids or materials of abnormal breathing.
4. The student should see audio-visual aids or materials of patients with stomas.
5. The student should see different kinds of oral and nasal airways.
6. The student should see different devices for ventilating patients (pocket masks, bag-valve-masks).
7. The student should see different kinds of suction units.
8. The student should see different kinds of oxygen tanks, regulators, and flowmeters.
9. The student should see nonrebreather masks and nasal cannulas.
10. The student should see audio-visual aids or materials of various dental appliances.

Kinesthetic (Do)

1. The student should practice evaluating breathing for adequacy.
2. The student should practice opening the airway with the head-tilt chin-lift maneuver.
3. The student should practice opening the airway with the jaw thrust.
4. The student should practice mouth-to-mouth artificial ventilation.
5. The student should practice artificial ventilation of a patient with a pocket mask with oxygen.
6. The student should practice assembly of a bag-valve-mask.
7. The student should practice using a bag-valve-mask to artificially ventilate a non-neck injured patient (adult, child, and infant) with and without assistance.
8. The student should practice using a bag-valve-mask to artificially ventilate a neck injured patient (adult, child, and infant) with assistance.

9. The student should practice artificial ventilation of a non-neck injured patient with a flow restricted, oxygen-powered ventilation device.
10. The student should practice artificial ventilation of a neck injured patient with a flow restricted, oxygen-powered ventilation device.
11. The student should practice insertion of an oropharyngeal (oral) airway (adult, child, and infant) with and without tongue blade.
12. The student should practice insertion of a nasopharyngeal (nasal) airway.
13. The student should practice checking a suction unit.
14. The student should practice suctioning.
15. The student should practice using a nasal cannula.
16. The student should practice using a nonrebreather mask.
17. The student should practice correct operation of oxygen tanks, regulators, and flowmeters.
18. The student should practice artificial ventilation of a patient with a stoma.
19. The student should practice artificial ventilation of an infant or child patient.

INSTRUCTOR ACTIVITIES

1. Supervise student practice.
2. Reinforce student progress in cognitive, affective, and psychomotor domains.
3. Redirect students having difficulty with content (complete remediation forms).

EVALUATION

Written: Develop evaluation instruments, e.g., quizzes, verbal reviews, and handouts, to determine if the students have met the cognitive and affective objectives of this lesson.

Practical: Evaluate the actions of the EMT-Basic students during role play, practice or other skill stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

REMEDIATION

Identify students or groups of students who are having difficulty with this subject content. Complete remediation sheet from the instructor's course guide.

ENRICHMENT

What is unique in the local area concerning this topic? Complete enrichment sheets from the instructor's course guide and attach with lesson plan.

MODULE 3

Basic Airway

Lesson 3-2

Practical Lab: Basic Airway Management

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:
Demonstrate the cognitive objectives of Lesson 3-1: Airway.

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:
Demonstrate the affective objectives of Lesson 3-1: Airway.

PSYCHOMOTOR OBJECTIVES

Demonstrate the psychomotor objectives of Lesson 3-1: Airway.

PREPARATION

Motivation: The practical lesson is designed to allow the students additional time to perfect skills. It is of utmost importance that the students demonstrate proficiency of the skill, cognitive knowledge of the steps to perform a skill, and a healthy attitude towards performing that skill on a patient.

This is an opportunity for the instructor and assistant instructors to praise progress and re-direct the students toward appropriate psychomotor skills. The material from all preceding lessons and basic life support should be incorporated into these practical skill sessions.

Prerequisites: BLS and previous modules.

MATERIALS

AV Equipment: Typically not required.

EMS Equipment: Equipment from the list in Lesson 3-1: Airway.

PERSONNEL

Primary Instructor: One EMT-Basic instructor knowledgeable in airway management.

Assistant Instructor: The instructor-to-student ratio should be 1:6 for psychomotor skill practice. Individuals used as assistant instructors should be knowledgeable in airway techniques and management.

APPLICATION

Procedural (How)

1. Instructor should demonstrate the procedural activities from Lesson 3-1: Airway.

Contextual (When, Where, Why)

1. Instructor should review contextual information from Lesson 3-1: Airway.

STUDENT ACTIVITIES

Auditory (Hear)

1. The students should hear the auditory information from Lesson 3-1: Airway.

Visual (See)

1. The students should see the visual material from Lesson 3-1: Airway.

Kinesthetic (Do)

1. The students should practice the kinesthetic activities from Lesson 3-1: Airway.

INSTRUCTOR ACTIVITIES

1. Supervise student practice.
2. Reinforce student progress in cognitive, affective, and psychomotor domains.
3. Redirect students having difficulty with content (complete remediation forms).

