What to Do When Every Minute Counts

High School Training Workbook

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Forward

What to Do When Every Minute Counts is a piece of the Health Core Curriculum endorsed by the Utah State Office of Education and Utah Department of Health EMS division. This workbook is designed for the development of skills to save lives until professional help arrives. The curriculum is a foundation for further education in health-related subjects.

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Module 1—Preventing Injuries and Emergency Illness

Healthy Lifestyles

Each year in the United States 700,000 people die of heart disease. Of these deaths 82 percent or 560,000 deaths per year-are caused by lack of exercise, poor diet, and tobacco use. If we apply the same calculations to other chronic diseases, over 1.6 million deaths in the United States could be avoided every year. These numbers can improve by following a healthy lifestyle. ("The Culprit and the Cure" by Steven G. Aldana) This would include:

- Getting regular physical exercise.
- Getting regular checkups.
- Eating a low-saturated, low-cholesterol and low-total-fat diet after age two.
- Eating a variety of foods to get enough carbohydrates, protein, and other nutrients.
- Not smoking or inhaling smoke from others.
- Maintaining appropriate weight for height and build.

Using Protective Equipment

Selecting the correct activity to promote fitness and prevent certain diseases is very important. Selection should be based on interest as well as physical ability and size. Even when you have chosen wisely, injuries and accidents can happen. Here are some steps to help stay safe while enjoying the benefits of physical activity:

- Use protective gear such as kneepads, goggles, wrist pads, shin guards, helmets, elbow pads, ankle supports, waist supports, shoulder pads, and proper footwear.
- Warm up five to ten minutes before beginning.
- Start off slowly, especially if you are new to the activity.
- Take time off for injuries.
- Remember that drugs won't speed up development. Alcohol and drugs will reduce performance and increase the risk of injury.

Safety Belts and Driving Safety

Motor vehicle accidents are the number one cause of death for adolescents. Unrestrained infants and children are especially vulnerable to injury from motor vehicle accidents.

- Infants up to about one year of age must be restrained in a rear-facing infant seat.
- Toddlers from one year to about four years should face forward in an approved car seat.
- Older children should use booster seats with a shoulder strap and lap belt.

Crime Prevention

Crime resulting in personal harm may be avoided by taking precautions to avoid dangerous situations. Such precautions include:

- Not walking alone late at night.

- Not allowing strangers in your car.
- Avoiding areas that are known to have a high crime rate.

For the health and safety of yourself and others, if you witness a crime you must consider several options. Desire for action may be increased with familiarity to the person or persons involved in the crime. Consider the consequences:

- First of all, does getting involved put you at risk?
- Another consideration is the degree of security of the crime. For example, are weapons involved?
- Also consider the number of people involved.

If the crime is dangerous, the best procedure may be staying in a safe place and calling the police or dialing 911.

The best action to decrease crime in your neighborhood may be organizing a neighborhood watch, or contacting your local government inquiring about crime prevention programs, and getting involved.

Accidents

As a bystander, you can take action that will make every difference in the outcome of an accident and the injuries sustained. Promptness, evaluation, and correct procedure are essential when supporting accident victims. This book is focused on educating students to take responsible action to safe lives and minimize injuries.

The Facts About Automobile Safety

According to the National Highway Traffic Safety Administration:

- Accidents are the leading cause of death for young adults ages 16 to 20.
- On our nation's highways, one teen dies in a traffic crash every hour on weekends and every two hours during the week.
- Seat belts prevent death in half of all accidents.
- When automobile collisions occur there are actually three collisions:
    1. Vehicle collision when the car collides with an object, such as another vehicle, a wall or a tree.
    2. Human collision when the occupant moves toward the point of impact until stopped by a barrier such as the steering wheel, dashboard or windshield.
    3. Internal collision when the brain and internal organs continue to move in the direction of travel, tearing connective tissues or being bruised by the collision with the skeleton, including the skull.
- Seat belts prevent the second and third collisions.
- In Utah, in 2004, unbelted occupants involved in crashes where a teenager was the driver were six times more likely to be killed than belted occupants.
- Teenage drivers in Utah represented only 7.7 percent of licensed drivers in 2004, yet they were involved in over one-quarter (27.6 percent) of all motor vehicle crashes.

For more information check out http://www.don't-drive-stupid.com.

High Visibility Enforcement

In Utah, law enforcement officers support the Zero Fatalities Campaign and have declared zero tolerance for unbuckled motorists. Statewide, officers issue citations when they observe a passenger or driver in a moving automobile not wearing his or her seat belt. Enforcement, accompanied by the high-visibility Click It or Ticket media effort, has helped to reduce traffic-related injuries and deaths. According to the Utah Department of Public Safety:

- Since Utah's participation in Click It or Ticket began in 1999, the state's safety belt use rate has increased more than 20 percent.
- There has been a 29 percent decrease in the number of people killed in crashes since 1995.
- Child restraint use has increased more than 16 percent since 1999.

Still, failure to buckle up contributes to more fatalities than any other traffic safety-related behavior.

Student Workbook –Module 1:

1. What are the six factors that contribute to a healthy lifestyle?

   1.
   2.
   3.
   4.
   5.
   6.

2. List four sports, their potential hazards, and safety equipment used to prevent injuries.

Sport	Hazard	Equipment
1.		
2.		
3.		
4.		

3. Consider the significance of deaths in the United States from heart disease. How many deaths result each year from poor lifestyles? _____

4. List five factors a person should keep in mind while enjoying physical activity:

   1.
   2.
   3.
   4.
   5.

5. During an automobile collision, what three collisions are actually occurring?

   1.
   2.
   3.

6. What are three results of the Click it or Ticket campaign?

1.

2.

3.

Suggested Follow-Up Activities

- Keep track of all the food you eat in one day. Total the calories. Evaluate the fat content. See (www.mypyramid.gov; and www.caloriesperhour.com)
- Select a current fad diet. Make a ten minute oral presentation on the pros and cons of the diet.
- Select an activity you participate in, and make a ten-minute oral presentation covering the following topics:

    1. How will this activity benefit you physically, mentally, and socially?
    2. What safety guidelines should be followed (e.g. activity, equipment, weather…)?
    3. What is the lifetime potential of the activity?
    4. Is the activity financially prohibitive?
    5. Why do you enjoy participating in the activity?

Oral Presentation Rubric

	4	3	2	1	Score
Content	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a partial understanding of the topic.	Does not seem to understand the topic very well.	
Presentation	Makes eye contact, uses a clear voice (appropriately audible), shows strong interest and enthusiasm about the topic, looks relaxed and confident.	Makes some eye contact, voice is audible, shows interest and enthusiasm about the topic.	Occasional eye contact, some mumbling, somewhat faked enthusiasm, and little or no expression.	No eye contact, reads notes the entire time, and seems uninterested.	
Visual Aid	Visual aid enhances presentation and all thoughts are clearly articulated.	Thoughts articulated clearly, but not engaging.	Adds nothing to presentation.	Poor, distracts audience and is hard to read.	
Preparedness	Student is completely prepared and has obviously rehearsed.	Student seems prepared but might have needed a couple more rehearsals.	The student is somewhat prepared, but it is clear that rehearsal was lacking.	Student does not seem at all prepared to present.	
Comprehension	Student is able to accurately answer almost all questions posed by classmates about the topic.	Student is able to accurately answer most questions posed by classmates about the topic.	Student is able to accurately answer a few questions posed by classmates about the topic.	Student is unable to accurately answer questions posed by classmates about the topic.	
Length of Presentation	Within 2 minutes of allotted time +/-	Within 4 minutes of allotted time +/-	Within 6 minutes of allotted time +/-	Too long or too short; 10 or more minutes above or below the allotted time	

Score:_____

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Module 2—Responding to Emergencies

Activating the EMS System

The first thing you need to do is evaluate the scene. Then decide whether there are other people available to help. See if anyone on the scene is qualified in emergency care procedures. Then most importantly, **call 911.**

When you call 911 and give the following information**:**

- Location
- Level of victims consciousness
- Number of people injured
- Number of vehicles involved
- Hazards on the scene
- Your phone number

The Good Samaritan Law

In the United States and Canada, there are laws protecting those who choose to aid others who are injured or ill. The law is intended to reduce bystanders' hesitation to assist for fear of being prosecuted for unintentional injury or wrongful death.

- In Germany, knowledge of first aid is a prerequisite for obtaining a driver's license. Neglect of duty to provide assistance is an offense; a citizen is obliged to provide first aid when necessary, and is immune from prosecution if assistance given in good faith turns out to be harmful.
- In France, the photographers at the scene of Princess Diana's fatal car accident were investigated for violation of the French Good Samaritan law because they did not come to her aid.
- In the United States, the laws protect any person from legal liability who gives assistance in good faith to save a life within the rescuer's scope of training.

