



UTAH SHERIFF'S  
ASSOCIATION

SEARCH AND  
RESCUE

STANDARDS



As approved by the Utah Sheriff's Association on 7-18-2013

<b>UTAH SHERIFFS' ASSOCIATION</b> <b>SEARCH AND RESCUE</b> Certification and Training Program	DATE	SUBJECT
	<b>7-18-2013</b> REVISION <b>05-06-13</b>	<b>Table of Contents</b> CORE HOURS <b>40</b>

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## **Purpose**

The purpose of this document is to facilitate mutual aid between counties for Search and Rescue incidents by providing training guidelines and outlining basic state certification standards for Search and Rescue team members throughout the State of Utah.

## **Scope**

This document identifies and establishes recommended minimum levels of knowledge and skills that will be required of Search and Rescue team members participating in the SAR mutual aid program, also known as joint Search and Rescue. This document does not mandate training at the county level for those who do not participate in the SAR mutual aid program, nor does it address the requirements of advanced specialty teams.

## **References**

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These standards are based on current Utah State Law (UCR 17-22-2 (p), NFPA Standards, NIMS requirements, standards set by the Utah Sheriff's Association, and other standards that are mandated.

# **Search and Rescue Mutual Aid Program**

## **Why?**

As required by State Statute, each County Sheriff is responsible for Search and Rescue within his jurisdiction and maintains a team capable of providing that service. However, there may be times when additional resources are needed. Obtaining those additional resources from other counties will be simplified if there are statewide guidelines for training or certification, standard operating procedures for initiating mutual aid, and a current database of resources available from each county.

## **Preparedness**

The Utah Sheriff's Association Search and Rescue Committee is responsible for facilitating the development of training and response plans for SAR resources involving multiple-county incidents. The committee will do this by maintaining statewide communication links between county sheriffs and emergency managers, public officials, and the various Search and Rescue groups.

The goal of the committee is to improve regional and state Search and Rescue response through the standardization of training, operating procedures and equipment. The committee will develop training programs and criteria meeting standards approved by the Utah Sheriffs Association, assist in the credentialing of Search and Rescue professionals, and conduct training for first responders.

## **Initiation**

The preferred method for initiation of SAR mutual aid is direct communication between County Sheriffs or, if necessary, a designee. Each county will maintain a point of contact who can be reached 24/7 by a dispatcher or any requesting agency. That person will, after receiving approval from the sheriff or his designee, notify or activate the appropriate resources according to the county's

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response plan.

The Sheriff who receives the request for assistance, or his designee, will determine whether SAR team members have the minimum credentials required for each response. The Incident Commander determines the desired credentials.

### **Response Procedure**

1. Each SAR team will bring equipment and resources to maintain their availability in the field for a minimum of 24 hours.
2. Each team will assign a team leader to coordinate with the Task Force Group Leader, who will be assigned to the team once they have arrived at the incident.
3. Upon arrival at the incident, the Team Leader will check in with a list of assets and their status.
4. Each team will follow all safety guidelines. Team members will not be assigned tasks beyond their capabilities.

5. The Team Leader or his designee will be responsible for tracking the status of individual team members. Reporting will be coordinated with all teams involved.

6. SAR resources are to remain assets of the parent agency, but will be under the direction of the requesting agency. The local Sheriff's Office will retain control of its own resources and jurisdiction.

7. All activities will be directed and coordinated by Incident Command.

8. When rendering mutual aid outside of your jurisdiction, SAR members shall not take photographs or video of the incident. SAR members shall not disseminate information to the media, family members or the general public without authorization from the agency in charge.



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## **Chapter 2: An Introduction to Utah Search and Rescue**

People often put themselves at risk by not being properly prepared, equipped, or trained for the activity in which they are taking part or for the terrain into which they are venturing. And sometimes, despite extensive preparation, accidents just happen. Sometimes, people just get lost. This is where Search and Rescue (SAR) comes in. Search and Rescue is the search for and provision of aid to people who are in distress or imminent danger.

In most western states, County Sheriffs are required by law to manage SAR services in their respective counties. In our state, that mandate is specified in Utah Code 17-22-2(p). Sheriffs generally rely on professionals and volunteers who serve on county SAR teams to assist in providing those services.

The skills required of a county SAR team are as varied as Utah's recreational activities and terrain. Some of those skills are specialized and require years of practice and training to master. Utah's Search and Rescue standards, as outlined in this document, are not meant to address the specialty skills but to provide a guideline for teaching the basic skills and objectives required of all SAR teams.

While each county may have specific or specialized needs, all SAR teams share some basic objectives. These objectives include:

- 1) Assist the County Sheriff in his responsibilities to provide or manage SAR operations in his county.
- 2) Train for the common situations that may be encountered and be flexible enough to adapt to the uncommon.

- 3) Maintain skills through continued training.
- 4) Educate the public through Preventative Search and Rescue programs.
- 5) Assist other counties by providing mutual aid.

SAR teams across the country have adopted a phrase from the U.S. Air Force's Pararescue Jumpers: "These things I do, so that others may live." We do everything reasonable to bring our subjects home alive. The key word is "reasonable." While SAR groups can often be the difference between life and death, there are times when we will not be able to save someone. The loss of life, while disheartening, is a fact of life. The best that we can do is train and prepare to do everything "reasonably" possible so that others may live.

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## Chapter 3: Legal Considerations in SAR

*NOTE: Search and Rescue members must comply with their individual County and Sheriff's personnel policies and procedures. If the county policy is more restrictive than these protocols, then the county policy will apply.*

To certify at the Basic Level, a member shall:

**1. Describe the precautions to be taken when travelling to and from an incident.**

*When members respond to incidents, they are required to obey ALL traffic laws, including speed limit and seat belt laws. This applies whether they are driving a county vehicle or a personal vehicle. Under certain circumstances, members could face civil and criminal charges if involved in an accident while responding to an incident. Traffic violations fall under the Utah Criminal Code and members can be cited for any traffic violations.*

**2. Describe personal protective equipment to be used at incidents.**

*Personal protective equipment varies with the type of incident and circumstances. Since many incidents are in the backcountry, helmets and work gloves may be required, not to mention proper clothing and footwear. Helicopter operations require ear and eye protection. Boat operations obviously require personal flotation devices, but may also require ear protection. Helmets must be worn on all UTV's and snowmobiles. If a member will come into physical contact with an injured subject, standard Body Substance Isolation (BSI) precautions will be implemented.*

**3. Understand the protection provided to SAR members by county liability insurance, including when it applies.**

*Members of SAR are covered under their county's liability insurance during incidents or training. This insurance protects SAR members from lawsuits or*

*claims arising from the normal performance of their duties. SAR members are immune from liability under the Utah Governmental Immunity Act because SAR operates in response to a governmental public duty to provide search and rescue services. The possibility could arise where an individual SAR member is named in a lawsuit. However, that SAR member should be dismissed from any lawsuit in accordance with the Utah Governmental Immunity Act. Only the county, as the SAR member's employer, should be named in a lawsuit. However, immunity laws may not cover a member or the county when gross negligence is involved.*

**4. Describe procedures to take if an injury occurs to a SAR member at an incident or training.**

*Each County will have its own set of guidelines regarding injuries. Typically, any injury at an incident or training must be immediately reported to the SAR liaison or the Sheriff's designee, who will contact the county's Insurance Coordinator. A Worker's Compensation Reporting Worksheet and the Employee Written Statement will need to be completed. If the injury requires medical attention, the Officer in Charge (OIC) or a SAR officer should accompany the injured person to a physician or to the emergency room.*

**5. Explain the Good Samaritan Act and when it applies to SAR members.**

*The Good Samaritan Act provides that a person who, gratuitously and in good faith, renders care at an accident or emergency is not liable for any civil damages or penalties as a result of any act or omission by the person rendering the emergency care, unless the person is grossly negligent or caused the emergency. However, you should be aware that a SAR member who stops to help in an emergency while not on duty may be held to a somewhat higher standard of care because of additional training. Do not act outside the scope of your training, whether on or off duty. In the event that the emergency turned into a SAR response, liability would shift from no liability under the Good Samaritan Act to liability for the county.*

**6. Duty to Act and when it applies to SAR members.**

*Duty to Act refers to an individual's responsibility to provide care or services. There is no duty to act when not on call or not responding to an incident since members of SAR are not required to respond to all SAR incidents. However, once you have indicated you are responding, you have a legal duty to continue unless released by the OIC. (Note: If, while not on duty, you happen upon someone who needs assistance and you have identified yourself as a member of SAR, you may have created a Duty to Act.)*

**7. Understand HIPAA and what it means for SAR and its members.**

*HIPAA is the Health Insurance Portability and Accountability Act. It is a privacy standard to protect patients' medical records and other health information provided to health plans, doctors, hospitals and other health care providers such as SAR personnel. We are required by HIPAA to maintain the privacy of a*

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*subject's health information. Basically, we may only share that information with other health care providers such as EMT's who take over treatment or with certain parties to obtain payment for services. What this means for a SAR member is that a patient's health information cannot be shared with anyone outside the immediate responders or medical control.*

#### **8. Understand the legal procedure for obtaining permission to render medical aid.**

*The initiation of care for conscious, mentally competent adults requires consent. If an adult is alert and oriented, that person has the right to refuse care and cannot be treated against his or her will. Treating a patient without obtaining consent may be grounds for charges of assault and/or battery. Before initiating treatment, identify yourself and ask for permission to examine or treat the subject. In most situations, consent from a parent or legal guardian is required for the treatment of a minor.*

#### **9. Explain Implied Consent.**

*Implied Consent applies anytime a person is physically unable to express consent. When a person is injured and unable to give expressed consent to be treated, or if a life-threatening situation exists, the law assumes the person would grant permission for treatment or transport. Parental consent is required for minors if the parents are present.*

#### **10. Understand the following terms and their relevance to SAR operations:**

- A. Standard of Care**
- B. Engendered Reliance**
- C. Negligence**
- D. Abandonment**
- E. Documentation**
- F. Confidentiality**

**A. Standard of Care:** *Standard of Care is defined as: "how a reasonably prudent person with similar training and experience would act under similar circumstances, with similar equipment, and in the same place." Basically, Standard of Care is interpreted to mean that you are expected to perform up to the level of your training and similarly to how other SAR personnel with similar training would perform in the same situation. Individual SAR teams will define their Standard of Care based upon their training and the standards expected by the county they represent. Presently, there are no national standards for SAR personnel.*

**B. Engendered Reliance:** *This refers to the expectations the public has about the services provided by SAR. When the public and those we rescue assume that we will provide a certain level of service, it is called engendered reliance. As long as the expectations match our capabilities, there is no problem. Problems can arise when the public assumes (perhaps based on the capabilities of one or two members) that we will provide a higher level of service than we are capable of providing. The Certification Standards will help to provide written documentation of the level of our capabilities and the expectations we have of our members.*

**C. Negligence:** *This refers to the failure to provide the same care that someone with similar training and in a similar situation would provide. For negligence to exist there must be a duty to act, a breach of that duty, and damages to the subject, which are caused by the rescuer's actions or inactions.*

**D. Abandonment:** *This is the unilateral termination of care, once any contact is made, without the patient's consent and without making any provisions for continuing care. Once providers have initiated care, they have a duty to continue that care until someone of equal or higher competence assumes responsibility. Abandonment can result in both civil and criminal actions against SAR personnel.*

**E. Documentation:** *Courts in the United States consider that an action or procedure that was not documented was not performed. They also consider incomplete, messy, or poorly written reports as evidence of incomplete or unprofessional care. Keeping complete and accurate records is an important safeguard against legal complications. You may be asked by the OIC to provide written documentation of your actions on an incident.*

**F. Confidentiality:** *Communications between rescuers and a patient, especially if medical care has been rendered, are considered confidential, subject to HIPAA, and cannot be disclosed without the expressed permission of the subject. All incident-related information and/or images should also be kept confidential. Even if the law does not require it, professionalism does.*

**11. Describe the legal procedures to consider when entering private property on an incident.**

*Before travelling onto private property, it is always advisable to obtain permission from the property owner. Failure to obtain permission to enter posted private*

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*property can result in trespassing charges. Under most circumstances, SAR personnel have no more right to trespass than anyone else. If a landowner asks searchers to leave, even if the property is not posted, searchers must honor the request.*

#### **12. Identify the procedures to follow if you encounter evidence at an incident site associated with a fatality or possible criminal act.**

*SAR personnel arriving first on such a scene have a responsibility to secure the area and prevent contamination or modification of the evidence. Evidence should not be handled. After the scene is secured, it must not be vacated for any purpose until you are relieved.*