EVALUATION

Practical: Evaluate the actions of the EMT-Basic students during role play, practice or other skills stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

REMEDIATION

Identify students or groups of students who are having difficulty with this subject content. Complete remediation sheet from the instructor's course guide.

ENRICHMENT

What is unique in the local area concerning this topic? Complete enrichment sheets from the instructor's course guide and attach with lesson plan.

MODULE 3

Advanced Airway

Lesson 3-3

Advanced Airway and Practical Lab

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

3-3.1 Explain the proper use of the advanced non-visualized airway. (C-1)
3-3.2 List the indications for use of the advanced non-visualized airway. (C-1)
3-3.3 List the contraindications for the use of the advanced non-visualized airway. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

3-3.4 Appreciate the need to ensure airway patency by utilizing an advanced non-visualized airway. (A-1)
3-3.5 Value the importance of positive pressure (assisted) ventilations while using an advanced non-visualized airway. (A-2)
3-3.6 Appreciate the importance of confirming placement after having inserted an advanced non-visualized airway. (A-1)

PSYCHOMOTOR OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

3-3.7 Demonstrate the steps involved in preparing an advanced non-visualized airway for insertion. (P-2)
3-3.8 Demonstrate the sequence of steps involved in inserting an advanced non-visualized airway. (P-2)
3-3.9 Demonstrate the sequence involved in confirming placement of an advanced non-visualized airway by asucultating for lung and epigastric sounds.
3-3.10 Demonstrate proper technique in ventilating a patient, in respiratory arrest, with an advanced non-visualized airway and positive pressure ventilations. (P-2)
3-3.11 Analyzes the anatomical location of an advanced non-visualized airway after placement and evaluation of lung and epigastric sounds. (P-3)
3-3.12 Problem solves difficulties encountered due to improper placement of an advanced non-visualized airway. (P-3)

PREPARATION

Motivation: A patient without a patent (open) airway, is a dead patient.

Prerequisites: BLS, Preparatory and Patient Assessment.

MATERIALS

AV Equipment: Utilize various audio-visual materials relating to airway management. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the program. Materials should be edited to assure the objectives of the curriculum are met.

EMS Equipment: Pocket mask, bag-valve-mask, flow restricted, oxygen-powered ventilation device, oral airways, nasal airways, suction units, suction catheters, oxygen tank, regulator, nonrebreather mask, nasal cannula, tongue blade, lubricant, stethoscope and advanced non-visualized airway.

PERSONNEL

Primary Instructor: One EMT-Basic instructor knowledgeable in airway management.

Assistant Instructor: The instructor-to-student ratio should be 1:6 for psychomotor skill practice. Individuals used as assistant instructors should be knowledgeable in advanced airway techniques and management.

PRESENTATION

Declarative (What)

I. Advantages of an advanced non-visualized airway
   - A. Insertion does not require visualization of the vocal cords
   - B. Proper placement into either the esophagus or trachea for dual lumen airways
   - C. Increased tidal volume by decreasing dead space
   - D. Provides protection from aspiration

II. Indications for use of an advanced non-visualized airway
   - A. Cardiac arrest
   - B. Unresponsive patient with inadequate respirations and absent gag reflex

III. Select appropriate size advanced non-visualized airway (refer to manufacturers recommendation on indications and contraindications for use for specific airways)
IV. Contraindications for use of the advanced non-visualized airway
  A. Patient's height (refer to manufacturer's recommendations)
  B. Presence of an active gag reflex
  C. Caustic substance ingestion
  D. Known history of esophageal disease
  E. Others (refer to manufacturer's recommendations)
V. Insertion of an advanced non-visualized airway
  A. Adhere to manufacturer's recommendations and Standards and Procedures
VI. Ventilate the patient
  A. Confirm placement
  B. Preoxygenate for a minimum of 30 seconds following insertion
  C. Continue to ventilate while monitoring airway placement and vital signs

APPLICATION

Procedural (How)

1. Demonstrate how to prepare an advanced non-visualized airway prior to insertion.
2. Demonstrate how to insert an advanced non-visualized airway.
3. Demonstrate how to confirm placement, once an advanced non-visualized airway has been inserted.
4. Demonstrate how to ventilate a patient with an advanced non-visualized airway and positive pressure ventilations.

Contextual (When, Where, Why)

1. Every patient must have a patent airway to survive.
2. Once the airway has been opened, the EMT-Basic must determine if breathing is adequate.
3. Patients with inadequate breathing must be artificially ventilated using basic and advanced airway management skills.