Rescuer Protection

You, the rescuer, must take steps to protect your own safety and health when providing help to those in need of first aid. There are two important things to consider when approaching a victim:

Survey the scene for hazards.

- **Electrical hazards:** Do not attempt to move downed power lines. Notify the power department. Turn off household current at the main breaker.
- **Fire or threat of fire:** Move patient to safety before administering first aid.
- **Smell of natural gas/noxious fumes:** Move patient to safety before administering first aid.
- **Traffic:** Have someone direct traffic away from the site.
- **Structural failure:** Move patient to safety before administering first aid.
- **Call 911.**

Be aware of the possibility of disease transmission.

- Diseases can be transmitted from the victim to the rescuer through contact with the victim's blood and/or body fluids.
- Disease transmission can occur if you touch or come in contact with a patient who is bleeding; has vomited, urinated, defecated; or displays loss of other body fluids.
- Using protective barriers is the most effective way to protect the first responder from contamination. These protective barriers include rubber gloves and face shields. It is recommended that rubber gloves and face shields be a part of your first aid kit.

Patient Evaluation

As you study this book, reference will be made to signs and symptoms; therefore, a definition of their meaning is in order.

Sign: What the rescuer sees, hears or feels.
Example: a pale face, no breathing, cold skin

Symptom: How the victim feels.
Example: nauseous, back pain, lack of feeling or sensation in the extremities

In a rescuer triage, view the circumstances, prioritizes multiple victims from critical to minor injuries, and provides immediate treatment.

Suggestions to prioritize injuries include:

Highest Priority

- Airway, breathing and circulation difficulties
- Uncontrolled or severe bleeding
- Open chest or abdominal wounds
- Severe head injuries
- Severe medical problems: poisonings, diabetes with complications
- Symptoms of shock
- Cardiac arrest

Secondary Priority

- Burns without complications
- Major or multiple fractures
- Back injuries with or without spinal damage

Lowest Priority

- Minor fractures or other injuries of a minor nature
- Obviously dead

Evaluation of the Injured

Pulse (Heartbeat)

1. The pulse is a pressure wave generated when the heart beats and blood is carried through the arteries.
2. The normal pulse rate for an adult is **60 to 80** beats per minute. A normal rate for a child is **80 to 100** beats per minute.
3. The pulse may be taken at any point on the body where an artery passes over a bony prominence or lies near the surface of the skin. The most common places to feel a pulse are:
   - **Carotid Artery** (between the Adam's apple and neck muscle)
   - **Brachial Artery**(center of inside of upper arm)
   - **Radial Artery** (at the palm side of the wrist at the base of the thumb)
   - **Femoral Artery** (inside upper leg)

Capillary Refill

1. Pressing the fingernails or toenails will cause the nail beds to blanch white.
2. The pink color should promptly return to the nail beds when pressure is released.
3. The return of the pink color to the nail beds indicates that the heart is pumping blood to that extremity (hand or foot).
4. If the pink color does not return to the nail beds, this means the blood is not circulating in the extremity.
5. When there is no capillary refill, immediate emergency care is necessary.

Temperature

1. Normal body temperature is 98.6 degrees.
2. In emergency care, temperature is estimated by using the back of your hand to feel the patient's skin.
3. The skin helps regulate the body temperature by radiating body heat and the evaporation of water (sweating).

Skin Color

1. Skin color is a useful sign to indicate whether a person's heart is delivering oxygenated blood to the skin.
2. The skin color of an accident victim can be:
   - **White, pale** or **gray.**
   - **Red** or **flushed.**
   - **Blue** (for people with dark pigmentation, the blue may be noted in the fingernail beds, under the tongue or in the palm of the hands).

Pupils of the Eyes

1. The pupils of the eyes are normally equal in size and constrict when exposed to light.
2. The pupils of an accident victim can be:
   - **Dilated** (large)
   - **Constricted** (small)
   - **Unequal** (different sizes)
   - **Fixed** (will not change when stimulated with light)

State of Consciousness

- **A** – Alert: The normal person is alert, knows what is going on, and responds to vocal or physical stimulation.
- **V –** Verbal: The victim can talk and answer back.
- **P** – Pain: The victim only responds to painful stimuli.
- **U –** Unresponsive: The victim does not respond to stimuli.

Inability to Move on Command (an Indicator of Paralysis)

1. The normal conscious person can move their body when requested to do so.
2. A paralyzed person will not be able to move a leg, an arm or both arms and legs, one side of body or the whole body.

Medical Identification

1. Individuals with hidden medical problems carry cards or wear jewelry.

Important Numbers

Fill in the chart below and keep it readily available for quick reference.

In life threatening emergencies, **always Call 911 immediately.**

Poison Control	
Doctor	
Neighbor	
Nearest Relative	
Veterinarian	

Student Workbook –Module 2

1. As a responder, what information should you prepare to give the dispatcher when you call 911?

   1.
   2.
   3.
   4.
   5.

2. What is the Good Samaritan law?

3. What safety precautions should be taken by the rescuer at the scene?

   1.
   2.
   3.
   4.
   5.
   6.

4. At the scene, a victim tells you he/she has a bad headache. There is a laceration over his/her right eye. Blood is coming from the nose, and the victim is nauseated.

   List the signs: 1._____
   2._____

   List the symptoms: 1._____
   2._____

5. The AVPU scale measures the victim's *level of consciousness.* What does this acronym stand for, and how is it assessed?

Situation	Assessment
A. _____	_____
V. _____	_____
P. _____	_____
U. _____	_____

6. Highest priority situations require immediate transportation to a hospital. What are examples of these conditions?

   1.
   2.
   3.
   4.
   5.
   6.

7. Explain how the following signs are evaluated:

   1. Pulse _____
   2. Capillary refill_____
   3. Body temperature_____
   4. Skin color_____
   5. Pupils of eyes_____

8. Find and count a pulse at each of the following pulse sites:
   - **Carotid artery** (between the Adam's apple and neck muscle)
   - **Brachial artery**(center of inside of upper arm)
   - **Radial artery** (at the palm side of the wrist at the base of the thumb)

Student Project

The Responsibility of an Educated First Responder During an Emergency Situation

A Persuasive Writing

Objective: Students will evaluate personal responsibility to an individual in a critical emergency situation. They will discuss the benefits of being responsible for peers and family members, as well as unknown persons. The writer will construct a sound argument that influences the readers thinking, and at times changes his or her mind about being prepared to take prompt action as a first responder.

Six Traits of Writing Rubric

	4	3	2	1	Score
Ideas	Paper is clear and focused. It holds the reader's attention. Relevant details enrich the story line or central theme.	The writer is beginning to define the topic, even though development is still basic or general.	The paper has no clear sense of purpose or central theme. The reader must make inferences based on sketchy detail.	The paper has no sense of purpose or central theme. The reader is unable to extract any actual meaning from the text.	
Organization	The order, structure or presentation of information is compelling and moves the reader through the text.	Organization is strong enough to move the reader through the text without confusion.	Writing lacks a clear sense of direction. Ideas, details or events are strung together in a loose or random fashion.	Writing has no sense of direction so the reader is often confused.	
Voice	Writer speaks to the reader in a way that is individualistic, expressive and engaging.	Writer seems sincere but not fully engaged or involved. The result is pleasant and reasonable, but not compelling.	Writer attempts sincerity but is still somewhat distanced from the topic and/or the audience.	Writer is flat, dull, tentative or inconsistent with the topic. The writing is lifeless and mechanical.	
Word Choice	Words convey the intended message in a precise, interesting and natural way.	Language is functional, even if it lacks flair. It is easy to figure out the writer's meaning on a general level.	Writer struggles with a limited vocabulary, searching for words to convey meaning.	Writer uses a very limited vocabulary and makes no attempt to find words to convey meaning.	
Sentence Style	The text has an easy flow and rhythm making the piece a delight to read.	The text tends to be more businesslike than musical, more mechanical than fluid.	The reader has to read the paper several times in order to give it an interpretive reading.	The reader is able to interpret very little of the meaning of the paper.	
Accuracy (spelling, usage, punctuation, grammar…)	Errors are minimal so that the reader can easily overlook them unless hunting for them.	Conventions are sometimes handled well and enhance readability. At other times, errors are distracting.	Frequent errors repeatedly distract the reader and make the text difficult to read.	There are so many errors that the reader can get little meaning from the text.	