#### **13. Explain how the Utah Workers' Compensation Act applies to SAR.**

*For the purposes of the Utah Workers' Compensation Act (UWCA), a SAR team member is considered an employee of the county when acting as a certified member of the SAR team. In the event the SAR team member suffers an injury or occupational disease resulting from SAR services, the UWCA covers medical expenses and sets wage benefits if the SAR member is unable to return to his regular job. Those wage benefits are set at a level equal to the weekly wage of an entry-level deputy sheriff employed by the supervising county sheriff at the time of the accident or occupational disease.*

#### **14. Explain how the Utah Search and Rescue Financial Assistance Program benefits the state's SAR teams.**

*Funds collected under the Utah SAR Financial Assistance Program are distributed to SAR teams across the state to reimburse them for certain incident-related expenses, equipment, and training. Personal equipment lost or damaged during a SAR mission may also be covered under this program. Depending on individual county policy, the*

*member may be required to purchase the replacement equipment and then supply a receipt to qualify for reimbursement.*



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## Chapter 4: Personal Readiness

To certify at the Basic Level, a member shall:

### 1. List and prioritize the necessities of life.

*Priority #1: Positive Mental Attitude - What affects a person physically also affects a person mentally, and vice versa. Knowledge and skills are important to maintaining a positive attitude.*

*Priority #2: Air/oxygen - Survival time without it is measured in minutes.*

*Priority #3: Shelter/Clothing - This can be anything that helps to keep you warm or cool, depending on seasonal requirements.*

*Priority #4: Rest - In addition to the physical and mental benefits, rest also provides time for analysis of the situation.*

*Priority #5: Water - Water is essential for body temperature regulation, waste elimination, and digestion of food.*

*Priority #6: Food - We can survive for weeks without food. Since most survival situations are short-lived, food should be last on the list of priorities.*

### 2. Describe the basic water, food, and chemical needs of the human body.

*As stated in the previous question, water is much more important to survival than food. We can survive a relatively long period of time without food. Food tends to be more important in colder conditions where additional calories are needed to maintain body heat. Water alone cannot meet the chemical needs of the human body during periods of heavy activity, when excessive amounts of salt are lost through perspiration. At such times, sports drinks or salty snacks can provide the necessary electrolytes which can prevent hyponatremia, a metabolic condition in which there is not enough sodium in the body fluids. Replacing only the lost*

water can lead to sodium imbalance (hyponatremia), which can be as harmful as dehydration.

**3. Describe 4 components of physical fitness important to SAR responders.**

*1: Cardiorespiratory Endurance - The ability of the circulatory and respiratory systems to supply oxygen to skeletal muscles during sustained physical activity. Regular exercise makes these systems more efficient by enlarging the heart muscle, enabling more blood to be pumped with each stroke, increasing the blood supply to working muscles. Exercise improves the respiratory system by increasing the amount of oxygen that is inhaled and distributed to body tissues.*

*2: Muscular Strength - Strength is a measure of how much force a muscle can exert.*

*3: Muscular Endurance - Endurance is the ability of a muscle to sustain repeated contractions or to continue applying force against an object.*

*4: Flexibility - The ability to move joints and use muscles through their full range of motion.*

**4. Describe how the body loses heat by:**

- A. Radiation**
- B. Conduction**
- C. Convection**
- D. Evaporation**
- E. Respiration**

*A. Radiation: Heat transferred from your body to the surrounding air. Since the laws of thermodynamics state that heat flows from a hot object to a cold object, uncovered areas of your body will lose heat to the air whenever the air is colder than your body temperature. The more you exert yourself in colder temperatures, the faster the heat loss will be through radiation from any bare skin since those same laws of thermodynamics state that the greater the temperature difference, the faster the heat is transferred.*

*B. Conduction: Heat transferred from your body to anything with which it makes physical contact. You can minimize conductive heat loss by placing an insulating layer between yourself and the cold surface.*

*C. Convection: Heat transferred from your body through the fluid movement of air (i.e. wind) or water. Free-moving air next to the body absorbs heat. Even if there is no wind, this air expands and rises allowing new cooler air to move in and replace the warmed air. Convective heat loss also occurs in water as water flows past the body.*

*D. Evaporation: Heat transferred through the evaporation of perspiration.*

*E. Respiration: Heat transferred through respiration is, essentially, evaporative heat loss. It can be minimized by breathing through some type of insulating layer.*

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**5. List at least 3 ways that clothing construction, design or fit can affect heat transfer.**

*Clothing can be designed to control the movement of air and moisture. Since air is a good insulator, clothing can be designed to trap air. Convective and evaporative heat loss can be minimized through the use of materials that do not allow the passage of air. Conductive heat loss can be minimized through the use of materials that do not absorb water or that transfer perspiration away from the body. As for fit, tight and constrictive clothing (such as elastic wrist or ankle bands) can impede the flow of blood that warms the extremities.*

**6. Describe the function of the following clothing layers:**

- A. Underwear or Wicking Layer**
- B. Clothing Layer**
- C. Insulation Layer**
- D. Shell Layer**

*A. Underwear or wicking layer: While this layer provides some insulation, its primary function is to control moisture. The wicking layer is designed to pull moisture away from the skin toward the outer layers where it can evaporate.*

*B. Clothing layer: This is the layer worn just outside the wicking layer. It is designed to provide some insulation and to absorb moisture from the layer beneath. It includes shirt, pants, etc., and should fit comfortably, not be too tight, and dry quickly.*

*C. Insulation layer: The function of the insulation layer is to trap air between the layers. Material thickness usually equates to insulation value and warmth.*

*D. Shell layer: The function of this layer is mainly to provide protection from wind, rain and snow. The main types of shells are waterproof, water-repellent, water resistant, or waterproof/breathable.*

**7. Describe general advantages and disadvantages of the following materials used in outdoor clothing:**

- A. Cotton**
- B. Wool**
- C. Silk**
- D. Nylon**
- E. Polypropylene/Polypro Blends**
- F. Polyester**
- G. Down vs. Synthetic Insulation (i.e. Primaloft, Thinsulate, etc.)**

*A. Cotton: In warm weather, cotton provides evaporative cooling and sun protection. However, its insulation value drops to virtually nothing when wet, making it a dangerous choice for winter.*

*B. Wool: Wool is a good insulator, even when wet. It can, however, absorb a lot of moisture making it fairly heavy. The loose weave of many woolen fabrics does little to protect from wind.*

*C. Silk: Silk's hollow fibers absorb and transport moisture away from the skin, making it a good insulator and useful as an underwear layer. However, silk can be easily damaged by excessive heat, sunlight and perspiration.*

*D. Nylon: Nylon is a lightweight, relatively strong material with excellent abrasion resistance. Cordura is a heavier nylon that is used in packs and boots. A disadvantage is that nylon absorbs and holds perspiration and body oils.*

*E. Polypropylene/Polypro blends: Polypropylene is lightweight and has very high insulation properties, as well as excellent wicking properties. It cannot absorb much moisture and dries very quickly, making it an excellent choice for the base/underwear layer. However, polypropylene can be damaged in relatively low heat and retains body odor. Many of the newer Polypro blends (Capilene, Terelene, etc) have retained polypropylene's good qualities while minimizing the bad.*

*F. Polyester: Polyester fibers are softer and lighter than other synthetic fibers. The fibers are hollow, do not absorb moisture, but are poor at wicking moisture. Polyester is widely used as insulation in coats and sleeping bags.*

*G. Down vs. Synthetic Insulation: Down is lightweight, highly compressible, and has high insulating properties when dry. However, it readily absorbs moisture and loses most of its value as an insulator when wet. Synthetic materials have similar insulating properties and weight, but do not absorb moisture. Synthetic materials retain their insulating properties when wet.*

**8. Explain how to recognize and manage Cold Stress and Heat Stress.**

*When a SAR worker is uncomfortably stressed by environmental conditions, several symptoms can appear. Common symptoms to each include a desire to rush the job, poor judgment, irrational or confused behavior, fatigue, drowsiness, or loss of coordination. Headaches and slurred speech can also be symptoms.*

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*The best ways to manage cold stress or heat stress include wearing seasonally appropriate clothing, taking breaks to maintain normal body temperature, and staying hydrated. Failure to recognize and treat either cold stress or heat stress can jeopardize the mission and even lead to more serious health issues.*

#### 9. Identify the "Ten Essentials."

*The original Ten Essentials list was identified in the 1930s by The Mountaineers, an organization for climbers and outdoor adventurers. The list has evolved over time from a list of individual items to a list of functional systems. You may never appreciate the value of the Ten Essentials list until you really need one of the essentials. The Ten Essentials are:*

- 1) Navigation (map/compass/GPS)
- 2) Sun protection
- 3) Insulation (extra clothing)
- 4) Illumination (at least 2 sources and extra batteries)
- 5) First-aid supplies
- 6) Fire starting source
- 7) Tools (knife, multitool, repair kit)
- 8) Nutrition (extra food)
- 9) Hydration (adequate water)
- 10) Emergency Shelter

*For SAR members, an 11th Essential has been added: Communication.*

#### 10. Construct a shelter and build a fire using contents of the Ready Pack.

*Skill-based*

#### 11. List at least 3 methods of water purification.

*In addition to clarification by filtering, questionable water can be purified by several methods.*

1. *Boiling: Boiling water will purify it (except at very high altitudes where the water boils at a lower temperature).*
2. *Iodine: Two percent tincture of iodine can purify water by adding 4 drops to each quart of clear water (8 drops per quart of cloudy water).*
3. *Bleach: Add 2 drops of commercial bleach to each quart of clear water, stir, and let stand for 30 minutes.*
4. *Water purification tablets*
5. *Commercial, back-packable water purifiers*

**12. Describe some considerations in personal waste disposal.**

*A small hole, called a cat-hole, is an acceptable method of disposing of human waste in most backcountry areas. A cat-hole is efficient because the top layer of soil in most areas contains microorganisms that decompose the remains of plants and animals. The bacteria essential for decay are only found in the top layer of soil. A cat-hole should be at least 200 feet from any water source and in a location that is not likely to be visited by others. Another option practiced by responsible dog owners: Pack it In, Pack it Out.*

**13. Explain the survival situation plan outlined in the acronym STOP.**

*S = Stay/Stop. Stop at the first sign of trouble. Rushing around may generate confusion. Stopping to think about the situation helps reduce emotional anxiety and panic.*

*T = Think. Think about what your correct actions should be. Analyze the weather, terrain and available resources.*

*O = Observe. Size-up the situation. Look around for immediate threatening hazards and survival resources.*

*P = Plan. Plan your best course of action before acting. Be deliberate and practical.*

**14. Define Positive Mental Attitude and its relationship to survival.**

*A vital survival priority is a mental attitude that is positive in nature and appropriate in its perspective regarding the current situation. This attitude is often the result of an extensive background in the knowledge and skills necessary to survive in a hostile environment. What affects a person physically also affects a person mentally, and vice versa. The simple realization of this fact can have a tremendous impact on anyone's ability to cope with stressful environments. If all other survival priorities have been met but an individual lacks the proper mental attitude to cope with the situation, survival can be jeopardized.*

**15. Describe the 4 aspects of the initial response to a life-threatening situation.**

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*1. Alarm: Anxiety appears as a natural reaction to any life-threatening situation. If allowed to progress unregulated, anxiety leads to overt fear.*

*2. Reaction: In the reaction stage, muscles can tighten, adrenaline starts to flow, and the heart rate increases. Survival training and outdoor experience will help turn reaction into a natural and positive response to the situation.*

*3. Response: The best way to manage this aspect is to take a methodical approach to the problem, using precise actions and procedures learned through training and experience.*

*4. Rest: In this aspect of your response, you may experience an abrupt emotional letdown after what has probably been a high-energy output. This will come eventually, whether wanted or not.*

#### **16. List at least 5 ways to control fear in yourself and in others.**

*In yourself:*

- 1. React to the problem at hand rather than to your emotions.*
- 2. Take logical, positive actions learned through your training and experience.*
- 3. Develop self-confidence by continually expanding your comfort zone.*
- 4. Be prepared (through training) and properly equipped.*
- 5. Relax and stay calm.*
- 6. Gather as much information about your situation as possible.*

*In others:*

- 1. Remain calm.*
- 2. Demonstrate a positive attitude.*
- 3. Do not negatively criticize others.*
- 4. Involve them in simple tasks.*
- 5. Comfort others without encouraging them to feel sorry for themselves.*
- 6. Accept a person's limitations and respect their feelings.*

#### **17. List 5 situations which could be encountered on SAR missions that may lead to a survival situation.**

1. *Stranded by a helicopter or another mode of transport*
2. *Physical injury (a good reason to work in teams)*
3. *Weather (lightning/flooding)*
4. *Wildlife encounters*
5. *Nightfall*

**18. Describe at least 5 types of dangerous weather phenomena or environmental conditions that might be encountered and how to deal with each.**

