



Survival



Survival Unit

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OBJECTIVES:

The student shall learn:

- How to avoid a wilderness survival situation.
- What to do in case one ever does become lost or stranded.
- The basic principles of survival first aid.

MAJOR CONCEPTS:

- ~ Direction finding
- ~ S.T.O.P.
- ~ Fire and shelter building
- ~ Distress signaling
- ~ Edibility test for plants
- ~ Basic units of a survival kit
- ~ First aid principles
- ~ Obtaining safe water

MATERIALS NEEDED:

- ~ Matches
- ~ Survival kit
- ~ Survival questionnaires
- ~ Plant photographs
- ~ Whistle
- ~ Cans for water
- ~ Clock (large watch face)

SUPPLEMENTAL RESOURCES AVAILABLE:

Survival With Style, Bradford Angier

Be an Expert with Map and Compass, Bjorn Kelstrom

The Sierra Club Wilderness Handbook, ed. by David Brower

Medicine For Mountaineering, ed. by James Wilkerson, M.D.

The Hiker's and Backpacker's Handbook, Bill Merrill

Wild Edibles of Fresno County, Mike Rhodes

The Tracker, Tom Brown, Jr.

Being Your Own Wilderness Doctor, Dr. E. Russell Kodet & Bradford Angier

SURVIVAL - INTRODUCTION

“Survival” is a loaded word. It brings to mind “do or die” situations, circumstances that evoke fear, even panic. In this unit we want to approach the subject objectively. The skills taught in the unit may one day prove extremely valuable to one of your students. Equally important, however, are the attitudes and perspectives developed.

The value of a positive mental and emotional attitude; having a determination and will to survive; viewing a difficult situation as a challenge to be overcome as opposed to a catastrophe in which there is no hope -- cannot be overlooked

This unit will deal with two basic concepts; first, how to avoid being lost or stranded and, second, what to do in the event that such a situation should occur. Though the chances are that most of the students in your class will never deal with an emergency situation like this, for the one or two who may someday find themselves in a survival situation, this could prove to be an extremely valuable course. The greatest body of information in this unit deals with what to do after becoming lost or stranded; however, it is very important to stress the common sense procedures which will enable the student to avoid becoming lost in the first place.

BASIC INFORMATION:

HOW TO AVOID A SURVIVAL SITUATION:

“Be prepared.” We’ve all heard that advice before, but too often it goes unheeded. There are a number of steps a person can take before going out into the woods. These are broken down into six major categories briefly mentioned here.

1. **Physical condition:** There is no question that if all other things are equal, the person in good physical condition will have a better, more enjoyable experience in the wilderness than the person who is out of shape. Weather, rugged terrain, and strenuous physical and mental activity can all be dealt with more effectively when one is in good physical condition.
2. **Equipment and clothing:** There is a tremendous variety of recreational equipment and clothing available that enables people to travel safely in the wilderness. Obtain good quality equipment (unfortunately, there is lots of cheap junk available, too), and learn how to use it properly before going on an outing. Practice using it before needing to depend on it. Clothing needs to be functional, durable, and appropriate for the activity and conditions.

3. **Planning:** A well-planned trip is key to avoiding potentially dangerous situations. Although one cannot foresee every potential problem, good planning helps eliminate the majority of problems and better prepares a person/group for facing those which may arise. Planning involves, among other things, determining routes, schedules, menus, personnel, equipment, safety procedures, and notification of others about your trip.
4. **Personnel:** It is best not to go alone. It is also wise to choose your companion(s) carefully. Go with people whom you respect for their good judgment, who already have experience (if possible), and who are familiar with the area in which you will be traveling (again, if possible).
5. **Training:** Obtain instruction if possible. There are numerous courses and qualified instructors available that can teach you the skills that not only will make your trip safer, but also much more rewarding. Additionally, there are many excellent resource books and magazines that are loaded with valuable information. Make the effort to learn from others' expertise. It's easier and safer than trying to recover from your own mistakes.
6. **Notification:** Let someone else know exactly where you're going and when you expect to be back. Leave a detailed written itinerary and then try to stick to it. In the event you end up stranded, or in some difficulty, there will be someone who has an idea of where to begin a search for you.

Try to be well prepared for any situation which may arise. What "well prepared" means will, of course, depend on where you are going and the conditions involved -- adequate clothing, rain gear, a survival kit and first aid kit, along with food and water are usually essential. Being well-prepared includes having a good working knowledge of where you are going and how to find your way back. The following section will deal with methods for determining direction of travel.

METHODS FOR DETERMINING DIRECTION OF TRAVEL

In order to avoid getting lost, it is very important to make sure you know where you came from and where you are going, as well as how to get back. Being a good observer is an important skill to master.