Score:_____

Power Point Review Questions:

1._____ 2._____ 3._____ 4._____ 5._____

Module 3—Airway and Breathing Problems

The Respiratory System

Breathing is controlled by the brain. Although you can hold your breath or breathe more quickly or more deeply, you cannot maintain these conditions indefinitely. The brain monitors the level of oxygen and carbon dioxide in the blood, and when these gases get out of balance in the blood stream, the brain takes over and attempts to restore normal breathing.

Respiration (Breathing)

A person who is not breathing or who is having difficulty breathing requires immediate care. All living cells of the body require oxygen to survive. Oxygen is particularly important for cells in the brain and nervous system. Without oxygen, the brain cells will die in **four to six minutes**. If enough brain cells die, the victim may live but will be in a vegetative state and unable to think, reason or move.

The respiratory system provides the means by which oxygen is delivered to the cells of the body and by which carbon dioxide is removed.

The airway is the passageway which extends from the nose and mouth into the lungs. This passageway permits air containing oxygen to be moved into the lungs and air containing carbon dioxide to be moved out of the lungs.

Respiratory Facts

1. The normal breathing rate for adults can vary greatly.
   - Infant – 25 to 50 breaths per minute
   - Child – 15 to 30 breaths per minute
   - Adult – 12 and 20 breaths per minute
2. Respirations may be heard or felt at the nose or mouth, and the chest can be seen rising and falling.
3. Respiration of an accident victim can be:
   - **Absent**
   - **Slow or fast**
   - **Shallow or deep**
   - **Gasping, labored or choking**

Abnormal Breathing

You may encounter apnea (lack of breathing) or poor breathing (breathing that is too slow, shallow or irregular) in accident victims or people who have a particular medical condition. It is important to restore breathing (artificial respiration) to them as soon as possible.

You may expect to see the following signs:

- The movement of air at the nose or mouth cannot be heard or felt.
- The victim may be struggling to breathe, and the muscles on the front of the neck may stand out prominently.
- The breathing may be noisy and have a bubbling sound.

- The breathing may be slow.
- The victim may be cyanotic. Cyanosis is a grayish-blue discoloration of the skin and membranes around the lips, ears, nail beds, and sometimes the whole body. For people with dark pigmentation, the nail beds, the palms of the hands, or the inside of the mouth may be the only reliable indicator of the presence or absence of cyanosis.
- Lack of breathing sounds – listen carefully at the mouth.
- Absence of chest rising and falling. Watch carefully to see whether breathing is shallow or deep.
- Absence of movement, coughing, and talking.

Inadequate Breathing or Absence of Breathing

You may need to give artificial respirations when the person is breathing but breathing *inadequately*. Inadequate breathing means shallow breathing (sometimes very rapid) or breathing at a much-slower-than-normal rate.

Begin artificial respiration immediately.

1. When a person is unconscious, muscles relax, and the tongue can fall back into the throat, which obstructs the airway.

2. Open the airway by using the *head tilt-chin lift*:
   - Place one hand on the patient's forehead.
   - Apply gentle pressure to tilt the head back.
   - With your other hand, lift on the bony part of the chin.

3. If breathing does not begin, pinch off the nose and gently blow air into the patient's mouth. Seal your mouth over the patient's mouth and blow evenly until the chest rises.

4. If the patient is an infant or small child, seal your mouth over the nose and mouth.

5. If rescue breaths do not make the chest rise, reposition the head and try again.

Caution: If the accident involved a fall or traumatic injury to the head or neck or if there is a possibility of a spinal injury, you should still use the head tilt-chin lift technique to open the airway. When performing the head tilt-chin lift, do so carefully. Do not to move the head around too much. Another technique for opening the airway of an injured victim that is being taught to professional rescuers is the jaw thrust maneuver. It requires a great deal of practice to do a jaw thrust correctly. Only trained professional EMS personnel should use the jaw thrust.

Continue to assess the air exchange. You should blow enough air into the patient's lungs so that you see the chest rise. For an infant or small child, breathe for him or her about once every three seconds. For older children and adults, breathe every five seconds. To calm yourself and help with your timing, count out loud.

Infants and small children	Once every 3 seconds
Older children and adults	Once every 5 seconds

Choking Victims

Conscious victim-Adult or Child:

Give artificial respiration at the same rate whether the victim is not breathing or breathing inadequately.

If the conscious victim appears to be choking and cannot cough, speak, or breathe, the procedure is as follows:

1. Ask, "Are you choking?"
2. If the victim nods “yes,” ask, “May I help you?"
3. If the victim gives consent, position yourself slightly behind the victim and give five back blows with the heel of the hand.
4. Step behind the victim, place your arms under his or her arms, and encircle the waist.
5. Double one hand into a fist with the thumb side up.
6. Place the thumb side of the fist against the victim's abdomen just above the navel.
7. Grasp your fist with your free hand and press into the victim's abdomen with a quick upward thrust toward the diaphragm.
8. Repeat the back blows and or the abdominal thrusts several times until the object is dislodged or the victim can breathe on his/her own.

For children, follow the same procedure as above. It may be necessary to kneel behind the child, depending on his/her size. The force of the back blows and the abdominal thrusts should be less forceful than those used on an adult.

Conscious Victim-Infant:

If the baby appears to be choking and cannot cough, cry, or breathe, the procedure is:

1. Position the infant face down on your forearm and hold the head with your hand.
2. Support your arm on your thigh.
3. Give five back blows with the heel of your hand.
4. Hold the infant between both your forearms, then turn the infant face up.
5. Give five chest thrusts in the center of the chest using two fingers
6. Continue giving five back blows and five chest thrusts until the object comes out or the infant begins to breath.

Unconscious Victim-Adult or Child:

Perform initial assessment used for CPR.

1. Tap the victim and ask: “Are you OK?”
2. Call 911.
3. Open the airway.
4. Look, listen, and feel for breathing.
5. Give two breaths.
6. If the first breath does not go in, reposition the head and try again.
7. If rescue breath does not make the chest rise, give five chest thrusts.
8. Look inside the victim’s mouth, if you see an object, remove it.
9. Then, give two breaths. If breaths do not make the chest rise, repeat steps 7 and 8.

Unconscious victim-Infant:

Perform initial assessment used for CPR.

1. Clap your hands or tickle the feet.
2. Open the airway.
3. Look, listen, and feel for breathing.
4. Give two breaths.
5. If the rescue breath does not go in, reposition the head and try again.
6. If the rescue breath does not make the chest rise, give five chest thrusts using two fingers.
7. If you can see the object, do a finger sweep with your little finger, then give two breaths.
8. If you do not see an object, repeat the five chest compressions.
9. Continue steps 6 and 7 until you get the object out or the infant starts breathing on its own.

Student Workbook—Module 3

1. What are the four most common causes of airway obstruction?

1.
2.
3.
4.

2. How long can the brain go without oxygen before cells begin to die? _____

3. List the seven-step procedure for aiding a choking conscious adult.

1.
2.
3.
4.
5.
6.
7.

4. Fill in the following table with normal respirations for the age groups listed.

Age	Normal Breathing Rates
Infants (<1 year old)	___per minute or 1 breath every ___ sec.
Children (1-12 years old)	___per minute or 1 breath every____ sec.
Adults (>12 years old)	____per minute or 1 breath every ___ sec.

5. What is *cyanosis*?

6. Why should you ask a conscious victim who appears to be choking if you can help?

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Module 4—Circulatory Problems

The circulatory system consists of the heart and a series of vessels that carry blood throughout the body. The vessels include:

Arteries carry blood rich in oxygen and other materials away from the heart to the body cells.

Veins carry blood loaded with carbon dioxide and other waste products from the body cells.

Capillaries are tiny vessels which connect arteries and veins, as well as exchange oxygen and waste products at the cellular level.

Risks Factors for Coronary Artery Disease:

- Heredity
- Diet, high cholesterol and obesity
- Physical inactivity
- Age
- Smoking
- High blood pressure
- Gender

Cardiovascular Problems

Angina Pectoris

Angina is a narrowing of an artery which diminishes the blood supply to the heart. It is usually brought on by stress, overexertion, exercise, or a large meal. The heart needs more oxygen than is available.

The victim suffers pain in the chest, arms, or sometimes the neck. It is usually not as severe as the pain of a heart attack.

Victims are usually aware of their condition and have been given medication (nitroglycerine) by their physician to relieve the pain. (Nitroglycerine temporarily dilates the blood vessels, which increases the flow of blood to the heart.) Angina pain is usually relieved by rest, and lasts three to eight minutes and rarely longer than ten minutes.

High Blood Pressure (Hypertension)

High blood pressure occurs when a person has blood pressure that is significantly higher than normal. Over time, it can cause damage to the heart, arteries, and other vital organs. About one in five Americans has high blood pressure. Of those people, about one-third to one-half do not even know they have hypertension. Teens can have high blood pressure, which may be caused by genetic factors, excess body weight, poor diet, lack of exercise, and diseases such as heart disease or kidney disease.

