Resources to Complete AED Certification

Unit: General Skills

Problem Area: Certifications

Lesson: Resources to Complete AED Certification

Student Learning Objectives.

Instruction in this lesson should result in students achieving the following objectives:

1. **Explain the components and use of an automated external defibrillator (AED).**
2. **Describe the hazards associated with the use of an AED.**
3. **Explain the importance of using an AED in conjunction with cardiopulmonary resuscitation (CPR).**

Resources.

The following resources may be useful in teaching this lesson:

"AED Challenge—Online AED Training," *AED Challenge*®. Accessed Dec. 31, 2008. <http://www.aedchallenge.com/>.

American Heart Association. Accessed Nov. 17, 2008. <http://www.americanheart.org/presenter.jhtml?identifier=1200000>.

Aronson, Susan, ed. *Pediatric First Aid for Caregivers and Teachers*. American Academy of Pediatrics, 2005.

"Circulation," *American Heart Association*. Accessed Dec. 21, 2008. <http://circ.ahajournals.org/content/vol112/24_suppl/>.

Eisenberg, Mickey. “Learn CPR: You Can Do It!” *University of Washington School of Medicine*. Accessed Dec. 20, 2008. <http://depts.washington.edu/learncpr/>.

Meeker-O’Connell, Ann. “How CPR Works,” *How Stuff Works*. Accessed Nov. 20, 2008. <http://health.howstuffworks.com/cpr.htm>.

Smith, Liz. “How to Use an AED,” *How to Do Things*. Accessed Oct. 31, 2008. <http://www.howtodothings.com/health-and-fitness/a3508-how-to-use-an-aed.html>.

Thygerson, Alton. *First Aid, CPR, and AED Standard*, 5th ed. Jones & Bartlett, 2006.

Equipment, Tools, Supplies, and Facilities.

- ✓ Classroom resource and reference materials
- ✓ Computers with printers and Internet access
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Overhead or PowerPoint projector
- ✓ Training automated external defibrillator
- ✓ Training manikin
- ✓ Visual(s) from accompanying master(s)

Key Terms.

The following terms are presented in this lesson (shown in bold italics):

- automated external defibrillator (AED)
- cardiac arrhythmia
- defibrillation
- electrocardiogram
- fibrillation
- normal sinus rhythm
- ventricular fibrillation
- ventricular tachycardia

Interest Approach.

Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situation. A possible approach is included here.

> *Give the students five minutes to write down the way in which to perform CPR. Collect their answers for review, and discuss any misconceptions. If possible, have a CPR instructor visit your class to demonstrate techniques and to discuss their importance in terms of saving lives. You may also show a short video from the Internet (e.g., www.youtube.com).*

SUMMARY OF CONTENT AND TEACHING STRATEGIES

Objective 1: Explain the components and use of an automated external defibrillator (AED).

Anticipated Problem: What are the components of an AED? When is an AED used?

I. An ***automated external defibrillator (AED)*** is a computerized device used to check a person's heart rhythm. It advises the rescuer if an electric shock is necessary to restore the heart to a normal sinus rhythm. An AED uses voice prompts, lights, and text messages to prompt the rescuer through the steps of defibrillation. All AED brands use the same steps. An AED is used when a victim is suffering from abnormal and potentially life-threatening cardiac arrhythmias.

A. AED components

1. AED manufacturers build the box-like device differently, so the component parts described may not be located in the same place for all brands.
2. Basic AED components:
   a. An electrical box
   b. Sticky patches with a cord
   c. A speaker for voice commands (housed within the AED)
   d. Cleaning wipes (optional)
   e. Directions (printed on the inside of the AED or in an instructional booklet)
3. Several colored buttons may be located on the AED.
   a. On button (power)
   b. Shock button (to deliver a shock)
   c. Display screen (voice/text commands)
4. ***Defibrillation*** is the stopping of the ***fibrillation*** (rapid, irregular, and unsynchronized contraction of the heart muscle fibers) of the heart to restore normal contractions, especially by the use of an electric shock.