1. *Lightning: Seek proper shelter or minimize your contact with the ground.*
2. *Flooding: Stay informed about weather conditions farther up the canyon and seek high ground when necessary.*
3. *Heat: Have the proper clothing. Seek shelter from the sun. Carry water.*
4. *Cold: Have the proper clothing and fire starting materials in your pack.*
5. *Nightfall: Have multiple artificial light sources, proper clothing and shelter.*

**19. Describe Personal Protective Equipment to be worn in any SAR situation, including but not limited to the following applications:**

- A. **Driving a snowmobile**
- B. **Driving a 4-wheeler or 6-wheeler**
- C. **Driving a UTV**
- D. **Backcountry Litter Carryout**
- E. **Trailer any vehicle**
- F. **Technical Rescue**
- G. **Boat Operations**
- H. **Swiftwater Rescue**
- I. **Helicopter Operations**
- J. **Winter Operations**

*In all of the above, adequate clothing, footwear, etc., for the job and/or season is assumed. Refer to your County Policy for specific PPE (i.e. full-face helmet, gloves, eye and hearing protection, etc.)*

**20. Explain Body Substance Isolation and identify ways to protect yourself from contamination.**

*Body Substance Isolation (BSI) is an infection control procedure which involves the use of protective gear when dealing with injured subjects. Federal regulations require all health care workers, including first responders, to assume that all patients in all settings are potentially infected with a communicable virus or other bloodborne pathogen. These regulations require that all health care workers use protective equipment to prevent exposure to blood and certain bodily fluids.*

*BSI methods include:*



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*a) Wearing latex gloves when handling patients, and changing gloves after contact with each patient.*

*b) Wearing protective eyewear or a face shield when blood or other bodily fluids may splatter.*

*c) Washing hands and other skin surfaces immediately and thoroughly if contaminated with blood or other bodily fluids.*

*d) Using a pocket mask or other airway adjunct if the patient needs resuscitation.*

### **21. Explain CISD and when it might be necessary.**

*Critical Incident Stress Debriefing: A CISD is a discussion or debriefing led by specially-trained personnel which may be held after SAR personnel experience extreme situations that might trigger emotional or psychological reactions. CISD is a valuable tool that aids SAR personnel in dealing with the emotional stresses resulting from an incident.*

**22. Possess a Ready Pack meeting your agency's guidelines, preferably a pack which will sustain you for 24 hours in the backcountry. Here is a sample Ready Pack list:**

<b>Clothing</b>
Seasonal insulating and shell clothing
Gloves (warm and/or work)
Extra Socks

<b>Safety</b>
Helmet
Safety Goggles

<b>Personal</b>
Trail Food
Sunscreen/Lip Balm
Tissue Paper or equivalent

<b>Tools</b>
Headlamp and Spare Batteries
2 <sup>nd</sup> Light Source (flashlight?)/batteries
6-light sticks
Fire-Start Kit
Knife/Multitool
2 Locking Carabiners
2-Prusik Slings
Tubular webbing (15-20 feet)
SAR-supplied rope or cord
Plastic Locking Zip-ties
4-Variou Plastic Bags

<b>First Aid</b>
Pain Reliever
Antiseptic Cleansing Pads
Antiseptic Ointment
Band-Aids (various sizes)
Cotton Swabs
Moleskin
Roller Gauze Bandage
CPR Mask

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## Chapter 5: Communications

To certify at the Basic Level, a member shall:

1. Describe the capabilities and limitations of:

- A. Portable radios
- B. Mobile radios
- C. Satellite phone
- D. Cell phone

*a) Portable radios: Portable radios broadcast at 5 watts, so their range is limited when compared with the 40-100 watt mobile radios in vehicles. It is also important to hold and orient them properly to obtain maximum range. Batteries must be kept charged.*

*b) Mobile radios: Mobile radios in the vehicles range anywhere from 40-100 watts. Because of their power and a superior antenna with a ground plane (if mounted optimally), they have a far greater range than the portable radios.*

*c) Satellite phone: The satellite phone can often pick up a signal when radios or cell phones cannot, such as in some canyons. If there is no line of site between radios or the radios are unable to hit a repeater, the satellite phone might still be able to pick up or transmit a signal. However, the sat phone can sometimes take up to 20 minutes to obtain a signal.*

*d) Cell phones: Cell phones are useful when communicating sensitive information. They can also be used to send and receive photos, such as pictures of tracks. However, there are countless locations where cell phones simply will not work. Texting sometimes works in areas where voice does not.*

2. Demonstrate the proper use of mobile and handheld radios.

*Skill based: Things to watch for include holding and orienting the radio properly (calm or wind), keying mic before talking, saying the right things in the right order, changing channels or groups, taking the radio out of scan mode.*

**3. Indicate, in general, which radio channels to use in specific situations.**

*County-specific*

**4. Explain the difference between a repeater channel and a line-of-sight channel and the limitations and benefits of each.**

*With a line-of-site channel, your radio transmission goes directly to other radios within range depending on terrain. With a repeater channel, your radio transmits to a repeater, either a fixed repeater, or a portable repeater. The repeater amplifies and re-transmits the signal, usually on a different frequency. Since repeaters are located on high points in the terrain, they allow your radio signal to reach distances and locations which might be impossible with line-of-site channels. On the other hand, there will be times when your radio transmission cannot reach the repeater because of terrain features blocking the signal, or the signal from the repeater cannot reach the intended radio for the same reason. In these cases, line-of-site channels can still allow you to communicate with other radios nearby or with someone set up as a radio relay.*

**5. Demonstrate a knowledge of which channels are repeater channels and which are line-of-sight channels.**

*County-specific*

**6. Explain a radio relay and when it might be necessary.**

*When radios cannot communicate directly or with the repeater due to distance, terrain or other difficulties, an intermediate radio relay is often established. For instance, if an incident is down in a canyon and personnel on scene are unable to communicate directly with the repeater or with other radios elsewhere in the canyon, the communication problem can often be solved by stationing someone with a radio on the rim of the canyon. That "radio relay" person can receive and repeat the transmissions to the intended recipients. It can be advantageous for the relay person to have 2 radios, one of which should be a mobile radio whenever possible.*

**7. Describe proper radio protocol and etiquette.**

- a) Key the mic, wait two seconds, then say the name or number of whoever you are calling followed by your own name or call number.*
- b) Think about what you are going to say and how it will be interpreted BEFORE you key the mic.*
- c) No filibustering. Keep it short.*

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- d) Protect the radio from wind when transmitting and from feedback caused by other nearby radios.*
- e) Do not interrupt another radio conversation unless it is an emergency.*
- f) Please do not make repeated calls to dispatch to let them know you are 10-17. They are busy. Dispatchers may be working other incidents with other agencies.*
- g) When possible, communications from field teams will be directed to the OIC, not to dispatch.*
- h) Most communications are being recorded, so be aware of background noise and language*
- i) If there are numerous field teams, it is best to designate one person from each team to communicate with the OIC.*

### 8. Interpret the following basic 10-code messages:

- A. 10-1** (*poor radio signal*)
- B. 10-4** (*affirmative, yes, understood, etc*)
- C. 10-9** (*say again, repeat*)
- D. 10-17** (*responding, going to, etc.*)
- E. 10-20** (*location*)
- F. 10-22** (*cancel, disregard*)
- G. 10-23** (*arrived*)
- H. 10-24** (*assignment completed*)
- I. 10-85E** (*condition: deceased*)

### 9. Explain when plain English rather than 10-code messages or call signs would be acceptable on the radio.

*Simple answer: almost always. The exception might be when reporting a death or serious injury, though, if possible, such information is better communicated via a method other than radio.*

**10. Describe types of information which should be conveyed via a method other than radio.**

*Because of the numbers of scanners in the world, sensitive information should be communicated via cell phone, satellite phone, or some method other than radio. Such information might include some clues, serious injury, death, etc.*

**11. Describe the "Chain of Communication" on an incident.**

*Basically, the "Chain of Communication" dictates that all communications from field teams go through the OIC, who will relay the information to dispatch if necessary. (An exception might be in large multi-agency incidents with a separate command post or dispatch). If it is info that dispatch needs to know, the OIC can relay it to dispatch or ask if they copied. Dispatchers are often listening to our radio traffic, but few communications from the field actually need to be time-stamped in their incident log. However, all pertinent communications to the OIC are (or should be) logged into the Unit Log in the incident folder, including times. If there are numerous field teams, it is best to designate one person from each team to communicate with the OIC.*

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### Chapter 6: Search Operations

To certify at the Basic Level, a member shall:

**1. Explain the Seven Essentials of Search Management.**

- a) *Search is an Emergency. Since the subject may be injured or unprepared for environmental conditions, every search should be considered to be an emergency. Quick response times can minimize the search area by limiting the amount of time the subject has had to be on the move.*
  
- b) *Maximize the Probability of Success with careful allocation of available resources. The decision on where to deploy resources depends on numerous factors including: available resources, the probability the subject is in a specific region, probability and difficulty of detection in any region, and access to the region.*
  
- c) *Search is a classic mystery. The clues are always there. Searchers must know what clues to watch for and how to find them.*
  
- d) *Search for clues, not just for the subject. There are more clues than there are subjects. The absence of clues is, in itself, a clue.*
  
- e) *Stay focused on things that are important to a successful search. Perform the job assigned to you rather than trying to second-guess search managers.*

f) *Know if the subject leaves the search area. Define and confine the search area as early as possible.*

g) *Grid search as a last resort. Grid searching takes more time and resources to cover any given area.*

**2. Explain the Search Urgency Form and list factors that determine search urgency.**

*The Search Urgency Form outlines several risk factors that can give an indication of the risk facing lost subjects. Some of those factors include:*

*a) The subject's age and physical or mental condition.*

*b) The number of subjects.*

*c) A weather profile*

*d) The subject's clothing, equipment, and resources.*

*e) The subject's experience level*

*f) Terrain or other hazards*

**3) Identify 3 categories of response based on situational urgency and explain each type of response.**

*1. Emergency Response: An emergency response is a fast, immediate response. Hasty teams and other resources will be deployed as fast as possible.*

*2. Measured Response: An immediate response is not required so more time can be taken to plan and gather resources to be sent into the field.*

*3. Evaluative Response: More investigation and evaluation needs to be done before deploying resources into the field. This may be in cases where the incident is not confirmed or might resolve itself without our assistance.*

**4. Name at least 5 factors that could help determine the size of a search area.**

*1. The speed with which searchers are deployed or the time span since the subject was last seen*



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2. *The subject's age, physical condition, and experience*
3. *Terrain features*
4. *Weather*
5. *The subject's mode of transportation*

**5. Define the following and explain their mathematical relationship to each other:**

- A. Probability of Area**
- B. Probability of Detection**
- C. Probability of Success**

*A. Probability of Area: The probability that the subject is within the search area*

*B. Probability of Detection: The probability of detecting the subject in any given area with each type of resource. This takes into account terrain and vegetation, the subject, weather and the search method, among other things.*

*C. Probability of Success: This measures search effectiveness. It is the probability of finding the subject of the search with any given type of resource in any given area. The POS can be mathematically estimated by multiplying the POA percentage by the POD percentage, or  $POS=POA \times POD$ .*

**6. Define the following and explain their importance in determining a search area:**

- A. Last Known Point (LKP)**
- B. Point Last Seen (PLS)**
- C. Initial Planning Point (IPP)**

*All search areas are drawn around either the LKP, PLS or IPP.*

*A. Last Known Point: The LKP is the point where the person is last verifiably known to have been. It differs from the PLS in that the subject may not have been seen at the LKP but may have left some clue as to his being there, such as a track, campfire, piece of equipment or clothing, etc.*

*B. Point Last Seen: The PLS is the most recent place at which someone can confirm that the subject was visually identified.*

*C. Initial Planning Point: Usually located at the LKP or PLS, the IPP is considered the geographical starting point for initial assessment and planning. Unlike the LKP or PLS, the IPP does not move during an incident.*

**7. Explain the following methods of determining a search area:**

- A. Theoretical**
- B. Statistical**
- C. Subjective**

*A. Theoretical: This method draws a circle on a map, the radius of which is determined by how far a subject could theoretically have travelled in the given terrain and in the time since last seen. When determining the size of the circle, several things are taken into account including terrain, the subject's physical condition and experience, weather, etc. Once the circle is drawn, terrain or other factors can aid in determining where to deploy resources.*

*B. Statistical: This method can draw several circles on a map depending on the statistics used. Those statistics can include how far past subjects (based on age, activity or other factors) have historically travelled in a straight line from a PLS or LKP. This method does not take terrain into account, though terrain can help in determining in which sections of the circle to deploy searchers.*