Rheumatic Heart Disease

Children and teens with a strep throat may contract rheumatic fever. This type of infection can cause permanent heart problems in children five to 15 years of age. Rheumatic fever can cause the opening through

the valve to become so narrow that blood can flow through only with difficulty. Blood cannot flow freely through this section, making each heartbeat less effective.

Coronary Artery Disease

Atherosclerosis is a slow, progressive disease that results in the narrowing of the coronary arteries (blood vessels of the heart) and usually occurs in adults. When the artery walls become narrowed or occluded, the blood flow to the heart muscle is reduced, which can lead to eventual death of the heart muscle.

Risk factors for coronary artery disease include:

- Heredity
- Diet, high cholesterol, and obesity
- Physical inactivity and lack of exercise
- Age
- Gender
- Smoking
- High blood pressure

Heart Attack (Myocardial Infarction)

The heart is a muscle, and, like all muscles in the body, is supplied with oxygen and nutrients through the circulatory system. Arteriosclerosis is a disease process that can damage coronary arteries. It lays down deposits of fat which progressively narrows the arteries. When an artery becomes blocked, the part of the muscle which it serves dies, and the victim has a heart attack. The heart will still continue to pump even though part of the muscle dies. However, the attack usually occurs in the left ventricle, which may be unable to pump or move all blood coming from the lungs. Fluid may accumulate in the lungs. This is a condition known as pulmonary edema. If too much heart muscle dies, shock and death will result.

A heart attack victim usually has severe pain, which is described as a crushing pressure beneath the sternum. It may travel from the left arm to the neck, to the left side of the chest, to the abdomen, or to the back.

Heart attack victims may also experience:

- Apprehension.
- Sweating.
- Shortness of breath.
- Pale, cool, and clammy skin.
- Nausea or vomiting .

Treatment for Cardiovascular Disease

- Call 911.
- Place the victim in a sitting position, leaning forward. The victim will be able to breathe more easily in this position.
- Do not allow the victim to move. Absolute rest is mandatory.
- Comfort and reassure the victim.
- Loosen the victim's clothing and make him or her comfortable.

Signs of Cardiac Arrest

A cardiac arrest victim will not be breathing and will have no carotid pulse.

Cardiopulmonary Resuscitation (CPR)

Steps for Adult CPR:

- Check area for safety; determine if victim or rescuer is in immediate danger.
- Check for response by saying, "Are you okay?"
- **Call 911.**
- Open airway by using head tilt-chin lift method.
- Check for signs of life: look, listen, and feel.
- If not breathing, pinch the nose and give two rescue breaths. If the chest does not rise and fall, reposition head and try again.
- Recheck for signs of life.
- Begin CPR: 30 compressions to 2 breaths.
- Repeat CPR for 2 minutes (5 cycles) and check for signs of life.
- Continue until help arrives.

Steps for Infant CPR:

- Check for response by gently clapping hands and tickling feet.
- Open airway using head tilt-chin lift technique. Be careful not to tilt the head too far back.
- Check for signs of life for 10 seconds.
- If not breathing, cover infants nose and mouth and give two rescue breaths. If the chest does not rise and fall, reposition head and try again.
- Begin CPR: 30 compressions to two breaths.
- Repeat CPR for two minutes (five cycles) and check for signs of life.
- **Call 911.**

Survival Rates for Quick Response

Don't Delay-Every Minute Counts!	Chance of Survival
One minute	98 out of 100
Two minutes	92 out of 100
Three minutes	72 out of 100
Four minutes	50 out of 100
Five minutes	25 out of 100
Six minutes	11 out of 100
Seven minutes	8 out of 100
Eight minutes	5 out of 100
Nine minutes	2 out of 100
Ten minutes	1 out of 100
Eleven minutes	1 out of 1000
Twelve minutes	1 out of 10,000

Summary of Lay Rescuer CPR for Adults, Children, and Infants

Step/Action	Adult: > 8 years	Child: 1-8 years	Infant: < 1 year
Airway	Head tilt-chin lift	Head tilt-chin lift	Head tilt-chin lift
Breathing	Two breaths	Two breaths	Two breaths
Circulation (Compressions)	In the center of the chest, *between* the nipples	In the center of the chest, *between* the nipples	In the center of the chest, *just below* the nipples
Compression Method	Two hands	One or two hands	Two fingers
Compression Depth	1½ to 2 inches	About ⅓ to ½ the depth of the chest	About ⅓ to ½ the depth of the chest
Compression Rate	About 100/min.	About 100/min.	About 100/min.
Compression-Ventilation Ratio	30:2	30:2	30:2
Defibrillation	Follow the prompts on the AED with the appropriate-size pads.		

The Good Samaritan Act

A victim of cardiac arrest quite often is a stranger and very often dies. The first responder may worry about a lawsuit being filed. Today all 50 states have Good Samaritan laws, and no person has ever been successfully sued for performing CPR. The laws grant limited immunity when any person tries to give CPR in an honest, "good faith" effort to save a life. This law applies to use of an AED as well. The guidelines which protect a Good Samaritan are:

- The rescuer is trying to help.
- The actions are reasonable.
- There is no compensation given.

AED-Automated External Defibrillators

During cardiac arrest, the chaotic beating of the heart (fibrillation) can be restored to normal rhythm if treated early with an electric shock. Electric shock is given by using an AED (Automated External Defibrillator). The shock paralyzes the heart, which may then begin normal rhythm. If the AED is activated within three minutes, the victim's chance of survival increases dramatically. The AED gives verbal prompts to rescuers that are easily followed.

Extreme caution must be used to avoid shocking rescuer or by standers.

Guidelines for use of an AED:

- Call 911.
- Turn on AED.
- Apply pads to the patient's bare and dry chest.
- Place one pad on the patient's upper right chest and the other pad on the patient's lower left side.
- Plug the electrode cable into the AED.
- Follow prompts.
- Let the AED analyze the patient's heart rhythm.
- Deliver a shock, or perform CPR if prompted.
- If prompted to shock, make sure no one is touching the victim. Loudly say, "Everyone stand clear."
- Deliver shock by pushing the shock button when indicated by the AED.
- From here on, follow the prompts of the AED to analyze, shock, or perform CPR.

Student Workbook—Module 4

1. Calculate how many times the average heart beats:

Per minute _____

Per day _____

Per year _____

Over 70 years _____

2. Identify three cardiac problems, the cause or condition, and a statistic for each.

Condition	Cause	Statistical Information

3. Place the CPR steps in order. Place #1 by the first step, etc..

1. _____ After delivery of two rescue breaths, immediately begin chest compressions. Place one hand in the center of the chest and your other hand on top of the first. Compress the chest about two inches and relax, letting the chest rise again.
2. _____ Use the head tilt-chin lift to open the airway.
3. _____ Check the victim for unresponsiveness by shouting at the victim; if he or she does not respond to your shout, apply a painful stimulus like squeezing a pen or pencil against the base of his or her fingernail. If there is no response to the painful stimulus, **call 911**.
4. _____ Check for breathing for 5-10 seconds. If the victim is not breathing, take a breath, pinch his or her nose, cover his or her mouth with yours, and blow until you see the chest rise
5. _____ If the victim's chest does not rise when the first rescue breath is delivered, reposition the victim's head by doing the head tilt-chin lift again and give a second breath.
6. _____ Continue with cycles of two breaths and 30 compressions until help arrives. Check for signs of life every two minutes.

4. What are factors for coronary artery disease that can be controlled?

1.
2.
3.

5. Describe the cause, symptoms and treatment for *Angina Pectoris.*

Cause: _____

Symptoms: _____

_____

Treatment: _____

6. What are two definite signs of cardiac arrest?

1.
2.

7. What is fibrillation?

8. Ideally, how quickly should the AED be activated?

_____

9. Where should the AED pads be placed?

_____

10. If the AED prompts the rescuer to shock, what is the most important safety factor:

_____

Activity: Designing a Poster

Your assignment is to prepare a poster illustrating how the heart functions and/or prevention of heart diseases. Your audience is a group of high school students.