B. Heart rhythms and AED use

1. ***Normal sinus rhythm*** is the regular cardiac rhythm measured by an AED's electrocardiogram to determine if a shock is necessary. An ***electrocardiogram*** is a test that measures the electrical activity of the heart. Electrodes are placed on the victim's skin to measure his or her heartbeat.

2. Irregular heart rhythms
    a. ***Cardiac arrhythmia*** is the disturbance of a normal heart rhythm. Arrhythmias may be regular, irregular, life-threatening, or non-life-threatening.
        (1) Accelerated rhythms (grouped as tachyarrhythmia) are characterized by atrial or ventricular rates that exceed normal sinus rhythm.
        (2) Slowed rhythms (grouped as bradyarrhythmia) are characterized by rates registering below normal sinus rhythm.
    b. ***Ventricular fibrillation*** (V-Fib or VF) is an abnormal and potentially life-threatening cardiac rhythm that occurs when no blood is pumped from the heart and all parts of the heartbeat are out of sync. V-Fib often occurs as a result of coronary artery disease as a heart attack. It must be treated as an extreme emergency and is fatal unless treated promptly.
    c. ***Ventricular tachycardia*** (V-Tach or VT) is another abnormal, potentially life-threatening arrhythmia that can lead to ventricular fibrillation. The victim almost always has palpitations (ventricles beat in an abnormal and fast, throbbing rhythm), and the application of an AED is often a treatment option.

C. AED training
1. Medical personnel and civilians may be trained to operate an AED. AEDs are very accurate and are easy to use. Training generally takes a few hours.
2. AEDs are used inside and outside of a hospital. Many PAD (public access to defibrillation) sites are available inside a medical setting or where people who are in danger of a heart attack live or work, such as nursing homes, public spaces (schools, shopping malls, restaurants, workplaces), and private spaces.
3. An AED has become the preferred device to properly deliver shocks of electricity to the heart, converting abnormal rhythms to normal sinus rhythms.

Use VM–A, VM–B, VM–C, and VM–D for illustration purposes and answer any student questions. Then use a game-show approach to review the terms introduced in this objective.

Objective 2: Describe the hazards associated with the use of an AED.

Anticipated Problem: What are the hazards associated with the use of an AED?

II. Hazards and techniques

A. Electrical risks
1. Wet or sweaty victim
    a. When a victim's chest is wet or sweaty, the electrical shock may travel through the water instead of through the chest.
    b. When a victim is lying in water, the shock may travel through the standing water.

c. It is essential to avoid placing patches near electrical devices, internal pacemakers, and medicine patches because of the possible electrical interference.

2. Ensuring victim and first responder safety is crucial.
   a. It is necessary to avoid touching the victim during the analyses of heart rhythm.
   b. It is necessary to avoid touching the victim during the delivery of a shock.
   c. It is necessary to continue CPR until advanced care or an AED arrives.
   d. First responders should heed any AED prompts (e.g., voice, text, or lights) to avoid contact with the victim.

B. Techniques
   1. Wet or sweaty victim
      a. It is essential to quickly dry the victim with a towel or cloth.
      b. The victim should be moved to a dry area, if possible.
   2. Electrical devices, internal pacemakers, and medicine patches
      a. Pads should be placed 1 inch from electrical devices and internal pacemakers.
      b. Medicine patches should be cleared to ensure contact between the AED and the victim's skin.
      c. A set of patches can be used to clear any excess chest hair by placing the extra set on the victim's chest and quickly ripping them off. (Prior to using a set of pads to remove excess chest hair, the first responder must ensure a duplicate set is available for use with the AED.)

Use VM–E to help students identify and avoid devices inside the chest when placing pads for contact during defibrillation.

Objective 3: Explain the importance of using an AED in conjunction with cardiopulmonary resuscitation (CPR).

Anticipated Problem: How is an AED used in conjunction with CPR?