*C. Subjective: This method can be a combination of the other two methods with the subjective feelings and opinions of the search managers and searchers taken into account.*

**8. Explain how to estimate Probability of Detection and why it is important for members of a search crew in the field to be able to do so.**

*A searcher's ability to estimate the POD for any area searched can be a valuable tool for search managers, helping to determine if areas were adequately searched or if additional resources need to be sent into an area. Estimating the POD takes several factors into account such as the terrain searched, any areas searchers were unable to access, vegetation or ground cover, weather and visibility, the search object itself, the physical condition of the searchers, and more. One way to aid in estimating the POD is to ask yourself: If there were 10 objects of varying sizes in my search area, how many of those would I have found?*

**9. Identify the 3 elements on which clue detection is based.**

*The probability of detecting a clue is based on a combination of the characteristics of 3 things: the sensor or searcher, the search subject or clue generator, and the environment in which the detection opportunity will take place. Changing any one of those variables can significantly affect the success of clue detection.*

**10. Identify the 5 categories of search clues.**

- 1. Physical (footprints, discarded material, etc.)*

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2. *Documentary (trail register, etc)*
3. *Testimonial (witnesses, family, friends, etc)*
4. *Events (Flashing lights, whistles, etc)*
5. *Analytical (reasonable conclusions)*

**11. Explain why searchers should look for clues rather than only for the subject.**

*Basically, there are MANY more clues than there are subjects in any given area. Each search subject is a signal generator who is constantly leaving clues for the searchers. The searchers need to be watching for those clues because they will lead to the subject.*

**12. Explain what to do when a possible clue or evidence is located.**

*Evidence or clues discovered in a search must be immediately reported to the OIC. Clues and evidence should not be handled by searchers unless otherwise directed by the OIC. Documentation of the clue or evidence should include location (GPS waypoint, mark on map) and a description (sketch or photograph).*

**13. Explain how knowledge of Lost Person Behavior can be an advantage to searchers.**

*By analyzing the behavior of past lost subjects in similar circumstances, search managers may be able to predict what the subject of the current incident might do. In addition, an understanding of how the present subject has acted in the past could help predict future actions. Trying to think like the lost subject can enhance a field searcher's understanding of where to look and what to look for. Anticipating how the subject might act requires that SAR personnel have a thorough understanding of the lost subject gathered from the initial subject profile and perhaps a more detailed lost person questionnaire.*

**14. Name the two basic categories of search tactics.**

1. *Direct search tactics involve physically moving through the search area.*
2. *Indirect search tactics involve activities such as information gathering or trying to attract the subject and get him/her to move toward you or react to you.*

**15. List and explain the 3 primary Direct search tactics.**

- 1. Hasty Search: This is a quick, initial response of searchers who check the locations where clues or the subject are most likely to be found.*
- 2. Efficient Search: An efficient search usually follows a Hasty Team that has found clues. The goal is to rapidly search a large area. This might involve flooding an area with searchers running roads and trails or an open grid search with widely-separated searchers.*
- 3. Thorough Search: This is a tight grid search that is slow, highly systematic, and manpower intensive. Consequently, it is used as a last resort.*

**16. List and explain at least 3 Indirect search tactics.**

- 1. Fact finding: This is a tactic that continues throughout the incident involving investigation and other information gathering.*
- 2. Attraction: Attraction involves attempts to get the subject to react or move toward you.*
- 3. Containment: This involves techniques to confine the movement of a lost subject and determine if the subject may have left the search area.*

**17. Identify some techniques used for the following search tactics:**

- A. Attraction**
- B. Confinement/Containment**
- C. Hasty Search (route vs. area)**
- D. Grid Search**

*A. Attraction: Techniques can include noise (sirens, whistles, yelling, PA systems) and/or lights (flashing overheads, beacons, searchlights, etc.)*

*B. Containment: Techniques include lookouts posted in strategic locations, track traps, and route/road blocks, patrols and attractions, notes on the subject's vehicle, etc.*

*C. Hasty Search: Tactics include sign-cutting and tracking, dog teams, trail-running teams, aircraft, etc. A route search does not have any boundaries other than the route or trail being searched and the adjacent areas. An area search has clearly-defined boundaries covering a certain segment of the terrain rather than a route or trail.*

*D. Grid Search: Searchers line up on a Control Line in a loose or tight configuration and move through the search area in a highly systematic and organized manner.*

**18. Demonstrate the ability to work as a member of a team conducting both a Loose Grid Search and a Tight Grid Search.**

*Skill-Based*

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19. Explain the following aspects of a grid search:

- A. Critical Distance (aka Average Maximum Detection Range)
- B. Critical Separation (aka Critical Spacing)
- C. Control Line or Base Line
- D. Guide Line
- E. Guide Method
- F. Search Lane

*A. Critical Distance or AMDR: This is the maximum distance at which an object of a particular size and configuration can be visually detected in any given terrain. It can be determined by placing an object similar to the search object in the environment in which the search will be conducted and then walking away from the object in several directions until the object can no longer be seen. Averaging those distances will determine the Critical Distance or AMDR.*

*B. Critical Separation/Spacing: This refers to the spacing between searchers in a grid search. Once the Critical Distance or AMDR is determined, the search manager can determine the Critical Distance/Spacing between searchers necessary to obtain the desired Probability of Detection.*

*C. Control/Base Line: This is the line perpendicular to the searchers' direction of travel on which the searchers line up. Searchers should all travel at approximately the same speed so that they remain on the Control or Base Line.*

*D. Guide Line: This is a line parallel to the direction of travel of the search team which determines the heading along which the searchers travel.*

*E. Guide Method: This is the method used to keep searchers travelling along the guide line. In some cases, it is a designated member of the team whose sole duty is to keep the searchers headed in the proper direction. Searchers can also self-guide with compasses.*

*F. Search Lane: This is the area an individual searcher is assigned to scan while moving through the search area.*

**20. Explain at least 6 important techniques that should be used by field searchers.**

1. *Stay alert and maintain the proper attitude.*
2. *Use ALL of your senses.*
3. *Yell and make noise occasionally.*
4. *Scan the "searcher cube": look up and down, left and right, and forward and behind.*
6. *Do not shine your light or headlamp into the eyes of other searchers.*
7. *Check the obvious and "attraction" sites.*
8. *Talk to hikers on the trail about what they might have seen.*
9. *Search for clues as well as the subject.*
10. *Safety first.*

**21. Describe the Lost Person Questionnaire and how it is useful for determining search strategy and tactics.**

*The Lost Person Questionnaire is used by search managers to gather information about the lost subject or subjects. Information can be gathered from a variety of sources to develop a profile of the search subject that can give search managers an idea as to how the subject will behave under various conditions. The questionnaire also covers topics such as physical description, health problems, equipment and resources the subject might possess, and more. The more information search managers can gather, the easier it will be to develop effective search strategy and tactics.*

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## Chapter 7: Orientation and Navigation

To certify at the Basic Level, a member shall:

### 1. Identify and explain 3 types of maps used in Search and Rescue.

*A. Topographic: Maps that portray the shape and elevation of terrain using contour lines.*

*B. Planimetric Maps: These are basically street maps that show horizontal information.*

*C. Orthophoto Maps: Satellite or aerial photos geo-referenced as maps.*

### 2. Identify and explain all of the margin information on a topographic map.

*A. Quad name, location and series in upper right corner*

*B. Latitude-Longitude, Universal Transverse Mercator, and State Plane Coordinates on all sides*

*C. Dashed map datum offset ticks in all 4 corners*

*D. Diagram of map location within the state and adjoining quad names*

*E. Scale, contour intervals, and road legend*

*F. Magnetic declination, map datum, and dates in lower left corner*

### 3. Identify and explain the following aspects of maps:

**A. Index and intermediate contour lines and intervals**

**B. Grid north vs. magnetic north**

*A. A contour line on a topographic map indicates points that are at the same elevation. Adjacent contour lines indicate an elevation change corresponding to the contour interval listed in the bottom margin. Every fifth contour line is darker and has an elevation number superimposed on it. This is called the Index Line. The lighter lines in between are called Intermediate Lines.*

*B. Magnetic north is the direction a compass needle points. Grid north is indicated by the vertical UTM lines on a topo map. Grid north is usually very*

*close to True North, which would correspond to the map edge. The differences are sometimes displayed in a graphic in the bottom margin.*

**4. Define and identify the following common grid systems on any map used by your county:**

- A. Geographic Coordinate System (Latitude-Longitude, or Lat-Long)**
- B. Universal Transverse Mercator (UTM)**
- C. United States Public Land Survey (Township, Range, Section)**

*A. The Geographic Coordinate System uses degrees of latitude and longitude to describe a location on the earth's surface. Lines of latitude run parallel to the equator. Lines of longitude run perpendicular to the equator and converge at the poles.*

*B. The UTM system is a grid-based system that divides most of the earth into zones, which are usually 6 degrees E-W and 8 degrees N-S. Coordinates are determined by measuring east and then north in the zones. Easting values are measured relative to a central meridian that is given a value of 500,000 meters in each zone. The northing values are measured continuously from zero at the equator. All measurements are expressed in meters.*

*C. The U.S. Public Land Survey system divides an area into Townships that are 36 miles square with borders running approximately north/south and east/west. Each Township is typically divided into 36 one-square-mile Sections. Positions are indicated by describing the location within a Section, the Section number, and then the Township's relation to an established Principle Baseline (tiers north or south of that line) and Principle Meridian (Range/East or West).*

**5. Be aware of the United States National Grid Reference System (NGRS).**

*The U.S. National Grid Reference System is a recently-developed grid system that is derived from the older Military Grid Reference System. It is confusing and rarely used. It utilizes UTM coordinates, but replaces the large 100,000 meter grid numbers in the margins of a topographic map with letters. It was developed with the intention of providing a universal coordinate referencing system that would supposedly improve interoperability between agencies from across the U.S. (Example: UTM coordinates 12S 0629932 x 4265895 become XH2993265895.)*

**6. Explain the difference between the 3 formats within the Geographic Coordinate System and their common uses.**

*When relaying lat-long coordinates, it is very important to know whether those coordinates are in degrees, minutes, and seconds or a decimal fraction thereof. Coordinates are often relayed by inexperienced people who have no idea if they are looking at a degree, a minute, a second or a decimal fraction on their GPS or cell phone. They may omit a decimal point or put it in the wrong place. They may confuse a symbol with a decimal point. The 3 formats are:*



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*A. Degrees, Minutes, Seconds: This can be the most cumbersome format with which to work. It's a lot like telling time. There are 60 seconds in a minute and 60 minutes in a degree. So one quarter (.25) of a minute is 15 seconds. The only decimal point in this format might appear as a fraction of a second. However, tenths of a second are seldom crucial since a full second is roughly 80-100 feet. On most GPS units, this will appear as hddd°mm'ss.s".*

*B. Degrees and decimal degrees: This is the standard format for e911 systems, OnStar, SPOT and InReach. There are no minutes or seconds in this format, only decimal fractions of a full degree. The number of digits to the right of the decimal point varies. On most GPS units, this will appear as hddd.dddd°.*

*C. Degrees, Minutes and decimal minutes: This is the preferred format for aircraft. There are no seconds in this format, only degrees, minutes, and decimal fractions of a minute. On most GPS units, this will appear as hddd°mm.mmm'.*

### **7. Locate your position on a map, when given coordinates in any of the 3 common grid systems.**

*Skill-based: Be able to recognize which of the 3 systems appears on any given map.*

### **8. Determine coordinates for any point on a map in each of the 3 common grid systems.**

*Skill-based: Be able to recognize which of the 3 systems appears on any given map.*

### **9. Demonstrate how to orient a map to terrain in the field.**

*Skill-based: Place the map on the ground or on a non-metal object. Set your declination-adjusted compass dial at 0/360 so that true north is on the Direction of Travel line. Place the compass on the map so that the edge of the base plate is parallel with the border of the map and the orienting arrow points toward the top of the map. Turn the map and compass together until the compass needle is "boxed".*

**10. Demonstrate how to take a field bearing and transfer it to the map.**

*Skill-based: Point the Direction of Travel arrow on a declination-adjusted compass at the object to which you want to determine the bearing. Rotate the dial until the needle is "boxed". The bearing will be indicated at the base of the Direction of Travel arrow. To transfer the bearing to a map, locate the object on the map and place the edge of the compass on that object. With the edge still tight against the object and without touching the dial, turn the base plate until the orienting lines in the housing line up with magnetic north or until a line bisecting 0-180 degrees on the dial is parallel with the border of the map. The orienting arrow must point toward the top of the map. The edge of the base plate forms a line on the map. You are along that line and the Direction of Travel arrow indicates the field bearing. Repeating this process with at least one other object can help determine your precise position on the map through triangulation.*