Poster Rubric

	4	3	2	1	Score
Attractiveness	The poster is exceptionally attractive in terms of design, layout, and neatness.	The poster is attractive in terms of design, layout and neatness.	The poster is acceptably attractive, though it may be a bit messy.	The poster is distractingly messy or very poorly designed. It is not attractive.	
Graphics – Originality and Relevance	Several of the graphics used reflect an exceptional degree of student creativity and are related to the topic, making it easier to understand.	One or two of the graphics used reflect student creativity an are related to the topic, making most of it easier to understand.	The graphics are made by the student, but do not relate to the topic.	No graphics made by the student are included.	
Content	At least seven accurate facts are displayed on the poster.	Five or six accurate facts are displayed on the poster.	Three or four accurate facts are displayed on the poster.	Less than three accurate facts are displayed on the poster.	
Required Elements	The poster includes all required elements as well as additional information.	All required elements are included on the poster.	All but one of the required elements are included on the poster.	Several required elements are missing.	
Mechanics	Capitalization and punctuation are correct throughout the poster.	There is one error in capitalization or punctuation.	There are two errors in capitalization or punctuation.	There are more than two errors in capitalization or punctuation.	

Score: _____

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

6._____ 7._____ 8._____ 9._____ 10._____

Module 5—Bleeding

Each time the heart pumps, a pulse can be felt throughout the arterial system. The pulse can most easily be felt where a large artery is close to the skin surface. The four main pulse sites are:

- the brachial artery inside the upper arm-- An infant's pulse is always taken here
- The carotid artery (neck).
- The radial artery (wrist).
- The femoral artery (inside upper leg).

Blood is a red, sticky fluid that travels through the circulatory system. A normal adult has six liters of blood. Blood carries oxygen to body tissues and removes waste products. It carries cells that combat infection in the body. It has the capability of clotting, which normally takes six to seven minutes.

The term *perfusion* means the circulation of blood within an organ. Perfusion keeps the body cells healthy by providing them with oxygen and other nutrients and by removing waste products.

Bleeding Interventions

Remember exposure to blood or other body fluids may expose you to infections such as Hepatitis B and C and HIV. Whenever possible put on a pair of disposable gloves and wash your hands thoroughly before and after touching the person.

External Bleeding

The loss of one liter of blood in an adult is serious. The loss of one-half liter of blood in a child is serious.

The body has a natural mechanism of defense against bleeding called clotting. If blood vessel damage is severe, however, clots cannot stop the damaged blood vessels from bleeding. If uncontrolled, bleeding can result in shock followed by death.

Three types of bleeding are as follows:

- **Arterial bleeding:** Blood coming from an artery spurts and is bright red in color. It is bright red because it is rich in oxygen.
- **Venous bleeding:** Blood coming from veins flows steadily and is dark bluish-red in color. It is this color because it is rich in carbon dioxide.
- **Capillary bleeding:** Blood coming from capillaries oozes and is similar in color to venous blood.

Treatment for Bleeding:

- Use protective gloves.
- Place a gauze pad or other clean cloth over the wound.
- Apply direct pressure to the wound.
- If bleeding does not stop, apply additional pressure over the bandage with additional dressings.
- Elevate the wounded body part.
- Use pressure points.
- Treat for shock.
- Call 911.

Simple Nosebleeds

- Have the person sit down and loosen any tight clothing around the neck.
- Have the person lean forward and pinch his or her nostrils just below the bony part of the nose. Keep pinching for at least ten minutes continuously.
- Put a cool compress over the victim's nose, neck, and forehead.
- If bleeding is still uncontrolled, seek medical help.

Internal Bleeding

Internal bleeding can result in severe blood loss, and the victim may die of shock. As an example, a fractured shaft of the femur can result in an internal loss of one liter of blood. Lacerations of the liver can result in severe blood loss and be quickly fatal.

The signs of internal bleeding are similar to those of shock. In addition, the victim may have a tender abdomen that enlarges. The victim suffering from severe internal bleeding is a serious case, and the rescuer can do very little for the victim at the accident scene.

Fast transportation to a hospital is a must. **Call 911.**

Student Workbook— Module 5

1. Keeping the body cells healthy by providing them with oxygen and other nutrients and removing waste products is called:

_____

2. What infections can be avoided by using protective gloves?

1.
2.

3. What are the steps to control bleeding?

1.
2.
3.
4.
5.
6.
7.
8.

4. What is the treatment for a simple nosebleed?

1.
2.
3.
4.

5. What is the treatment for internal bleeding?

1.
2.

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Module 6—Shock

Cardiovascular Shock

Cardiovascular shock can be an unseen enemy. This condition robs organs, tissue, and cells of needed oxygen as well as nutrients necessary for survival. Being aware of the problem and knowing how to recognize and treat it can greatly enhance the patient's chances of survival.

Shock is caused by:

- Failure of the heart to pump sufficient blood.
- Severe blood or fluid loss, so that there is insufficient blood traveling through the system.
- Enlargement of blood vessels, so that there is insufficient blood to fill them.
- Breathing problems resulting in insufficient oxygen traveling through the system.

The signs and symptoms of shock are:

- Increasing restlessness and anxiety.
- Weak and rapid pulse.
- Cold and clammy skin.
- Profuse sweating.
- Possible nausea or vomiting.
- Pale or cyanotic face.
- Shallow, labored, rapid, gasping, or possibly irregular breathing.
- Dull and lusterless eyes with dilated pupils.
- Marked thirst.
- Possible fainting in cases of rapidly developing transient shock.

If shock is not reversed, the person will die. A quick-thinking responder can intervene and slow or eliminate the progression of early shock and irreversible damage.

The most common types of cardiovascular shock include:

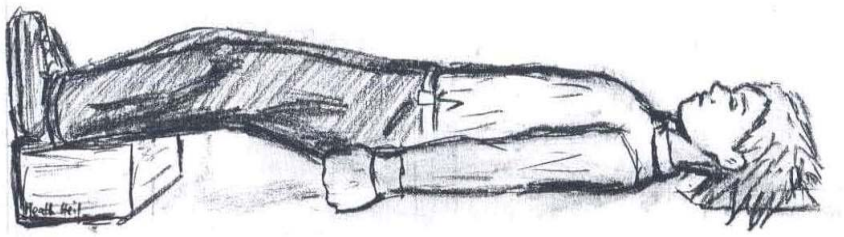
Type of Shock	Means of Shock	Primary Reason for Shock	Body Part Broken
Hypovolemic	Low blood volume	Prolonged vomiting and diarrhea, dilation of vessels	Fluid volume low
Cardiogenic	Heart fails	Heart disease, heart attack or heart failure	Pump fails
Psychogenic	Stress	Psychological stress causes vessels to expand (fainting)	None
Hemorrhagic	Blood loss	Major bleeding	Loss of fluid, damaged blood vessels

The above table shows that every type of shock has a cause. As you will see, one major goal of treating shock is to eliminate the cause as best as you can.

Treatment:

- Elevate the feet.
- Loosen tight or uncomfortable clothing.
- Move the victim out of the elements and to a comfortable place.
- Do not give liquids.
- Keep the victim warm.
- Do not leave the victim.
- Call 911.

Remember:
Shock is serious and may easily lead to death. Most care can be done without moving the victim. Moving a person may result in serious injury.



Electrical Shock

Electrical shock occurs when a person comes into contact with an electrical energy source. When helping someone who has sustained electrical shock:

- Assess the scene for safety.
- **Do not touch the victim.**
- Disconnect the power source, if safe to do so, or call the power company.
- Do not move the victim.
- Check the ABC's (airway, breathing and circulation).
- Begin CPR if necessary.
- Check for spinal injuries from a fall.

The symptoms can include:

- Cardiac arrest.
- Burns.
- Shortness of breath.
- Chest or abdominal pain.

Student Workbook—Module 6

1. In your own words, define shock.

2. List four ways oxygen delivery failure may occur.

   1._____

   2._____

   3._____

   4. _____

3. Name three types of shock and give the primary cause of each type.

   1._____

   2._____

   3._____

4. List four treatments when caring for someone in cardiovascular shock.

   1. _____

   2._____

   3. _____

   4. _____

5. What is the ultimate danger when treating someone in shock?

   _____

   _____

True or False (Rewrite all false statements making them true)

T or F You must restrain the victim who is in shock.

T or F Memory loss and slurred speech are signs of shock.

T or F Shock is a condition in which the heart fails to circulate blood adequately to vital organs and can cause death if untreated.

T or F When treating shock, force liquids as much as possible.

T or F Hemorrhagic shock is caused by blood loss.