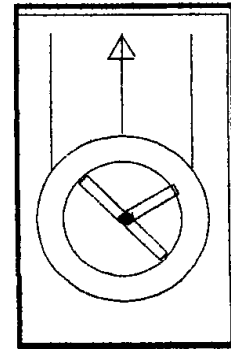
It is very easy to lose your sense of direction in the woods and wander in circles, even in an area with which you are familiar. Knowing how to find your direction could very

well keep you on course in a hiking situation. The following outline teaches three methods which can be used in determining direction of travel.

I. **Compass** - A compass is the most accurate and least time-consuming method for determining directions. It is a valuable tool when properly used.

However, due to the time constraints of this class we will focus on other methods of finding directions. For detailed information on using a compass have your students participate in Calvin Crest's Orienteering Course or consult the book, Be Expert with Map and Compass in the resource center.

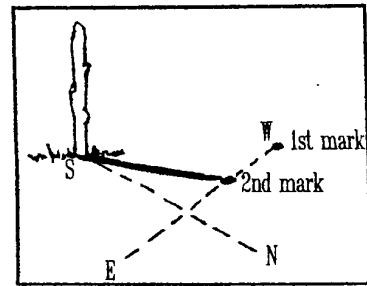
It is always wisest to carry a good quality map of the area in which you are traveling. And it is necessary to understand map symbols, know how to read the map, and most importantly, how to use the map in conjunction with the compass.



II. Finding direction with a stick

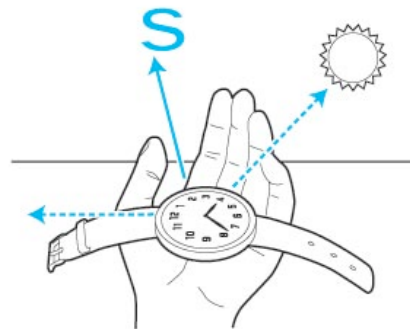
(requires sunshine and shadows)

- A. Shove a stick (~ 4' long) vertically into the ground.
- B. Mark the tip of the shadow that it casts.
- C. After 10-15 minutes mark the tip of the shadow again.
- D. A straight line drawn through these two marks is an east-west line.
- E. Draw a line from the base of the stick that will intersect the east-west line at a 90° angle. This is a north-south line with the stick being to the south. (In the northern hemisphere.)



III. Finding direction with a watch

- A. Assuming your watch has the correct time, point the hour hand for the current time toward the Sun.
- B. Draw an imaginary line one-half the way between the hour hand and the 12 to find south. (Use 1 for daylight savings time)
- C. Bisect this S-N line to find east and west.



Elements of a Survival Kit

Survival kits can be cheaply assembled and easily carried, but may make all the difference if an emergency situation should arise. Essential items include:

1. High quality pocketknife with at least two cutting blades.
2. Pocket compass
3. Match container with matches (at least one of the following:)
 - a. water-proof kitchen-type matches (cushion the heads against friction to prevent them from accidentally being lit)
 - b. water-proof matches rolled in paraffin-soaked muslin in an easily opened container such as a small soap box, toothbrush case, etc.
 - c. plastic or metal water-proof container.
4. One other means of starting a fire, (e.g. magnifying glass, hot spark, flint and steel)
5. Needles - sailmakers, surgeons, and darning -- at least one of each.
6. Assorted fishhooks in heavy foil, tin, or plastic holders.
7. Fishing line - for fishing, tying up a shelter, sewing, etc.
8. Pencil - in case you have to leave your campsite it is important to leave a written message including: 1) when you left, 2) where you are headed, 3) the state of your health. The wood of the pencil can also be used for starting fires if necessary.
9. Toilet paper (or other paper) to be used for writing on, as well as starting fires.
10. Water purification tablets - to ensure safe drinking water.
11. Bandages, aspirin, soap - for first aid purposes.
12. Tea bags, bullion cubes, sugar cubes, salt tablets - small lightweight food items that will provide some nourishment when combined with foods that are gathered.
13. Personal medicines, if needed.
14. Aluminum foil - can be used for signaling, carrying and boiling water, cooking.
15. Plastic bag - can be used for food storage, water carrying, water-proof container for paper or fire-starting materials.
16. Small birthday candles - just in case it's your birthday! No, actually, they can greatly simplify fire-starting and save matches.
17. Safety pins (several sizes) - many uses.
18. Large metal band-aid box or other metal container with a lid. This will hold the above-mentioned items, as well as serve as a container for boiling water, cooking food, signaling (the lid or bottom of the box both have reflective surfaces).