**11. Demonstrate how to determine a bearing on a map and transfer it to the field.**

*Skill-based: Place the declination-adjusted compass on the map so that one edge of the base plate is along a line between the starting point and the destination, with the direction of travel arrow pointing toward the destination. Rotate the dial until the orienting lines in the base are parallel with magnetic north on the map or until a line bisecting 0-180 on the compass dial is parallel with the border of the map (orienting arrow toward top of map). Your direction of travel arrow indicates the bearing. To follow that bearing, simply remove the compass from the map, rotate the base plate until the needle is boxed, and follow the direction of travel arrow.*

**12. Demonstrate the ability to determine a back azimuth.**

*If the bearing is less than 180 degrees, add 180 to get the back azimuth. If your bearing is more than 180 degrees, subtract 180 to get the back azimuth.*

**13. Determine an approximate distance between two points on any map.**

*Skill-based: Measure the distance on the map with a ruler or mark it on a piece of paper. Determine the distance using the bar scales on the map.*

**14. Identify the major parts of a compass and explain the function of each of those parts.**

*A. Base Plate or Base: The flat surface on which the rest of the compass is mounted. It will usually have measurements and scales marked on it, along with the Direction of Travel Arrow.*

*B. Bezel or Housing: The round container often filled with liquid that contains the magnetic needle which points to magnetic north when held level and away from metal objects, radios, etc.*

*C. Dial: The ring around the housing that has degree markings on it. When the dial is rotated, the entire housing rotates.*

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*D: Direction of Travel Arrow: An arrow inscribed on the base plate of the compass that indicates the direction of travel when navigating.*

*E. Orienting Arrow: The arrow inscribed into the base of the housing that rotates when the housing is turned. It is used to determine north by "boxing" the red end of the needle in the orienting arrow.*

*F. Orienting Lines: Parallel lines in the bottom of the compass housing that are parallel with the orienting arrow. They are useful when using the compass with a map.*

*G. Magnetic Needle: The magnetized piece of metal that sits on a fine point within the housing and points to magnetic north when the compass is held level. One end is red to indicate north.*

*H. Index Line or Index Mark: The butt end of the Direction of Travel Arrow where the azimuth is read.*

### **15. Explain Magnetic Declination and demonstrate how to adjust a compass to compensate for it.**

*Magnetic Declination is the angular difference between Magnetic North (where the compass points) and True North or Geographic North. It varies slowly with time because of the movement of the magnetic north pole. To adjust a compass in the western U.S. for declination, the orienting arrow needs to be rotated so that it points east of zero degrees by whatever amount the declination happens to be at the time in the area.*

### **16. Demonstrate the ability to follow a compass course, including the ability to navigate by compass around an obstacle blocking the path of travel.**

*Skill-based*

### **17. Explain how the GPS system works.**

*Your GPS is basically a satellite receiver. It receives signals from a network of satellites travelling in very precise orbits at speeds of roughly 7000 miles per*

hour. Based on these signals, GPS receivers use triangulation to calculate the user's exact location. The GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. That time difference indicates the distance between the satellite and the receiver. If the GPS receiver is locked onto the signal of at least 3 satellites, it can calculate a 2D position. A 3D position can be calculated if the receiver is locked onto 4 or more satellites. Typical GPS accuracy is 15 meters.

Many newer GPS units utilize a network of ground-based repeaters that relay a corrected signal to a pair of geostationary satellites over the equator which then re-transmit the signal to compatible GPS units. This system, called WAAS, corrects for signal errors caused by ionospheric disturbances, timing and satellite orbit errors. It improves accuracy to within 3 meters 95% of the time. WAAS works best if you have a low southern horizon.

**18. Identify advantages and limitations of using a GPS.**

*Advantages: Precise positioning in different formats, navigation, speed determination, track logging, etc.*

*Disadvantages: Reliance on battery power and technology, poor signal in certain areas, user error, and mechanical failure.*

**19. Identify situations that will affect GPS accuracy.**

*Prior to May of 2000, GPS signals were intentionally degraded by the U.S. government in a program called Selective Availability (SA). If you were lucky, your GPS position was accurate to within 100 meters. After SA was ended, positions immediately became accurate to within about 15 meters. With improved design and the development of the WAAS system, GPS accuracy can now be better than 3 meters in areas of good reception. Since GPS signals are radio signals, they travel by line of sight. They will pass through clouds, glass and plastic, but will not go through solid objects such as buildings or mountains. Multipath errors, caused by the signal bouncing off of buildings or canyon walls, increase the travel time of the signal and can cause inaccuracy. Dense tree cover or narrow canyons that block direct views of the satellites can also degrade signal accuracy or even prevent signal reception. GPS position accuracy improves with the length of time the unit is left turned on. Most units now give some measurement of position accuracy.*

**20. Explain Horizontal Datum and how it can affect the transfer of data between a GPS and map.**

*A horizontal datum is a mathematical model used to measure positions on the earth. Different models or datums project a slightly different grid onto the earth's surface. Any single point on the surface of the earth can have substantially different coordinates depending on the datum used. When transferring coordinates between a GPS, maps, computers, etc., the datum must match. If not, the coordinates will be inaccurate. All GPS units come from the factory set*

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*to a default datum of WGS84. USGS maps are NAD27. Coordinates relayed by services such as SPOT, InReach, and OnStar will be in WGS84.*

**21. Demonstrate the following procedures with a GPS:**

- A. Determine current location**
- B. Change position format and map datum**
- C. Enter a waypoint when given coordinates**
- D. The GOTO function**
- E. Track log creation**

*Skill-based*

**22. Explain the following devices that send coordinates from the field, including where the coordinates are initially sent and problems that might be encountered in determining the precise location of the device (as new technology develops, this list may change):**

- A. SPOT Messenger**
- B. Delorme InReach**
- C. Personal Locator Beacons**
- D. Smart Phones vs. Dumb Cell Phones in relation to Phase Two 911**
- E. Emergency Locator Transmitter**
- F. OnStar**

***A. SPOT:** SPOT Messenger is a one-way communication device that allows the user to send pre-defined text or email messages along with the location of the device to friends, family, etc., through the commercial Globalstar satellite system. SPOT Connect is a one-way device that pairs with a smartphone and allows 120-character pre-defined messages or 41-character "type and send" messages to be transmitted. The SPOT devices can also send an emergency notification to the GEOS International Emergency Response Coordination Center. When the device is triggered, the message and coordinates are transmitted to a satellite which re-transmits the data to ground-based antennas that route the signal to the appropriate network and receiver. The appropriate emergency response agency*

is contacted and given the coordinates. Lat-Long coordinates are WGS84 and in decimal degree format.

**B. Delorme InReach:** This is a new device similar to SPOT, except that it allows 2-way communication when paired with a cell phone and the proper app. The phone is essentially the keyboard and message screen for the device. Emergency signals are transmitted via commercial satellites to the same Emergency Response Coordination Center as SPOT signals. The RCC can communicate directly with the InReach device, or they can allow local authorities to do so.

**C. PLBs:** These devices transmit distress signals on the internationally-recognized distress frequency of 406MHz to the COSPAS-SARSAT satellite system, which is monitored by NOAA and the AFRCC. Each device transmits an identifying code which is linked to a database maintained by NOAA. Most newer PLBs transmit coordinates along with the identifying code. However, some older or less expensive units do not transmit coordinates. With non-GPS units, it may take several satellite passes to determine an approximate location, and then a Direction Finder can be used to locate the 121.5MHz homing beacon, perhaps delaying rescue by several hours over the GPS-equipped PLBs.

**D. Smart and Dumb Cell Phones:** With the implementation of Phase Two 911, most newer phones automatically transmit coordinates with the 911 call. These coordinates have proven to be very accurate. However, there are still instances where the less-accurate triangulation method is used or when the coordinates given may be those of a cell tower, such as when someone has poor service, is using an older phone, or has service with a carrier that has not activated Phase 2 in the county.

**E. ELT:** These are beacons carried by aircraft that transmit on a frequency of 121.5 and/or 406MHz. The 406MHz signals go to the COSPAS-SARSAT system monitored by NOAA and the AFRCC. As of 2009, the COSPAS-SARSAT system stopped monitoring the 121.5 frequency, so ELTs transmitting only at 121.5 can only be located by ground-based receivers or by aircraft flying overhead. Since location of the 406MHz device depends on satellite triangulation, it can take a substantial amount of time to get what amounts to an approximate location via the 406MHz frequency. We can search for 121.5MHz ELTs with our Direction Finder.

**F. OnStar:** This is a service of General Motors that relies on mobile phone voice and data networks. Customers can manually or automatically signal for assistance. Coordinates are transmitted with the signal in decimal degree format and a map datum of WGS84. The signal is routed to OnStar call centers and relayed to the appropriate local agency. Since the service relies, in most places, on Verizon's network, it is subject to the same limitations as cell phone service.

**23. Explain some issues that can be encountered in receiving initial coordinates for an incident and how to deal with those issues.**

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## Chapter 14: National Incident Management System (NIMS) Compliance

All SAR members shall complete FEMA Independent Study courses:

- a. *IS-100.b - Introduction to the Incident Command System, ICS 100*
- b. *IS-700.a - National Incident Management System (NIMS) An Introduction*

These online courses can be found at <http://training.fema.gov/IS/NIMS.aspx>. Be sure to print a copy of the certificate upon completion of the course.

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*of the information. The diagram should contain accurate measurements, reference points, evidence locations, and any other items of relative value.*

### 11. Explain the 3 ways of taking measurements at a crime scene.

**A. Triangulation Method:** *Measure from two fixed objects, known as reference points, which are as far apart as practical. Do not use fence posts, trees, or objects that might subsequently be removed or cut down. You might need to make your own reference points. This method is mainly used for outdoor scenes.*

**B. Coordinate Method:** *This method involves measuring from two reference points at right angles. It is most often used indoors.*

**C. Baseline Method:** *This method is most often used outdoors when there is a roadway from which to measure. Stretch a straight tape between reference points and measure from that tape to the evidence.*



*Start at the beginning of the scene. Show the progression of events. Photograph the approach. After that, take photographs from the point of entry to the point of exit. Working in an organized, methodical manner will reduce the possibility that you will miss evidence.*

*Crime scene photographs must show the scene prior to any alterations. The scene must be documented first with long range photographs, then medium range and finally close-ups. After the initial scene documentation, evidence placards are put in place and another complete series of long range, medium range and close-up photos are taken. Do not include your equipment or other people in photos of the scene.*

*For a picture to be admissible in court, it must be a true and accurate depiction of the scene as it appeared on the day the photograph was taken. Crime scene photographs should never be staged. If any items of evidence were moved prior to your arrival, they must be photographed where you found them. Never replace items where they were originally found. This is staging.*

**9. What special procedures should be followed when including a scale in your photographs to document the size of an object?**

*When photographing crime scenes, it may be necessary to include a scale to document the size of an item. This is especially true when taking examination quality photographs of fingerprints, shoe and tire track impressions, bite marks, blood spatter, and tool mark impressions.*

*When photographing with a scale, take the picture of the evidence at a 90-degree angle. Fill the frame and include the scale in the photo. Do not put the scale on the item of evidence. Place the scale beside the item. Use at least an 8-megapixel camera and shoot the item in RAW format. If RAW is not available, use the camera's highest-quality setting.*

**10. Explain the procedure for drawing a Crime Scene Diagram.**

*A diagram is a map of the scene showing the location where the incident took place. The diagram must show where the scene is in relation to the area around it. If the diagram or map is completed properly, anyone viewing the diagram will be able to return to the exact location and find the center of the crime scene. When you have finished your diagrams ask yourself one question: "If someone unfamiliar with this case were to look at my completed diagrams, would that person be able to find the original scene, understand what took place, and put the listed evidence back in the original locations?"*

*A rough sketch is often drawn at a crime scene. Search and rescue members can use their mapping skills in completing the rough sketch. Final diagrams will be completed from the rough sketch, so it is important that the sketch contain all*

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**A. Physical evidence:** *This can be something as large as an airplane or as small as a hair or tiny piece of glass. Examples of this type of evidence include the body of a subject, firearms, projectiles, shell casings, knives, axes, clubs, vehicles, bags, rope, tape, clothing, computers, cash, perishable items and more.*

**B. Impression evidence:** *Examples of impression evidence include tire tracks, footwear, footprints, bite marks or tool marks.*

**C. Fingerprint evidence:** *The three categories of fingerprint evidence are Latent (hidden) prints, Patent (visible) prints, and Plastic (impressed) fingerprints.*

**D. Biological evidence:** *Blood, semen, bones, teeth, saliva and hair are all examples of biological evidence.*

**E. Trace/Other evidence:** *Trace evidence is generally thought of as any type of evidence occurring in sizes so small that can be transferred between two surfaces without being noticed. This type of evidence can include hairs, fibers, paint chips, glass, wood and soil or dirt.*