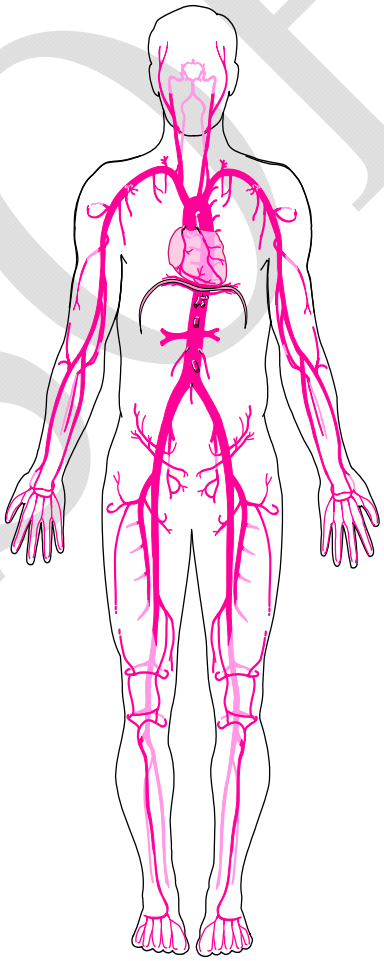
Draw a line connecting the type of shock to the area of the body where the problem occurs.

Cardiogenic

Hypovolemic

Psychogenic

Hemorrhagic



Activity: "Don't Panic"

This activity deals with stress. When treating a person with cardiovascular shock, you must work fast. Assess the situation and begin treatment as soon as possible to reverse a life-threatening condition.

Materials used:

- One piece of paper per group
- One pencil per group
- One die per group

Divide the class into groups of six people per group.

One person starts by rolling the die. You want to roll 1's to begin. After one roll, pass the dice to the next person on your right, leaving out the person that is writing the alphabet.
The person to his or her left begins writing the alphabet, clear and easy to read. The person that finally rolls 1's will then continue writing the alphabet. When you get to Z, start over with A.

Keep track of how many times your group had to write the alphabet before rolling all six numbers. When shaking the dice, start with 1's then 2's, 3's, 4's, 5's, and 6's. The team to rolling all six numbers first calls out "**don't panic**."

Play the round at least three times.

Questions:

How does this game relate to cardiovascular shock?

Ask the students how the stress of being in a hurry playing the game can correlate with the stress of treating a person with cardiovascular shock when time is an issue.

[Editing time; Additional questions to be asked Communication, conflict levels, biggest frustration working with others (people in your group), and more to follow. To be put into question form.]

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Module 7—Spine and Head Injuries

Injuries to the Spine

Do not move patients with suspected spinal injuries. Damage to the spinal cord can result in paralysis. All unconscious accident victims should be treated as if they have spinal injuries. All conscious victims should be checked for spinal injuries before moving them. You must assume that accident victims with weakness or numbness in their arms or legs have spinal injuries.

When the spinal cord is damaged, the victim loses the ability to move muscles in the body. The severity of the injury increases with greater height on the spinal cord.

Area of Injury	Location on Spinal Cord	Expected Problem
Mid-Neck	Cervical 3-4	Respiratory arrest Paralysis of arms and legs
Mid-Chest	Thoracic 4	Respiratory distress Paralysis of arms and legs
Belly Button	Thoracic 10	Paralysis of legs
Lower Back	Lumbar 1-2	Weakness or paralysis of legs

Signs of Spinal Cord Injuries:

- Pain in the neck or back
- Increased pain when pressing the area of injury
- Increased pain when patient tries to move
- Difficulty breathing
- Immobility or lack of feeling in parts of the body

Spine Injury Treatment:

- Immobilize the patient and do not let him/her move.
- Keep the head and spine in alignment.
- Only move the patient if the airway is blocked or there is immediate danger.
- Perform CPR if necessary.
- **Call 911.**

If the patient is conscious, ask the following questions:

- "What happened?"
- "Where does is hurt?"
- "Can you move your hands and feet?"
- "Can you feel me touch you?"

Head Injuries

Head injuries-or more specifically, brain injuries, can have many different causes. However, the result is a decrease in brain function.

Some common causes of brain injuries include a blow to the head, stroke, fall, suffocation, and drug overdose.

The brain and spinal cord are surrounded with a liquid called cerebrospinal fluid. This fluid nourishes brain cells and acts as a shock absorber. When a person has a skull fracture, cerebrospinal fluid mixed with blood may drain from the patient's nose and/or ears. Do not attempt to stop the flow of this fluid from the ears or nose. To do so may increase pressure on the brain or introduce infection around the brain. If the brain is injured, the patient may have a concussion.

Signs of concussion:

- Confusion
- Staggering
- Unconsciousness
- Inability to breathe

Emergency Care for Head Injuries:

- Monitor ABCs (airway, breathing and circulation).
- Control bleeding.
- Bandage bleeding scalp wounds using minimal pressure.
- Keep patient from hurting himself or herself if convulsions occur.
- **Call 911.**

Student workbook—Module 7

Fill in the blanks on the following chart:

Area of Injury	Location in Spine	Expected Problem
		Respiratory arrest paralysis of arms and legs
Mid-chest		
		Paralysis of legs
	Lumbar 1-2	

1. Signs of spinal cord injury:

    1.

    2.

    3.

    4.

2. Emergency care for spine injuries:

    1.

    2.

    3.

    4.

3. Signs of brain injury:

1.

2.

3.

4. Causes of head or brain injuries:

1.

2.

3.

Activity: Bumper Sticker to Promote the Use of Helmets

Choose an activity in which a helmet should be worn to prevent head and/or brain injuries. Create a "bumper sticker" using a 3"x12" paper to promote the use of a helmet during the chosen activity.

Bumper Sticker Rubric

	4	3	2	1	Score
Graphics-Originality	Graphics used on the bumper sticker reflect an exceptional degree of student creativity in their creation and/or display	Graphics used on the bumper sticker reflect student creativity in their creation and/or display.	Graphics are made by the student, but re based on the designs or ideas of others.	No graphics made by the student are included.	
Graphics-Relevance	Graphics are related to the topic and make it easier to understand.	Graphics are related to the topic and make it somewhat easier to understand.	Graphics relate to the topic but add little to the message.	Graphics do not relate to the topic.	
Attractiveness	The bumper sticker is exceptionally attractive in terms of design, layout, and neatness.	The bumper sticker is attractive in terms of design, layout and neatness.	The bumper sticker is acceptably attractive though it may be a bit mess.	The bumper sticker is distractingly messy or very poorly designed. It is not attractive.	
Mechanics	Capitalization, punctuation, and grammar are correct throughout the bumper sticker.	There are 1-3 errors in capitalization, punctuation, or grammar.	There are 3 errors in capitalization, punctuation, or grammar.	There are more than 4 errors in capitalization, punctuation or grammar.	
Message	The message is clear and easily read. It is appropriate for all who will view it.	The message is easy to read. It is somewhat relevant for the audience.	The message is unclear and difficult to understand.	The message is unclear or irrelevant to topic.	

Score: _____

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Module 8—Burn Emergencies

Types of Burns

Burns are a common cause of injury affecting over 1 million people in the United States each year. They lead to the hospitalization of almost 40,000 children each year, and over 1,000 deaths. Burns come from a variety of sources, including hot liquids, household appliances, sun exposure, heat, chemicals, and electrical current.

Most burns are preventable. Some steps you can take to help prevent burns include:

- Set your hot water heater to 120 degrees F or less.
- Do not carry hot liquids or food near a child, and do not allow children near stoves, hot barbecue grills, hot appliances, portable heaters, and outdoor fires.
- When cooking, use the back burners and turn all pan handles inward.
- Use covers on electrical outlets.
- Install smoke detectors and keep them in working order.
- Do not leave matches or other flammable materials where children can find them.
- Leave fireworks to the professionals.

Don't get burned yourself!

Burns result in pain and can lead to infection and cardiovascular shock. They are most serious when victims are very young or very old. The severity of a burn depends upon its size, location, and depth.

- **Size** – Any burn larger than your hand should be treated by a physician.
- **Location** – Burns are most severe when located on the face, neck, hands, feet, and genitals.
- **Depth:**

Degree of Burn	Depth	Signs and Symptoms	Example
First degree	Outer layer of skin	Dry, red, and painful	Sunburn
Second degree	Middle layer of skin	Thin, wet blisters; painful	Steam burn
Third degree	Last layer of skin	White, charred, leathery; may be painful or cause minimal pain	Fire

The seriousness of a burn can be estimated from the following factors:

- Degree of the burn

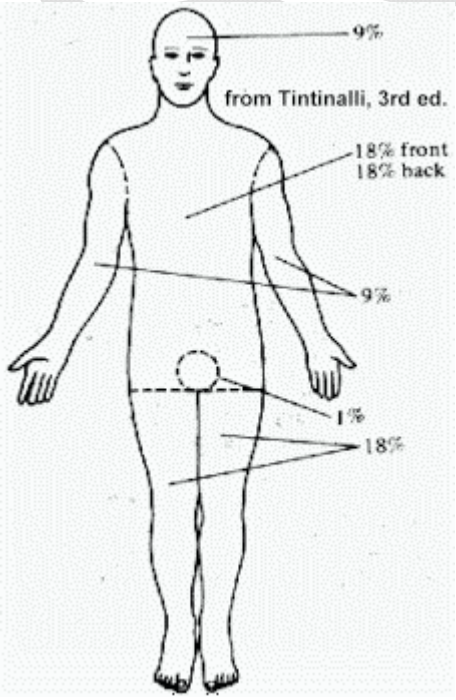
- Percentage of the body burned
- Location of the burn
- Age of the patient

The Rule of Nines-Calculating Burn Percentages in Adults

For and adult you can estimate the body surface area that has been burned by using multiples of nine, as calculated in the following chart:

Area	**% of Body**
Head	9
Each upper limb	9
Each lower limb	18
Front of trunk	18
Back of trunk	18
Groin	1

For example, one leg and one arm (9 + 18 = 27%), plus the groin (1%)and the front trunk and back trunk (36%) would equal 64%.