III. AED and CPR

A. AEDs are simple and easy to use and are specifically designed to help deliver the best care possible to enhance the probability of victim survival.
   1. Current guidelines advise using an AED as soon as possible.
      a. It is essential to begin CPR and to continue until the AED indicates to stop CPR compressions.
      b. AEDs provide voice-command instructions in sequence, such as:
         (1) "Place pads directly onto victim's chest."
         (2) "Stop CPR."
         (3) "Analyzing heart rhythm."

(4) "Stay clear of the victim."
(5) "Shock advised."

c. AEDs are advanced enough to analyze and specify a particular shock for a particular abnormal rhythm or to advise no shock for certain victims.

B. CPR is a set of basic skills used to "buy time" until an AED or advanced care arrives. CPR compressions are continued until the AED instructs the first responder to stop.

C. Patches are advised once the first responder establishes that the victim is not breathing, is unresponsive, or has no pulse. To place patches, the first responder must:

1. Locate the victim in a safe and dry area, if possible.
2. Place patches on the upper right chest and on the left side below the armpit. Placement illustrations are commonly shown on the patch.
3. Patches must be in proper contact with the skin to ensure accurate analyses. First responders should follow the AED voice prompts to ensure proper contact.

Assign students to small groups. Give each group 10 minutes to use the Internet to search for instructions for administering CPR and AED and the differences for adults, children, and infants.

Review/Summary.

Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle.

Application.

Use the included visual masters and lab sheet to apply the information presented in the lesson.

Evaluation.

Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

Answers to Sample Test:

Part One: Matching

1. f
2. e
3. g
4. a
5. d
6. b
7. c

8. h

Part Two: Short Answer

1. Answers will vary but should include three of the following hazards and safety precautions to which rescuers must adhere before shocking a victim:
   a. When a victim's chest is wet or sweaty, the electrical shock may travel through the water instead of through the chest.
   b. When a victim is lying in water, the shock may travel through the standing water.
   c. Avoid placing patches near electrical devices, internal pacemakers, and medicine patches due to the possible electrical interference from the devices.
   d. Avoid touching the victim during the analyses of heart rhythm.
   e. Avoid touching the victim during the delivery of a shock.
   f. Continue CPR until advanced care or an AED arrives.
   g. First responders should heed any AED prompts (e.g., voice, text, or lights) to avoid contact with the victim.
2. Answers will vary but should include three of the following components in a typical AED:
   a. An electrical box
   b. Sticky patches with a cord
   c. A speaker for voice commands (housed within the AED)
   d. Cleaning wipes (optional)
   e. Directions (often printed on the inside of the AED or in an instructional booklet)
3. Answers will vary but should include three of the following voice commands AEDs provide rescuers:
   a. "Place pads directly onto victim's chest."
   b. "Stop CPR."
   c. "Analyzing heart rhythm."
   d. "Stay clear of the victim."
   e. "Shock advised."

Part Three: Completion

1. CPR (cardio pulmonary resuscitation)
2. decreases
3. analyzing, shocking
4. clear (or remove)
5. voice-command
6. Accelerated

Sample Test

Name _____

Resources to Complete AED Certification

Part One: Matching

Instructions: **Match the term with the correct definition.**

a. automated external defibrillator (AED)
b. cardiac arrhythmia
c. defibrillation
d. electrocardiogram
e. normal sinus rhythm
f. ventricular fibrillation
g. ventricular tachycardia
h. fibrillation

_____1. An abnormal and potentially life-threatening situation in which no blood is pumped from the heart and all parts of the heartbeat are out of sync