### **7. Explain the purpose of Crime Scene Photography and when SAR members are allowed to take photos.**

*The purpose of photography is to present the scene to the court as it was when you were there. All photographs taken may be considered evidence. Photographs or videos taken by SAR members while engaged in a SAR activity shall not be disseminated outside of the organization unless authorized by the Sheriff or his designee. A SAR member may be held civilly or criminally liable for unauthorized use or distribution of photographs or video footage.*

### **8. Explain the procedure to follow if you are asked to take photographs at a crime scene.**

*try to protect the evidence in place (i.e.: tarp, etc). Evidence should only be disturbed if it is in danger of being destroyed if left unprotected.*

**F. Establish a Perimeter:** *The perimeter of a crime scene should be established as soon as the scene has been brought under control. The purpose of a perimeter is to preserve and maintain evidence. It varies in size. It is always better to begin with a larger area and then reduce it as facts develop. The objective is to safeguard evidence not yet discovered, such as shoe and tire impressions, blood evidence, etc. An entry and exit corridor should also be established at this time. Anyone entering or exiting the scene should use this path to maintain the integrity of the overall scene. The rule is "one way in and one way out." Whenever possible, two perimeters should be established. An outer perimeter can be for the staging area. The inner perimeter should be restricted to crime scene units and detectives. A crime scene log should be kept. This log should record all personnel who enter and exit the scene. Clear the scene of all unnecessary people and keep the interior of the scene secure. At this point, Search and Rescue must wait for law enforcement to arrive and take charge of the scene. The supervising detective may still have SAR assist with perimeter security, evidence gathering, or other crime scene responsibilities. He may also need SAR's expertise in water, land, and mountain rescue.*

**3. Explain the role of Search and Rescue in evidence collection.**

*You may be asked to assist in evidence collecting. Deputies will advise SAR members of any specific items that need to be collected.*

**4. Explain the procedure to follow if you are asked to collect evidence.**

*While the job of SAR members is usually to protect evidence rather than to collect it, obtain very specific instructions from law enforcement if you are asked to collect any piece of evidence. Different types of evidence require specific packaging techniques and containers.*

**5. Explain evidence collection and documentation procedure.**

*Every piece of evidence must be documented with photography, placed in the rough crime scene sketch, measured, cataloged, and then either processed at the scene or collected properly and preserved for subsequent processing in the lab.*

*A written log of all collected items should contain the item number, description, location, and the name of who collected it. All of the packaging should be sealed and dated. The seal consists of completely taping the opening of the package and putting your initials and date so that half of it is on the tape and half is on the package. The item number must also be written on the package.*

**6. Identify the 5 general categories of evidence.**

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*arrives. That person must do the same things to protect the scene that the first officer would do. The time to prepare for court is the moment you arrive at the scene – and SAR members have been called into court.*

**B. Mental Preparation:** *The first thing to do while en route to a crime scene is to think. Arrive at the scene with a mental plan. Use what you know about the call and develop scenarios about what may have happened and what your response should be to a given set of circumstances. Be as prepared as possible for what will confront you at the scene. Any witnesses should be kept separate until they can be interviewed.*

**C: Take charge of the situation:** *When you arrive as the first responder, take charge of the situation. The priority is to evaluate and render first aid to the injured and summon the required emergency units. When other units arrive, advise them where to go and how to enter the scene. Keep all traffic entering and exiting the scene moving in a single direction that protects physical evidence.*

**D. Safety First:** *Ensure your own safety and the safety of other responders. Determine if the suspect(s) have fled the scene and recognize other possible hazardous conditions so that you can alert other responders. Always wear gloves at any crime scene. Other protective clothing might include booties, Tyvek suits, goggles, etc.*

**E. Preserve Evidence:** *Unless a piece of evidence is in jeopardy of being contaminated or is a hazard to others, touch nothing. Secure the scene by roping it off with barricade tape and have someone maintain security at the tape. Pay attention and make notes. Mental notes are not good enough. Make detailed written notes of what you observed and what you were told by witnesses. Use your senses of smell, hearing, and eyesight when at a crime scene. By the time investigators arrive, odors such as gasoline, kerosene, diesel fuel, cleaning agents, or drugs may have dissipated. Evidence should be secured in place and not moved until law enforcement and /or crime scene personnel can arrive. If weather elements may potentially damage the evidence,*

## Chapter 13: Crime Scene Awareness

All search and rescue incidents should be considered crime scenes until proven otherwise. Care must be taken when approaching each SAR incident to preserve evidence or prevent contamination of evidence.

To certify at the Basic Level, a member shall:

### 1. Explain the following terms or concepts related to a possible crime scene:

**A. Agent for law enforcement:** *Anyone who does anything under the direction of a law enforcement officer is his agent. Since Search and Rescue in Utah works under law enforcement, all SAR members are agents of law enforcement. Thus, SAR members are required to follow all laws, including laws pertaining to search and seizure. All items of evidence collected by SAR members are to be turned over to law enforcement immediately and are not to be used for their private use or passed on to other individuals or agencies.*

**B. Exclusionary rule:** *Evidence which has been seized or obtained illegally by law enforcement officers will not be admitted as evidence into a criminal trial.*

**C. Exigent Circumstances:** *Circumstances so urgent that they justify a warrantless entry and search and seizure by law enforcement officers when a warrant would have ordinarily been required.*

**D. Reasonable expectation of privacy:** *Under reasonable circumstances, a person has a right to expect privacy. Husband and wife, boyfriend and girlfriend, or any other persons living together have an expectation of privacy. Evidence not in plain view could be excluded from court.*

**E. Plain view doctrine:** *The observation by a law enforcement officer of evidence which is in plain view and not concealed. The evidence can be seized without a warrant as long as the officer is at the location legally.*

**F. Revoking a consent to search:** *A consent to search can be withdrawn or limited by the person giving the consent at any time prior to the completion of the search. If consent is withdrawn, you must stop searching at that point and secure a search warrant.*

### 2. Explain Key Aspects of Crime Scene Procedure for SAR Personnel.

**A. Work Together:** *It is imperative that Search and Rescue work together with Law Enforcement at a crime scene. The actions of all involved are directly related to the successful processing and recovery of the physical evidence at the scene. In most instances where a crime has been committed, law enforcement will be there to take charge. If law enforcement has not yet arrived, it is the responsibility of the first responder on scene to take charge until law enforcement*

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*m) Potential terrorist targets*

**7. It is recommended that Search and Rescue personnel take FEMA's Independent Study Program Course IS-5.a, An Introduction to Hazardous Materials. The 10-hour course is available online at FEMA's website.**

*effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. The MSDS is required to be available to employees working with the substance and also to fire departments and emergency planning officials.*

*e) Emergency Response Guidebook: This is the "little orange book" developed by the U.S. Department of Transportation in cooperation with similar agencies in surrounding countries. It outlines hazards and response recommendations for all hazardous materials. All SAR members, when given either the name or identification number of a hazardous material, should be able to use this book to identify the material, the hazards of the material, and the recommended response procedures to any incident involving the material.*

**6. Describe potential locations where hazardous materials might be found in your local jurisdiction.**

*Some locations will obviously contain hazardous materials. In rural areas, hazardous materials could be found in locations that might not be so obvious.*

- a) Illegal drug labs (homes, cabins, camps, vehicles)*
- b) Dump sites (legal or illegal)*
- c) Farms and ranches that use pesticides (organic or otherwise)*
- d) Abandoned mines and other confined spaces*
- e) Persons who commit suicide by chemical*
- f) Chemical manufacturing businesses*
- g) Businesses that use chemicals in their facilities*
- h) Shipping routes*
- i) Local retailers*
- j) Gas and LPG storage sites*
- k) Storage units*
- l) Pools and culinary water systems*

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*storage tanks and smaller containers in fixed facilities. Placards and labels are diamond-shaped with color-coded quadrants indicating the type of hazard and a number indicating severity. The blue quadrant indicates health hazard level. Red indicates flammability hazard. Yellow indicates chemical instability or reactivity. The white quadrant can be used to indicate a "special notice" such as dangerous reactivity with water or radioactivity. The numbers range from 0 to 4, with 4 being the highest hazard level. Use of the system is voluntary unless specified by local codes.*

*b) DOT: The U.S. Department of Transportation regulates the transport of hazardous materials. DOT labels and placards identify the class of material and the specific material being transported. Hazardous materials containers in transportation are required to be appropriately labeled and the vehicle placarded when the hazardous materials' gross aggregate weight exceeds 1001 pounds. Some hazardous materials are required to be labeled and placarded regardless of the amount being transported. The color of the placard indicates the general class of hazardous material. Large identification numbers or letters on the placards designate the specific substance.*

*c) Shipping papers: Any carrier transporting hazardous materials is required to carry shipping papers indicating the specific material and amounts of the material being transported. Those papers are required to be kept in specific locations, depending on the mode of transport.*

*d) Material Safety Data Sheets (MSDS): OSHA requires chemical manufacturers and importers to evaluate the chemicals they produce or import and provide hazard information to employers and workers by putting labels on containers and preparing material safety data sheets. OSHA requires certain information to be included in the MSDS. The MSDS includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health*



*particularly sensitive to toxic substances; since capillaries are near the surface, the substance can be absorbed by the bloodstream more readily.*

*b) Injection: Injection occurs when a contaminated object pierces the skin. It could be a needle or any sharp object such as glass or metal fragments. With injection, the hazardous material enters the blood stream immediately.*

*c) Ingestion: A hazardous material can contaminate something which is eaten either on purpose or inadvertently. Chemicals can be ingested if they are left on hands or clothing or accidentally contaminate food or drinks.*

*d) Inhalation: This occurs when the substance (gas, dust, etc.) is inhaled into the lungs. While some hazardous materials can cause nose, eye or throat irritation or have an obvious smell, many chemicals can be inhaled without providing any sensory warning.*

#### **4. Describe methods of recognizing when hazardous materials might be present.**

*While there may sometimes be sensory clues that a hazardous material is present, those sensory clues are the least dependable and most dangerous method of detecting a hazardous material. If you notice an area that has a terrible smell, your eyes water, your skin is irritated or you begin to cough or feel nauseous, leave immediately and notify the proper authorities. Sometimes there are physical signs that a hazardous material could be present. Physical signs might include numerous dead animals, birds, or fish, unusual bare spots in the ground such as dead or discolored vegetation when there is no current drought, lack of normal insect activity, the presence of metal drums or other specially designed containers, oily water, etc. Vehicles carrying hazardous materials in certain quantities are required to display DOT placards. However, many vehicles (such as UPS) are not required to be placarded when carrying smaller quantities of potentially hazardous materials.*

#### **5. Describe methods of hazardous materials identification.**

*a) NFPA 704: This is a system for hazardous materials identification maintained by the National Fire Protection Association. It is used on stationary*

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## Chapter 12: HAZMAT Awareness

To certify at the Basic Level, a member shall:

### 1. Define a hazardous material.

*A hazardous material is a substance or material which, because of its chemical, physical or biological nature, poses a potential risk to life, health, safety or property if released.*

### 2. Explain Search and Rescue's role in a Hazardous Material incident.

- a) *Recognize the potential threat.*
- b) *Alert the proper emergency response personnel.*
- c) *Know how to identify the material, if possible.*
- d) *Protect yourself and others.*
- e) *Isolate the scene by restricting or rerouting traffic and conducting an evacuation, if necessary.*
- f) *Assist in providing first aid.*
- g) *Avoid becoming part of the problem. Do not approach too close.*

### 3. Explain the ways hazardous materials can enter the body.

*a) Absorption: A material can be absorbed through the skin or enter through a cut in the skin. Some chemicals can be absorbed regardless of the skin's condition, so protective gear should be worn to prevent absorption. Eyes are*

**5. Explain Suspension Trauma.**

*Suspension trauma, also known as orthostatic shock or "harness hang", is a result of blood flow restriction while suspended motionless in a harness. Restriction from the harness straps plays a role in suspension trauma, but the chief contributing factor is lack of muscular motion which would normally keep blood circulating throughout the body. Without motion, blood collects or "pools" inside the dangling legs. As the blood supply to the brain decreases, the heart beats faster, the subject feels lightheaded and then loses consciousness. Permanent and irreversible damage quickly develops in the oxygen-starved brain and kidneys. If left unconscious for more than a few minutes, the subject will die. Reasons for the individual to pause motionless on a rope could include exhaustion, hypoglycemia, hypothermia, injuries, technical problems or mental problems such as fear.*