Critical Burns

Critical burns are the most serious type of burn and require immediate emergency transportation to a hospital for treatment. The following are examples of critical burns:

- Burns associated with the airway or that cause trouble breathing
- Burns covering more than one body part, third degree burns covering more than 10% of the body surface, or second degree burns covering more than 30% of the body surface
- Burns that extend circumferentially around an extremity or the torso
- Burns to the head, neck, hands, feet, or genitals
- Burns to children less than fiveyears of age or to adults over 55 years of age
- Burns resulting from chemicals, explosions, or electricity

Moderate Burns

Moderate burns include:

- Third degree burns over 2% to 10% of the body surface, excluding face, hands, and feet.
- Second degree burns over 15% to 30% of the body surface.
- First degree burns over 50% to 75% of the body surface.

The general condition of the victim must also be considered. For example, a moderate burn in an aged or critically ill person might be serious.

Burn Treatment

There are three types of burns. The treatment of burns includes things you should, and things should not do based on the type of burn. In each situation, the most important thing to do is to keep yourself from getting burned, and then stop the burning process.

Thermal Burns	
Do	• Remove the patient from the heat source. • Check breathing. • Stop bleeding. • Cool the burn with cold water. • Cover the burn with a sterile pad or clean sheet. • Treat for shock. • Call 911.
Don't	• Do not apply oils, sprays, or ointment to a serious burn.
Chemical Burns	
Do	• Flush the skin with water for 20-30 minutes. • Flush the eyes continuously with water until medical help is obtained if the patient's eyes are involved. Remove contact lenses, if possible, but do not delay flushing the eyes. • Remove contaminated clothing. Avoid spreading the chemical to unaffected areas.

	• Check ABCs. • Cover the burn with a sterile pad or clean sheet. • Treat for shock. • Call 911.
Don't	• In some cases involving powdered or dry chemicals, it may not be appropriate to flush the burn with water. Carefully brush the chemical off the skin and check the package for emergency instructions.
Electrical Burns Electrical burns can be more serious than they appear since they penetrate the skin. The electricity commonly enters in one place and leaves the body in another; therefore, there are two external burn sites and possibly internal burns that follow the track of the electricity as it passed through the body. Respiratory and cardiac arrest are common with electric shock.	
Do	• Turn the current off at the source (breaker or fuse box). • Check ABCs. • Cover the burn with a sterile pad or clean sheet. • Treat for shock. • Call 911.
Don't	• Do not touch the patient while he or she is in contact with electricity.

Treating burns can be difficult because of the pain they cause and the unpleasant appearance of serious burns. The following are general considerations to remember when treating burns.

- Remove rings, belts, shoes and tight clothing before swelling occurs.
- DO NOT REMOVE CLOTHING if it is stuck to the burn. Carefully cut around the stuck fabric to remove clothing.
- Cover the burn with a loose, dry dressing to protect against infection.

Student Workbook—Module 8

1. Fill in the table describing the types of burns and their characteristics.

Degree	Depth	Signs and Symptoms	Example
1st			
2nd			
3rd			

2. Critical burns are the most serious and require immediate ambulance transportation. Write a description of a critical burn.

3. Describe a situation in which a person may suffer each of the folowing types of burns.

Thermal	
Chemical	
Electrical	

4.

Name three important facts concerning burns from class studies:
1.
2.
3.

Types of Burns

Is a burn **1st** or **2nd** or **3rd** degree? Circle your choice.

1st or **2nd** or **3rd** Dry, red burns from sunbathing too long.

1st or **2nd** or **3rd** Dry, leathery burns from touching a hot stove.

1st or **2nd** or **3rd** Red, raised blisters from hot radiator fluid.

1st or **2nd** or **3rd** Red, painful burns without blisters from spilling hot soup.

1st or **2nd** or **3rd** Dry, hard, charred skin, without a lot of pain, from a fire.

Decide whether each action is a **Do** or a **Don't** action when caring for burns. Circle your choice.

Do or **Don't** Cool a thermal burn with water.

Do or **Don't** Check for bleeding in an electrical burn.

Do or **Don't** Touch a patient in contact with electrical cords.

Do or **Don't** Cover a thermal burn with clean bandages.

Do or **Don't** Apply an antibiotic ointment to thermal burns.

Do or **Don't** Cool an electrical burn with lots of water.

Do or **Don't** Remove the victim from the heat source in a thermal burn.

Do or **Don't** Check for breathing.

Do or **Don't** Wash the eyes with water for three minutes with chemical burns.

Do or **Don't** With rubber soled shoes kick electrical wires away from the victim.

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Student Activity:

Home Fire Safety Evaluation

Dear Parent,

Your student's health class is studying actions to take when a serious emergency occurs, such as an accident, natural disaster, or other life-threatening situations. Your student has the opportunity to develop the skills needed by a first responder. Our studies will include treatment for bleeding, shock, heart attack, and serious injuries, as well as protocol for CPR and AED.

Your student will be creating an action plan for safe evacuation from your home in case of an emergency. He or she will prepare a floor plan of your home. Attention will be given to smoke and carbon monoxide alarms, best routes to exits, a meeting place outside the home, and areas of potential danger. Also, your family will discuss an emergency evacuation plan and practice it.

Thank you for your time and recognition of the importance of home safety.

Parent/Guardian Comments:

What to Do When Every Minute Counts

Student Evaluation of Home Safety Plan

Name_____ Class Period _____

1. How did information from the classroom discussions apply to your home evaluation?

2. What were the positive results from your home evaluation in terms of safety?

3. What areas in and around the home presented concerns during your evaluation?

4. What other problems might arise during an actual emergency?

5. What actions can your family take to improve home safety?

Module 9—Poisoning Emergencies

Poison is any substance that can cause illness, injury, or death when taken into the body.

☠ Approximately 90% of poisonings occur in the home, and more than half of these involve children under the age of six.

Types of Poisoning

1. **Inhaled Poisons**

   The victim of exposure to toxic fumes (gases) must be removed as soon as possible from the contaminated area. The rescuer must take precautions to ensure he or she will not be exposed.

   Treatment for inhaled poisoning:

   - Move victim to an area with fresh air.
   - Call 911.
   - Check for signs of life if victim is unconscious.
   - Look for other injuries and treat.

2. **Ingested Poisons (Swallowed)**

   Ingested poison is the most frequent type of toxic exposure. Infants and children are most often involved. Ingested products include everything from medicines to laundry detergents, from gasoline to houseplants.

   Treatment for ingested poisoning:

   - Call the poison control center or 911.
   - Do not give the victim any food or drink without specific instructions from the poison control center.
   - Place victim in recovery position on his/her left side until the ambulance arrives.
   - Monitor ABCs (airway, breathing, and circulation).

3. **Injected Poisons (Bites and Stings)**

   Insect stings and animal bites are among the most common sources of injected poisonings.

   Treatment for insect bites and stings:

   - Move to a safe area to avoid further harm.
   - Try to remove the stinger by scraping it off with a firm, sharp-edged object such as a credit card or fingernail.
   - Wash the area with mild soap and water to help prevent infection. To reduce pain and swelling, apply a cold compress. Apply hydrocortisone cream, calamine lotion, or a baking soda paste to the area several times a day until the pain is gone.
   - Call 911 if the victim was bitten by a venomous spider and begins to have trouble breathing or shows signs of a severe reaction.

Treatment for snakebite:

- Get the victim to a hospital. Keep the victim calm and lay him or her down if possible.
- Keep the bitten area at or below heart level.
- Call 911.
- Do not apply ice or heat.
- Maintain breathing and prevent aggravation to the wound.
- Do not extract poison.
- Walk slowly and rest periodically if you are the victim.