_____2. A regular heart rhythm

_____3. An abnormal and potentially life-threatening situation in which the victim almost always has palpitations

_____4. A computerized device used to analyze and shock a victim's heart into a normal rhythm

_____5. A test that measures the electrical activity of the heart

_____6. A disturbance of the normal heart rhythm

_____7. The process of restoring a victim's heart to normal contractions

_____8. A rapid, irregular, and unsynchronized contraction of the muscle fibers of the heart

Part Two: Short Answer

Instructions: **Answer the following.**

1. List three hazards and safety precautions to which rescuers must adhere before shocking a victim.

2. List three components of an AED.

3. List three voice commands AEDs provide to rescuers.

Part Three: Completion

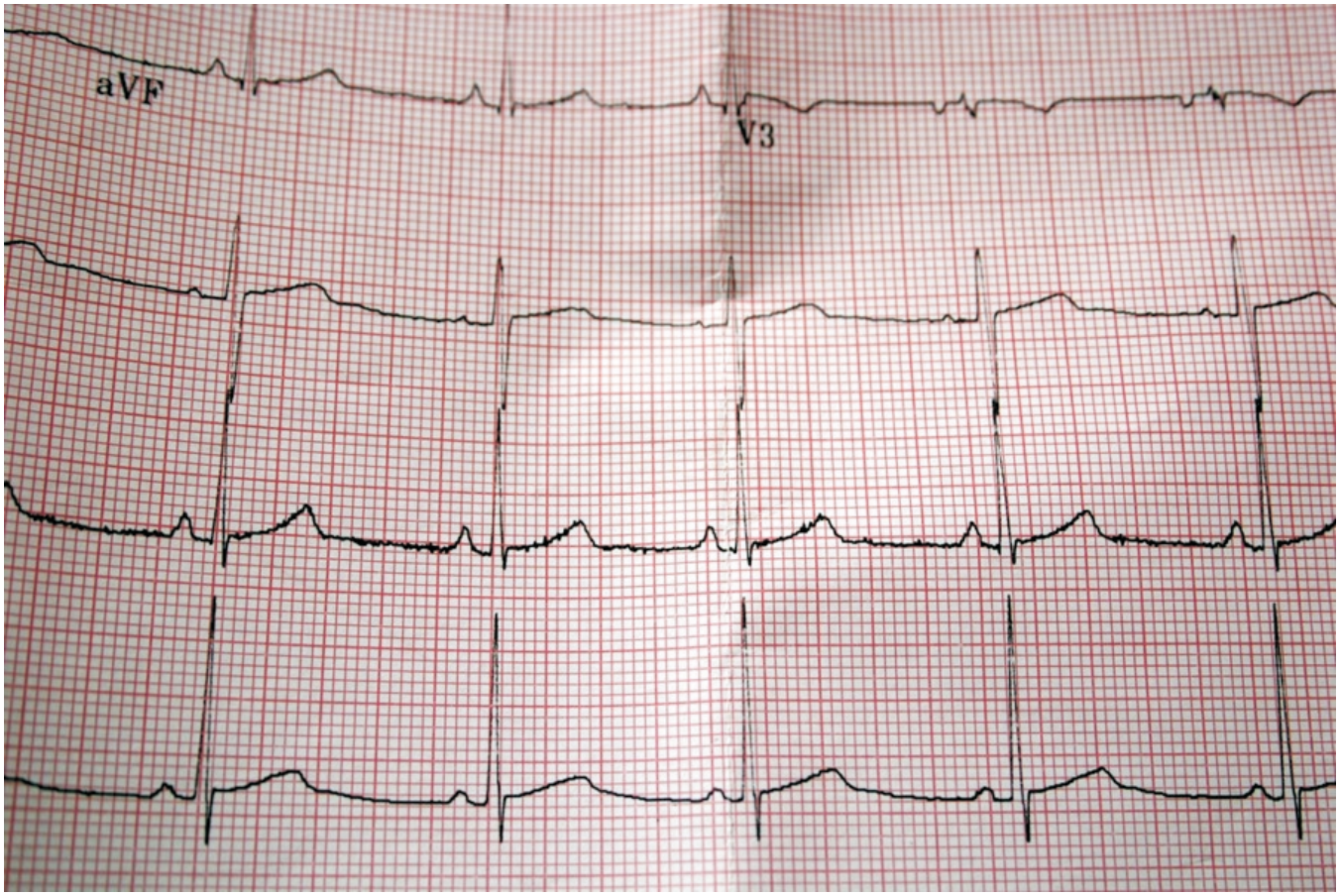
Instructions: **Provide the word or words to complete the following statements.**