**6. Explain how to reduce the chance of Suspension Trauma in a suspended person.**

*If someone is stranded in a harness but has something to kick against or stand on (such as a rock ledge or foot loop), it is helpful for them to use their leg muscles by periodically pushing against it to keep blood circulating. Obviously, an unconscious or injured person may not be able to do so. However, keeping the legs moving can be both beneficial and dangerous for a suspended subject. Exercising the leg muscles will keep the blood returning to the torso, but as the movements become weaker, the leg muscles will continue to demand blood and will become less effective at returning it to the body. The moment the victim ceases leg movement, the blood will immediately start to pool. "Pedaling an imaginary bicycle" should only be used as a last-ditch effort to prolong consciousness, because as soon as the "pedaling" stops, fainting will shortly follow. If it is impossible to rescue someone immediately, then rig a rope or webbing to raise the person's legs to a sitting position.*

**7. Demonstrate how to secure a patient into a litter for a standard carryout using webbing and/or straps specifically designed for the litter being used.**

*Skill-based*

**8. Identify methods for protecting a patient from different aspects of the environment during a carryout.**

*A. Litter shields or helmets for sticks, branches, falling rocks, sand, sun, etc.*

*B. Various methods of thermal protection such as blankets or sleeping bags.*

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### **Chapter 11: First Aid, CPR and Patient Care**

**Members are required to maintain certifications in Basic First Aid and CPR (American Heart Association standards). Courses must be taught to current standards by recognized providers, and should include but are not limited to the following:**

- A. Describe precautions to be taken before treating an injured person.*
- B. Demonstrate the ability to perform an Initial Assessment.*
- C. Explain the ABC's of patient care.*

**To certify at the Basic Level, a member shall:**

- 1. Describe accepted methods for controlling bleeding.**
- 2. Identify the signs and symptoms, and describe basic treatment for the following:**
  - A. Shock*
  - B. Dehydration*
  - C. Heat Cramps*
  - D. Heat Exhaustion*
  - E. Heat Stroke*
  - F. Hyponatremia*
  - G. Frostbite*
  - H. Hypothermia*
  - I. Insect Bites*
  - J. Snake Bites*
  - K. Exposure to poisonous plants*
- 3. Demonstrate proper splinting for a variety of broken bones.**
- 4. Demonstrate how to protect a patient in the litter from different aspects of the environment during a carryout.**

- e) *Using the Coarse and Fine modes and knowledge of the difference*
- f) *Signal identification*
- g) *Proper search pattern*

**15. Differentiate between the general capabilities of a medical vs. a non-medical helicopter.**

*The line between the two is often blurred. But generally, a medical helicopter is on-scene only to treat and transport the patient. However, depending on the pilot and the mission, there may be times when a medical helicopter will transport rescuers and gear to and from a location or even help in a search. But this is not their job.*

*Non-medical helicopters are a tool for the rescuers. They are called when we need help with a search or to transport gear and personnel to and from an incident location. Non-medical helicopters will often land in locations that the medical helicopters will not (depending on the pilot).*

**16. Identify various local and regional sources for helicopters or other air support functions.**

*County-specific*

**17. Explain types of incidents in which the Civil Air Patrol or civilian fixed-wing aircraft could prove useful.**

*The Civil Air Patrol or civilian fixed-wing aircraft would be most useful in searches. Fixed-wing aircraft can cover a great deal of ground in a short time. They can be used to fly roads or trails or to fly grid patterns in the search area.*

**18. Name at least 2 types of specialized equipment available on a limited number of helicopters.**

- a) *Helicopters are available with winch or hoist capabilities.*
- b) *Some agencies have avalanche receivers that can be suspended on a line below the helicopter, enabling fast searches of relatively large or remote areas.*

# UTAH SHERIFFS' ASSOCIATION

## SEARCH AND RESCUE

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### 11. Identify lighting requirements for a landing zone at night:

- A. When the pilot is using night vision
- B. When the pilot is not using night vision

a) *With night vision: On-ground lighting at the LZ should be kept to a minimum with NO bright lights being used. If possible, locate any lighting on the side or downwind of the LZ so that the pilot is not looking into them on his final approach. The helicopter landing kit lights would be an exception, and the pilot may even ask for those to be turned off.*

b) *Without night vision: Vehicle headlights or other bright lights may be used to designate the LZ. Once the pilot has seen the LZ and checked it out, he may ask for the lighting to be reduced. Again, try to illuminate the LZ from the sides or downwind so that the pilot is not blinded by the lights on final approach.*

### 12. Explain when SAR personnel may approach the helicopter and how to approach.

*SAR personnel should only approach the helicopter after the pilot or a crewmember has signaled them to approach. Approach only from the front within view of the pilot. Never approach from uphill. (With Blackhawks, approach from the side at the direction of the Crew Chief)*

### 13. Identify 2 types of incidents in which the Direction Finder can be used.

*The Direction Finder is used to locate aircraft Emergency Locator Transmitters or Personal Locator Beacons carried by backcountry travelers.*

### 14. Demonstrate use of the Direction Finder.

*Skill-based, things to check:*

- a) *Turning on and off*
- b) *Deploying antennas*
- c) *Choosing the frequency or channel*
- d) *Proper sweep method*

*c) Obstacles and Ground Cover: The LZ should be clear of any obstructions such as trees, fences, taller brush, etc. Try to envision where the touchdown pad (where the pilot might put the skids) will be and make sure there are no obstructions within the larger safety circle or LZ. The ground cover should be as firm as possible so that the problem of rotor-blown dust is minimized. Always advise the pilot of any taller obstacles in the area, even if they are outside of the actual LZ.*

*d) Approach and Departure Paths: Helicopters like to take off and land into the wind. Make sure that there are no obstructions in those paths. Hilltop and ridge top landing zones are much better than canyons. Always advise the pilot of any obstructions (power lines, canyon walls, etc) in the approach and departure paths.*

**9. Describe precautions to be taken at the landing zone before the helicopter arrives or departs.**

*Clear the area of any vehicles and people. Make sure that anything which can be picked up by the rotor wash (clothing, blankets, etc) is secured or removed from the area. Anyone near the LZ should have proper PPE. At the EOC, close the bay doors.*

**10. Explain the following duties of the LZ or helispot manager:**

**A. Scene safety**

**B. Communication with the aircraft**

**C. Identification of the specific proposed landing location**

**D. Provision for a wind indicator**

*a) Scene Safety: See #8. The LZ manager should do this himself or assign someone to do so.*

*b) Communication with aircraft: The LZ manager should be the only person communicating with the aircraft on the pre-determined channel (best to use a non-repeater channel). He will advise the pilot of any hazards on the ground or in the area, wind, proposed location, and will keep him updated about any changes.*

*c) Identification of location: The LZ manager should stand on or adjacent to the proposed touchdown pad with his back to the wind and arms extended downwind until final approach. The pilot will not always land exactly where you think he will.*

*d) Provision for a wind indicator: Many things can serve as wind indicators, in addition to the LZ manager standing with his back to the wind and arms outstretched downwind. Prior to the arrival of the helicopter, ribbon or flagging can be tied to bushes, antennas, fence posts, etc. Windsocks and smoke canisters can be used. The LZ manager can also pick up some dirt and toss it into the air.*

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*e) Time of Day: Since air is cooler (more dense) in the morning, flying missions early in the day can maximize the performance of the helicopter.*

### **7. Define "density altitude" and how it affects helicopter flight.**

*While it is important to understand how altitude, temperature, and humidity individually affect aircraft performance, it is also important to know how the three conditions interact in what is called density altitude. Density altitude is pressure altitude corrected for temperature and humidity. Basically, density altitude is a measurement of air "thickness". It can have a profound effect on aircraft performance. Air is said to be "thin" at higher elevations and "thick" at lower elevations. When the air is thick, the rotor blade is cutting through more dense air, which provides additional lift and increased performance. When the air is thinner or less dense, helicopter performance is decreased. To compensate for loss of lift, power requirements must be increased. At any given altitude, density altitude varies with temperature and, to a lesser extent, humidity. It is important to note that high density altitudes may be present at lower elevations on hot days because of the interaction of temperature and altitude.*

### **8. Identify the requirements for a helispot or landing zone including:**

- A. Size**
- B. Slope**
- C. Obstacles and ground cover**
- D. Approach and departure paths**

*a) Size: The size of the LZ depends on the size of the helicopter, terrain, and wind. For the helicopters we work with, an LZ of 100-120 feet square is usually sufficient. With no wind and a hilltop or fin top LZ, or a smaller helicopter, you might be able to get by with a smaller area. The pilot will always be the one to determine if he can land in the area you have chosen.*

*b) Slope: The slope should be relatively flat, with no more than a 1 foot in 10 foot slope.*



*through a deputy. The deputy will ask dispatch to call for the helicopter. The deputy or EMS can cancel the helicopter.*

**5. Identify the following aspects of a safety briefing:**

- A. When the briefing is given**
- B. Who gives the briefing**
- C. What information is contained in the briefing**

*a) When: The briefing is given before the mission or before anyone boards the helicopter*

*b) Who: The briefing is given by the pilot or a crewmember*

*c) The briefing will include:*

- 1. Aircraft hazards*
- 2. Seat belt and harness procedures*
- 3. Loading and unloading procedures*
- 4. Location of ELT, First Aid and Survival kits*
- 5. Gear and cargo security*
- 6. Fire extinguisher location*
- 7. Fuel and electrical shut-off*
- 8. Emergency egress and door operation*
- 9. No smoking*

**6. Explain how each of the following may affect the performance of a helicopter:**

- A. Wind**
- B. Altitude**
- C. Temperature**
- D. Humidity**
- E. Time of Day**

*a) Wind: Helicopters like to take off and land into the wind. However, they cannot fly in excessively high winds or if the gust spread is too great.*

*b) Altitude: The performance of a helicopter decreases at higher altitudes because the air is generally less dense than at lower altitudes. There is, essentially, less air for the helicopter rotors to grab at higher elevations, so power must be increased to offset the thinner air. At lower altitudes, the rotor blade is cutting through more dense air, which provides additional lift and performance.*

*c) Temperature: As air heats up, it expands leaving fewer molecules of air in any given space. Just as with altitude, this thinner air decreases the performance of the helicopter. With cooler (thicker) air, additional lift is realized and performance is increased.*

*d) Humidity: Increased humidity decreases the density of the air, decreasing helicopter performance. Humidity plays less of a role in air density than either temperature or altitude.*

# UTAH SHERIFFS' ASSOCIATION

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## Chapter 10: Air Operations

To certify at the Basic Level, a member shall:

### 1. Identify at least 6 safety rules for personnel during helicopter operations.

- a) *Do not approach the helicopter until signaled by the pilot or crewmember.*
- b) *Approach and depart from the side or front in view of the pilot (Blackhawks: side only)*
- c) *Approach from the down slope side or from level ground*
- d) *STAY AWAY from the tail rotor and keep others away from it*
- e) *Wear proper PPE (goggles, earplugs, etc.)*
- f) *Never carry anything over your head (carry tools horizontally)*
- g) *Secure hats and helmets*
- h) *Keep landing area clear of loose articles*
- i) *Fasten seatbelt in helicopter and do not unfasten until directed by the pilot*
- j) *Re-fasten seat belt after exiting*
- k) *Do not throw anything from the helicopter*

### 2. Describe radio communications protocol during helicopter operations.

*The LZ coordinator is the only person who should be talking with the pilot. Any other radio traffic should be kept to a minimum until the helicopter is safely on the ground. Any clock reference is from the pilot's perspective (i.e.: We are at your 3 o'clock)*

### 3. Identify who ultimately decides what an aircraft will or will not do.

*Two words: The Pilot.*

### 4. Explain who can ask for a helicopter to be dispatched or cancelled and how to do so.

*County-Specific? EMS and the deputy can always ask for the medical helicopter to be dispatched. If SAR wants a rescue helicopter, the request should go*

together.

**g) Butterfly Knot** - A very versatile mid-line loop.

**h) Clove Hitch** - An adjustable middle-of-rope hitch that can be dropped onto or over an object. It can also be used as a mid-line, adjustable tie-in for personal use.

**i) Tensionless Anchor (High-Strength Tie-Off)** - An efficient method of attaching a line to an anchor point which provides for most of the original rope strength to be preserved.

**j) Bowline** - A versatile knot that can be used for tying anchors or a fixed loop in the end of a rope. The bowline should always have a backup or safety knot.