4. Contact Poisons (Absorbed Through Skin)

Poisons on the skin should not be taken lightly; death is possible from contact poisoning. Symptoms of contact poisoning include dermatitis, blistering, and similar skin damage.

Examples of contact poisons are:

- Strong acids.
- Strong bases.
- Cleaners and solvents.
- Pesticides, herbicides, fungicides, or rodentacides.

Treatment for contact poisoning:

- Call the poison control center or 911.
- Protect yourself from contact with chemicals.
- Remove affected clothing.
- Brush off or blot chemical. (Wear protective gloves.)
- Flush with water. (20-30 minutes minimum)

When calling the poison control center or 911:

- Identify yourself and your relationship to the victim.
- Describe the victim by name, age, and sex.
- Describe, as best you can, the circumstances of the poisoning.
- Have the package or poison container in your hand. Identify, as best you can, what the victim took, how much was taken, and when it was taken.

Utah Poison Control: 1-800-222-1222 Website: www.utahpoisoncontrol.org

Student Workbook—Module 9

1. Define poison and give five examples.

Poison is:

1.
2.
3.
4.
5.

2. Complete the following chart:

Types of Poisoning	Examples	Symptoms	Treatment
Inhaled			
Ingested			
Injected			

Contact			

3. Our living areas are filled with various dangerous chemicals. Take time to survey your home for potential dangers.

Fill in the following chart (choose one product from each area, then list cautions and emergency care):

Home Poison Dangers

Area	Product Name	Cautions (*Choose One*)	Emergency Care (*Choose One*)
Under Kitchen Sink			
Bathroom Cabinets			
Laundry Room			
Garage or Shed			
List Necessary Improvements			

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Module 10—Environmental Emergencies

Heat Cramps

A victim may suffer painful muscle spasms in the extremities after strenuous exercise. Heat cramps may occur after heavy exercise in warm or moderate temperature. Heat cramps most often occur in the legs and the abdomen, but can also be present in any voluntary muscle.

Treatment for Heat Cramps:

- Get the victim to a cool place.
- Stretch and massage muscles.
- Give victim the victim water or a sports drink containing electrolytes.
- Do not give the victim salt water or salt pills; they can increase the onset of heat-related emergencies.

Heat Exhaustion

Heat exhaustion occurs when the patient has been working in a hot environment, There is an increased need for blood flow to the skin, muscles, and heart.

Signs of heat exhaustion include:

- Weakness.
- Dizziness or fainting.
- Headache.
- Loss of appetite.
- Nausea.
- Gray, cold or clammy skin.

Treatment for this condition is the same as for shock. The victim should be transported to a medical facility as quickly as possible. **Call 911.**

Heat Stroke

Heat stroke is a condition in which a person's sweating mechanism has broken down and the body is unable to lose heat through the skin.

Symptoms of heat stroke:

- The skin will be very hot and dry.
- Patient may be in a coma or unresponsive.

Heat stroke is an emergency. High temperatures can destroy brain cells, which may cause brain damage. The patient may die if not treated.

Treatment for heat stroke:

- Call 911.
- Cool the person with wet clothes and fan him or her.
- Monitor airway and breathing.
- Cover with a blanket if shivering occurs.
- Do not give any food or water.

Hypothermia

During exposure to cold a general cooling occurs, which causes the body to go through five stages:

1. **Shivering** – This is the body's attempt to generate heat.

2. **Decreased Muscle Function** – Loss of motor skills results in slurred speech and stumbling.

3. **Gradual Loss of Consciousness** – This begins with drowsiness and progresses to unconsciousness.

4. **Decreased Vital Signs** – This is manifest by the slowing of pulse and respiration.

5. **Apparent Death** – All body functions have stopped.

Treatment for hypothermia:

- Handle the patient with care.
- To prevent further heat loss, remove the victim's wet clothing and add additional clothing or blankets.
- Rapidly transport the patient to a medical facility.

NOTE: If it takes more than 30 minutes to reach a medical facility, the patient should be re-warmed. This can be accomplished by placing heated objects that do not exceed 105 degrees Fahrenheit next to the victim.

Every effort should be made to resuscitate hypothermic victims. The rule is: **No hypothermic patient is dead until warm and dead.**

Frostbite

If the body is exposed to excessive cold, the fluid in the cells will freeze. The ice crystals which result may destroy body cells. If you suspect that any part of a victim's body is suffering from frostbite, **DO NOT RUB**. The movement of the ice crystals in the tissue can destroy the cells. The freezing of cells may be minor, superficial or deep.

- **Frostbite superficial—**The skin appears white and waxy and is firm to the touch. However, the underlying tissue is soft. Superficial frostbite should be treated with dry covers and steady warmth, not to exceed 105 degrees Fahrenheit.
- **Frostbite deep—**The skin is white and feels hard and unmoving. Deep frostbite requires immediate medical attention. If medical help is not available within 30 minutes, re-warm by immersing in water, not to exceed 105 degrees Fahrenheit**.**

Student workbook—Module 10

1. Fill in the table with the appropriate treatment for each heat related problem.

Heat Cramps Loss of electrolytes in the body during exercise in a hot environment causing cramping**.**	
Heat Exhaustion A type of shock resulting from being in the heat too long. Skin is pale, clammy, and warm to the touch.	
Heat Stroke A sudden rise in body temperature. The body cannot cool normally.	

2. Fill in the table with the appropriate treatment for each cold-related problem.

Frostbite Water in the cells freezes. As the cells expand, their walls break, causing tissue damage.	
Hypothermia A condition of decreased temperature. Shivering stops. Blood cools.	

3. The rule for treating hypothermic victims is: "No hypothermic patient is dead until _____ and _____."

Activity: "Be Prepared"

Directions: Working in groups of four, create situational scenarios for each environmental emergency.

Example 1: What is the situation?

While snowmobiling in the high Uintah Mountains, two young men are involved in an accident. Bill is injured when he hits a snow-covered tree trunk and rolls his machine. He is trapped under the snowmobile. It is late afternoon, and the sun is setting. The wind begins to pick up. It is cold, very cold. John tries for several minutes to lift the machine off Bill, but cannot budge it. He then checks Bill for symptoms and discovers that Bill is shivering uncontrollably. John realizes that Bill must be in shock and may be suffering from hyperthermia. Understanding that this is a real emergency, he quickly pulls out the emergency bag that they had carefully packed for this adventure. John, knowing that he and Bill are well-prepared, immediately goes into survival and rescue mode.

- **What are the contents of the emergency pack?**
- **What does John do to assure Bill's survival until help arrives?**
- **What rescue precautions have the young men taken before they left home?**
- **What rescue actions does John take on the mountain?**

Example 2: What is the situation?

Paul and Landon are planning a hike in the Canyon Lands over the Fourth of July weekend. Both are scouts and have hiked in this area for several years. They are aware of both the weather conditions and the terrain: therefore, they know how to prepare for the adventure. Both young men are high school athletes and work out five days a week. They decide to invite Paul's dad, Jim, because he is a joker and they know he will be a fun companion. However, Jim is a bit overweight and out of shape. The second day of the hike, the young men notice that Jim is having trouble keeping up. He says that his legs are hurting and he is having a difficult time breathing. He feels dizzy and nauseated, but is not sweating. Suddenly, he stops and sits down on a rock. Because of their scout training, the boys realize that Jim is in trouble and quickly jump into emergency mode.

- **What are the contents of their day packs?**
- **What should Paul and Landon do to assure Jim's survival until they can get help?**
- **What rescue precautions have the young men taken before they left home and started into the wilderness?**
- **What rescue actions did the young men take in the wilderness?**

PowerPoint Review Question:

1._____ 2._____ 3._____ 4._____ 5._____

Student review activity (Poison and Environment)

Puzzle Review Activity

Activity One:

This activity can be used as a review, or for peer learning. As a review, divide the class into ten groups. Assign each group a topic inside the puzzle piece. The group will gather accurate information for evaluating the situation, determining the action, and possible prevention. After writing a few notes the group will prepare a scenario that fits into the topic and present it to the class. The presentation demonstrates the correct response and action. At the conclusion of the action, the group will review the procedures followed. The class members will fill in other puzzle pieces until review is complete.

Activity Two:

Divide class into ten groups and fill in information written on the board for each puzzle piece.
For example:

> Assess the situation, review possible actions, and proceed with treatment. Then one person can stay at the station and the others can rotate around the room until all pieces are complete. The members return to "home base" and report information gathered to complete the puzzle

By inserting other words into the puzzle other topics can also be used.

Contact Poisoning

Ingested Poisoning

Inhaled

Injected Poison

Drug Overdose

Heat Cramps

Heat Exhaustion

Frost bite

Heat Stroke

Hypothermia

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