STUDENT ACTIVITIES

Auditory (Hear)

1. The student should hear how to prepare an advanced non-visualized airway prior to insertion.
2. The student should hear how to coordinate basic airway management skills with the use of an advanced non-visualized airway.
3. The student should hear how to insert an advanced non-visualized airway.
4. The student should hear how to confirm placement, with a stethoscope, once an advanced non-visualized airway has been inserted.

5. The student should hear how to ventilate a patient with an advanced non-visualized airway and positive pressure.

Visual (See)

1. The student should see how to prepare an advanced non-visualized airway prior to insertion.
2. The student should see how to coordinate basic airway management skills with the use of an advanced non-visualized airway.
3. The student should see how to insert an advanced non-visualized airway.
4. The student should see how to confirm placement, once an advanced non-visualized airway has been inserted.
5. The student should see how to ventilate a patient with an advanced non-visualized airway and positive pressure.

Kinesthetic (Do)

1. The student should demonstrate how to prepare an advanced non-visualized airway prior to insertion.
2. The student should demonstrate how to combine basic airway management skills with the use of an advanced non-visualized airway.
3. The student should demonstrate how to insert an advanced non-visualized airway.
4. The student should demonstrate how to confirm placement, with a stethoscope, once an advanced non-visualized airway has been inserted.
5. The student should demonstrate how to ventilate a patient with an advanced non-visualized airway and positive pressure

INSTRUCTOR ACTIVITIES

1. Supervise student practice.
2. Reinforce student progress in cognitive, affective, and psychomotor domains.
3. Redirect students having difficulty with content (complete remediation forms).

EVALUATION

Written:	Develop evaluation instruments, e.g., quizzes, verbal reviews, handouts, and practice sessions to determine if the students have met the cognitive, affective and psychomotor objectives of this lesson.
Practical:	Evaluate the actions of the EMT-Basic students during role play, practice or other skill stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

REMEDIATION

Identify students or groups of students who are having difficulty with this subject content. Complete remediation sheet from the instructor's course guide.

ENRICHMENT

What is unique in the local area concerning this topic? Complete enrichment sheets from the instructor's course guide and attach with lesson plan.

MODULE 3

Basic and Advanced Airway Management

Lesson 3-4

Evaluation: Basic and Advanced Airway Management

OBJECTIVES

OBJECTIVES LEGEND

C=Cognitive P=Psychomotor A=Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:
Demonstrate knowledge of the cognitive objectives of Lesson 3-1 – 3-3.

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:
Demonstrate knowledge of the affective objectives of Lesson 3-1 – 3-3.

PSYCHOMOTOR OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:
Demonstrate proficiency in the psychomotor objectives of Lesson 3-1 – 3-3.

PREPARATION

Motivation: Evaluation of the student's attainment of the cognitive and affective knowledge and psychomotor skills is an essential component of the EMT-Basic educational process. The modules are presented in a "building block" format. Once the students have demonstrated their knowledge and proficiency, the next lesson should be built upon that knowledge. This evaluation will help to identify students or groups of students having difficulty with a particular area. This is an opportunity for the instructor to evaluate their performance, and make appropriate modifications to the delivery of material.

Prerequisites: Completion of Basic and Advanced Airway lessons.

MATERIALS

AV Equipment: Typically none required.

EMS Equipment: Equipment required to evaluate the student's proficiency in the psychomotor skills of this module.

PERSONNEL

Primary Instructor: One proctor for the written evaluation.

Assistant Instructor: One practical skills examiner for each 6 students.

PRESENTATION

Declarative (What)

I. Purpose of the evaluation
II. Items to be evaluated
III. Feedback from evaluation

APPLICATION

Procedural (How)

1. Written evaluation based on the cognitive and affective objectives of Lesson 3.
2. Practical evaluation stations based on the psychomotor objectives of Lesson 3.

Contextual (When, Where and Why)

1. The final lesson in this module is designed to bring closure to the module and to assure that students are prepared to move to the next module.
2. This modular evaluation is given to determine the effectiveness of the presentation of materials and how well students have retained the material.
3. This is an opportunity for the students to make necessary adjustments in study habits or for the instructor to adjust the manner in which material is presented.

INSTRUCTOR ACTIVITIES

1. Supervise student evaluation.
2. Reinforce student progress in cognitive, affective, and psychomotor domains.
3. Redirect students having difficulty with content (complete remediation forms).

REMEDIATION

Identify students and/or groups of students who are having difficulty with this subject content. Complete a remediation sheet from the instructor's course guide. If students continue to have difficulty demonstrating knowledge of the cognitive and affective objectives, or demonstrating proficiency in psychomotor skills, the students should be counseled, remediated and re-evaluated. If improvements in cognitive, affective or psychomotor skills are not achieved, consideration regarding the ability of the student to progress in the program should be taken into account.