# UTAH SHERIFFS' ASSOCIATION

## SEARCH AND RESCUE

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**Rope Operations**

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*ropes. Static ropes are used in rescue systems built for lowering or raising the rescuer and victim. Dynamic ropes have considerable stretch and are generally only used in rescue work to belay a lead climber where a fall is possible.*

### **5. Demonstrate the ability to tie the following knots and explain their usage.**

*a) **Double Grapevine (Grapevine, Double Fisherman's)** - Used to join two lengths of rope or to tie a length of rope or cord into a loop.*

*b) **Single Grapevine (Half a Grapevine)** - Used as a safety or backup knot. Tails should be at least 1 1/2 inches after the knot is tied.*

*c) **Prusik Hitch** - The prusik hitch is most often used as a friction rope grab in belay systems. It can be either 2 or 3 wrap depending on the type of load and application.*

*d) **Figure 8 Follow-through** - Used when the bight of any Figure 8 loop needs to be tied around an object rather than just clipped into an object, such as a carabiner. The figure 8 follow through must always be backed up with a safety.*

*e) **Figure 8 Bend** - Used to temporarily join the ends of two ropes that will be under load.*

*f) **Water knot (Ring Bend)** - Used for tying webbing together or tying loops in webbing. It is the acceptable method for tying two working ends of webbing*

# Chapter 9: Rope Operations

To certify at the Basic Level, a member shall:

**1. Identify at least 5 rules of rope care.**

- a) *Do not stand or step on rope.*
- b) *Protect rope from abrasion by padding abrasive edges and surfaces.*
- c) *Remove knots as soon as possible.*
- d) *Store ropes out of sunlight in a clean and dry environment.*
- e) *Inspect for damage after every use*
- f) *Avoid nylon running across nylon*
- g) *Avoid high temperatures (no speed rappelling)*
- h) *Keep rope logs*
- i) *Wash ropes when excessively soiled*
- j) *Do not store ropes wet*
- k) *Keep chemicals, acids and oils away from ropes*

**2. Explain the job of a Safety Officer at a Technical Rescue incident.**

*The job of the Safety Officer is to watch for hazards during setup and operation of a technical rescue. The Safety Officer has the authority to stop all technical operations until the safety hazard is corrected.*

**3. Explain who may yell "Stop" and why during a technical rescue operation.**

*Anyone on the SAR team may yell "Stop" during a technical rescue incident if that person notices a safety violation. Lack of safety during a rescue becomes an emergency in its own right. It is the responsibility of each team member to be constantly on guard against unsafe situations. Catastrophic failures during a rescue can most often be traced back to the cumulative effect of several smaller problems or oversights.*

**4. Explain the difference between static and dynamic ropes and, in general, when each is used.**

*Static ropes are constructed so that they have much less stretch than dynamic*

# **UTAH SHERIFFS' ASSOCIATION**

## **SEARCH AND RESCUE**

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*track.*

### **12. Explain how to preserve and document tracks and evidence.**

*Any track or sign may be crucial evidence. Immediately report any evidence and its location to Incident Command and do not touch it unless otherwise directed. Tracks, clues, or any other evidence must be preserved and protected from contamination. Trackers should make every effort to protect tracks and sign, which may include marking or flagging tracks. Limit the number of people and vehicles in the area of the sign and make sure anyone in the area is aware of the location of the sign or evidence. You may be asked to document the tracks or evidence with a photograph, written description or drawing.*

### **13. Demonstrate identification and drawing of a track.**

*Skill based*

### **14. Demonstrate setup and use of a tracking stick.**

*Skill-based*

### **15. When shown a track, determine the direction of travel.**

*Skill-based*

### **16. Demonstrate step-by-step tracking as a member of a tracking team.**

*Skill-based*

*A lower angle of light makes it easier to see the track itself or detail in the track. Thus, tracking in the early morning or late afternoon can be advantageous because of the low angle of the sunlight. Light can also be manipulated. A small mirror or reflective surface can be placed next to the track to reflect light at a low angle across the track and bring out more detail. The reflected light can be rotated completely around the track to provide the best view. There are situations when it will be easier to see sign with the light behind you such as when tracking through a field of tall grass looking for shine.*

**9. Identify special procedures and equipment used in night tracking.**

*Tracking at night gives the tracker complete control over light angle, which has a huge effect on track visibility. A good light is invaluable for night tracking. Desirable traits of tracking lights include low brightness and a relatively diffuse beam. Some people claim to have great luck with small, colored, key-chain-type micro lights. Lights can be placed low on sticks or attached low on the legs of the trackers.*

**10. Explain tracking strategy.**

*Trackers should be called as early as possible in an incident. They start working from either the PLS or LKP to determine a direction of travel, possibly using the step-by-step method. People and vehicles should be kept away from tracks to avoid destruction of those tracks or evidence. Once a direction of travel has been determined, teams can be assigned to perimeter cut for sign at distances that might allow for the track to be positively identified farther from the PLS or LKP. However, a tracking team is often kept on the initial set of tracks or those tracks are marked and flagged so that the tracking team can return to them if necessary. All possible precautions are taken to preserve any tracks.*

**11. Explain various methods of determining the age of tracks.**

*One of the first things many trackers do is study their own tracks in the area of the subject's tracks. This practice is called indexing. The difference between the tracker's fresh tracks and the subject's tracks can give an immediate clue as to the age of the tracks. Aging is most accurately determined by relating the conditions and appearance of the track to environmental conditions and weather history. Obviously, weather and soil type have a profound effect on tracks. Tracks are greatly affected by wind, rain, humidity, frost, sun, temperature and other weather conditions. Knowing recent weather patterns can aid in aging tracks. A few of the characteristics of a track that can give an indication of its age include color, the sharpness of lines, wind-deposited debris, color and bruising of disturbed vegetation, surface crust or texture in the track, insect activity, and many more. Any of these characteristics can be compared to the index track to give an idea as to the relative age of the subject*

# UTAH SHERIFFS' ASSOCIATION

## SEARCH AND RESCUE

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- e) *Measurements of the overall length and width of the track*
  
- f) *Measurements of specific portions of the track (heel, ball of foot, etc)*
  
- g) *Shape of the toe and heel (leading edge of heel, pointed toe, etc)*
  
- h) *Specific shapes of lugs or other markings or patterns in the track*
  
- i) *Inside or outside stride measurement (specify)*
  
- j) *Subject behavior (wandering, straight line, etc)*

### **7. Explain how the tracking team labels tracks.**

*Full tracks are usually circled. Full or partial tracks can be labeled as either the left or right foot by first drawing a semicircle encompassing the rear of the track. If it is a right track, a short hash mark is drawn to the right of the arc (the mark will resemble a measuring cup with a straight handle). If it is a left track, the mark is drawn to the left of the semicircle. Another method is to place a dot of colored powder in the heel of each track. Whatever the method, be consistent and communicate it to other trackers that may be working on the same situation and use a method that does not disturb the tracks. When a "signature" print is found, its location should be marked and preserved.*

### **8. Describe how light angle affects the visibility of the track and ways to manipulate light angle.**



*members of the tracking team try to identify nearly every track left by the subject. Once a stride is determined, a tracking stick can be constructed using o-rings, rubber bands or some other method to mark the stride (and possibly the track size) on the stick. The stick should be set up so that the distance from the tip of the stick to the marker is the same distance as the outside stride. When the marker is placed at the heel or rear of a known track, the tip of the stick will point to the area where the heel of the next track should be located. When positioned on the known track, the stick is swept slowly in an arc back and forth pointing in the general direction of travel. If the stride is marked correctly on the stick, the next track should be found somewhere along that arc. The Tracking Stick or Sign-Cutting Stick is, essentially, a visual aid that helps focus your attention on a small area where the next track should be found.*

**5. Explain the structure of a tracking team and the functions of each team member.**

*A tracking team is usually comprised of three people. The team consists of a Point Person and two Flankers. The Point Person is responsible for actually locating and following the tracks and coordinating the efforts of the team. The two Flankers are located on either side of and slightly behind the Point Person. Their duties include watching for sign coming into or leaving the prime sign area, watching for hazards, cutting for sign if the track is lost, etc. A three-person team also allows for rotation of team members to combat fatigue.*

**6. List aspects of a track that should be included in either a drawing or a radio description of the track.**

*a) Subject heading*

*b) Ground Surface*

*c) Approximate age of track*

*d) Basic footwear type (heel, no heel, hiking boot, tennis shoe, etc.)*

# **UTAH SHERIFFS' ASSOCIATION**

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*w) Transfer - Soil, debris, vegetation, or other evidence that is collected on footwear and is deposited in subsequent tracks or sign.*

### **3. Identify and explain equipment that a tracker should carry.**

*a) Tracking stick - To assist in the location of the next track in the step-by-step method*

*b) 36" tape measure - Measuring stride, etc.*

*c) Paper, pencil, camera - For drawing tracks and keeping records.*

*d) GPS, compass, map - For marking locations of evidence/tracks and determining direction of travel and possible destinations.*

*e) Mirror and flashlight - Both can be used to light tracks from a lower angle so that better detail can be seen.*

*f) Flagging - Useful for marking locations of tracks*

### **4. Explain the procedure for step-by-step tracking, including the setup and use of a tracking stick.**

*Step-by-step tracking is a slow, methodical system of tracking in which*

appear.

**o) Sign** - All evidence of change from the natural state that is inflicted on the environment by someone or something.

**p) Sign Cutting** - Attempting to locate sign in order to establish a starting point from which to track. When multiple teams are tracking, sign cutting can be used to advance the prime sign in an organized manner.

**q) Step by Step Tracking** - A methodical, and usually slow, stride-based method of tracking in which trackers try to identify almost every individual track left by the subject.

**r) Stride Interval** - The distance from one point of a track to another point of the next track. There are 2 main types of stride interval. Inside Stride is usually defined as the distance from the toe of one track to the heel of the next track. Outside stride is usually defined as the distance from the heel of one track to the heel of the next track.

**s) Toe Dig** - The indented mark of the toe created by a normal walking motion caused by the bending of the foot as weight transfer is thrust forward from the ball of the foot to the toe on to the next step.

**t) Track or Print** - An impression or mark left from the passage of someone or something that can be positively identified as being man or animal.

**u) Tracking Stick** - Also known as a Sign Cutting Stick. A stick or pole that serves as a visual aid in determining the primary sign area. There are several methods for marking the size of the track and stride on the stick.

**v) Track Trap** - A natural or manmade area, usually soft earth or sand, that will readily display tracks or evidence of human passage.

# UTAH SHERIFFS' ASSOCIATION

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*g) **Kick** - The forceful impact of footwear on the ground that usually scatters debris in the direction of travel.*

*h) **LKP** - Last Known Point. The place where, according to evidence, the quarry being tracked is last known to have been.*

*i) **Light Angle** - The angle from which the track is lit, which can have a profound effect on the visibility of the track.*

*j) **Line of Sign** - A progressive line of evidence indicating a route of travel.*

*k) **PLS** - Point Last Seen. The last place the subject was seen by a witness.*

*l) **Perimeter Cut** - Looking for sign around the perimeter of a search area primarily to confine, eliminate or identify a search area and help determine a direction of travel.*

*m) **Point Person** - The lead person on the tracking team who has the primary responsibility of locating and following the prime sign.*

*n) **Primary Sign Area** - The immediate area around a track where the next track or sign should be located. In the step-by-step method, the term is used to describe an arc at the end of a tracking stick where the next sign should*

## Chapter 8: Tracking

To certify at the Basic Level, a member shall:

1. Give 3 reasons why tracking is used by Search and Rescue teams.

- a) *There are many more clues than search subjects.*
- b) *Tracking creates clue awareness.*
- c) *Once tracks are located, resources can be concentrated in a narrower, focused search area.*

2. Explain the following tracking terms:

a) **Aging** - *Process for determining the time lapse since sign was made. Factors utilized to determine sign age include wind, rain, sun, and any other things that might alter the appearance of the sign.*

b) **Barriers** - *Man made or natural objects that could have an effect on the direction the quarry would take. A barrier would cause the subject to go over, around, or change direction.*

c) **Containment** - *The process of assuring that your subject does not leave the search area without your knowledge. Methods of containment include track traps, lookouts, natural barriers, etc.*

d) **Flagging** - *Vegetation pushed or forced forward from footfall or someone's passage is called flagging. Direction of travel can be determined by the direction of the flagging. The term can also be used to describe the disturbance of leaves and branch entanglement.*

e) **Flankers** - *Tracking team members on the sides of or behind the point person whose prime responsibility is to watch for sign leaving or coming into the prime sign area.*

f) **Heel Marks** - *The curved mark or depression on the ground surface made by the impact of the rear of the foot usually caused by a normal walking motion.*

# **UTAH SHERIFFS' ASSOCIATION**

## **SEARCH AND RESCUE**

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**Orientation & Navigation**

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*Coordinates are often relayed by inexperienced people who have no idea if they are looking at a degree, a minute, or a second. They may omit a decimal point or put it in the wrong place. Dispatch sometimes can only relay a string of numbers that were given to them. It is often up to the OIC to decode the numbers and determine a location. Sometimes it can be obvious. Other times, coordinates may have to be entered into the computer in several formats to determine the most likely location of the incident.*