1. An AED is used in conjunction with _____ to "buy time" until advanced medical care arrives.
2. Failing to utilize an AED during cardiac arrest _____ a victim's chances of survival.
3. Rescuers should not touch a victim when an AED is _____ the victim's heart rhythm or when _____ the victim.
4. To ensure contact between the AED and the victim's skin, rescuers should _____ any medicine patches.
5. AEDs provide _____ instructions in sequence.
6. _____ rhythms are characterized by atrial or ventricular rates that exceed normal sinus rhythm.

VM–A

ELECTROCARDIOGRAM EQUIPMENT

NORMAL ELECTROCARDIOGRAM (ECG OR EKG)



LIFE-THREATENING RHYTHM: ABNORMAL EKG

VM–D

PORTABLE DEFIBRILLATOR (AED)

VM–E

IMPLANTABLE CARDIOVERTER DEFIBRILLATOR WITH PACEMAKER

LS–A

Name _____

The Assistant Coach Is Down!

Purpose

The purpose of this activity is to become familiar with the use of an automated external defibrillator in conjunction with CPR.

Objectives

1. Recognize situations in which an AED should be utilized.
2. Diagnose an appropriate response to an emergency situation.
3. Practice the quick and safe use of an AED.

Materials

- pencil
- scratch paper
- computer with Internet access

Procedure

1. Watch your instructor demonstrate the use of an AED.
2. Work in pairs.
3. Practice using an AED in the following simulated situation: "The Assistant Coach Is Down." Diagnose the following situation:

   a. You are participating in the basketball practice free-throw shooting routine and notice that the assistant coach keeps stretching his arm during the practice session. After practice, you see the coach sitting on the bleachers looking very pale. A short while later, you notice he has fallen from the bleachers and is lying sideways on the ground.

b. You run to the coach's side and try to get a response. The coach is cold, clammy, and unresponsive. A teammate calls 911. List the CPR process steps you would initiate.

c. During CPR, a teammate brings an AED to the scene. What is the first step you would take when using an AED with an adult?

4. Describe the hazard and safety precautions you would take if it becomes necessary to shock the assistant coach.

5. Compare your team notes (from questions 2, 3, and 4) with the class to make sure all CPR steps and AED precautions were identified. You may also want to compare your notes with www.heartsavers-cpr.com/Comparison_CPR_AED_Steps.pdf for adults. If any precautions were missed, discuss them with your partner.

6. Turn in your team notes to your instructor.

The Assistant Coach Is Down!

Sample introduction to LS–A: Many AED models all function in a similar way—voice commands, text messages, lighted buttons, and quick and easy instructions. Every minute a victim goes without a shock from an AED, his or her chance of survival decreases by 10 percent. No matter the life-saving treatment—CPR or AED—something is better than nothing.

Sample Responses:

3. Appropriate responses to items 3a and 3b would be similar to the information found on www.heartsavers-cpr.com/Comparison_CPR_AED_Steps.pdf for adult victims.
4. Answers would include the following hazards and safety precautions to which rescuers must adhere before shocking a victim:
   a. When a victim's chest is wet or sweaty, the electrical shock may travel through the water instead of through the chest.
   b. When a victim is lying in water, the shock may travel through the standing water.
   c. Avoid placing patches near electrical devices, internal pacemakers, and medicine patches due to the possible electrical interference from the devices.
   d. Avoid touching the victim during the analyses of heart rhythm.
   e. Avoid touching the victim during the delivery of a shock.
   f. Continue CPR until advanced care or an AED arrives.
   g. First responders should heed any AED prompts (e.g., voice, text, or lights) to avoid contact with the victim.
5. Compare team response sheets to the information found on www.heartsavers-cpr.com/Comparison_CPR_AED_Steps.pdf.