Additional items that would be beneficial (if you have big pockets or a large container) are:

1. penlight flashlight with fresh batteries
2. flexible wire saw
3. antibiotic ointment
4. larger first-aid kit

WHAT TO DO IN CASE OF BECOMING LOST OR STRANDED

The acronym S.T.O.P. is a useful tool in remembering the best way to act when lost or stranded. It stands for:

S - Stop and stay put

T - Think

O - Observe

P - Plan how to survive

In a survival situation a person's biggest enemy will be panic.

It is extremely important to remain calm and clear-headed.

In planning what to do there are five basic needs to consider. Your first three considerations will have to be **fire**, **water**, and **shelter** and the conditions you find yourself in will determine which of these is the most important. For example, if you find yourself in a survival situation where the weather is cold and dry and you are near a stream, fire will be your first need. However, if it is about to rain, building a shelter would come first. Every survival situation is different and this is why the **T**, **O** and **P** in S.T.O.P. are so important.

After taking care of the needs for water, fire, and shelter, the next considerations, in order of importance, are **distress signaling** and, then, **food supply**. The reason food is fifth on the list is because, although a person can only survive a matter of days without water, he can go for almost a month without food, that is, theoretically. Realistically, food should be obtained whenever possible to keep up one's strength. These five considerations are discussed below in further detail.

Fire Building

Fire is one of the most useful tools ever discovered by man. In a survival situation it is essential as it can provide warmth, light at night, a means of cooking, purifying water, drying wet clothing, signaling, and frightening away animals.

To build a fire you need: 1) matches, 2) a fairly open area cleared down to mineral soil, and 3) **tinder**, **kindling**, and **fuel wood**. **Tinder** is the starter. It can be very thin twigs of dry wood, dry bark, wood shavings, dead grass, straw, ferns, pieces of paper or lint from the pockets, etc. **Kindling** is the second addition to the fire and consists of small limbs, branches, or heartwood (no larger in diameter than one's little finger). Its purpose is to maintain the small fire in the beginning and to get the larger **fuel wood** burning. The principles of fire making are always the same, the fire proceeds from spark, to tinder, to kindling, to fuel wood.

Under extreme conditions, when the number of matches or other spark-producing tools are limited, fire building is much more likely to be successful if it is approached deliberately

and thoughtfully. All three elements must be readily available and arranged in such a way so that the spark can proceed from one to the other easily, with enough oxygen to keep the fire burning.

Starting a Fire With Matches

Arrange a small amount of kindling in a low tepee, log cabin, or lean-to shape, with a good supply of tinder under it. These must be close enough together so that the flames can reach from one piece to another. Leave a small opening near the bottom for lighting and air circulation. Shielding the match from the wind, light the tinder from the lower windward side of the fuel. Allow the fire to get a good start before adding more pieces. Do not build the fire too large. A large fire is harder to control and uses up too much fuel. The fire should only be large as needed.

Starting a Fire Without Matches

A fire can be started without matches, but it requires some know-how. There are three methods of starting a fire without matches: fire by friction, fire using a magnifying glass (or other convex lens), fire by flint and steel.

Fire by friction is probably the most difficult to master, but was widely used by Indians for centuries. Although the technique is simple, considerable diligence and effort are required. You would need a bow with a string long enough to loop around a dry stick that would serve as a drill. You would need to carve a socket with which to hold the drill against a hollow in the fireboard.

By moving the bow back and forth and so rotating the drill in the fireboard, you cause so much friction that a spark starts to glow in the tinder, which is placed at the bottom of the notch beside the fireboard. This spark is blown into a flame with which the fire is lighted.

A fire may also be started by using a **magnifying glass** or some other convex lens such as can be found in cameras, binoculars, eye glasses, or even broken bottles. This method only works in full sunlight by holding the lens in such a way that the light is tightly focused on the tinder.

Another method is the use of **flint and steel**. This is done by striking a piece of flint rock against a piece of rough steel. As this is done a spark will fly off. The object is to catch the spark in some dry tinder that will ignite easily. Once the spark is in the tinder, blow gently on the spark until it flames. Then carefully add small twigs or needles and gradually add larger branches.

A poorly prepared fire will waste matches or flint. An unnecessary fire consumes too much wood. Practice the primitive methods of fire making before the match supply is exhausted. A fire is essentially for warmth, keeping dry, signaling, cooking and water

purification. Maintain the fire properly. When the campsite is left for good be sure the fire is out by pouring water on it and then carefully sift through the remains by hand. If you burn your hand, your fire is not out!

Obtaining Drinkable Water

As mentioned earlier, water is essential for survival. Although people “have” survived for days without drinking, it is strongly recommended that you not go more than 24 hours without water (*less time in hot, arid climates*).

In today’s world it should not be assumed that any surface water is safe to drink. There is a good chance it is contaminated. It is important to take the time to purify the water, if you choose not to, your chances of survival will be severely impaired. Therefore, the task is twofold: *finding the water and purifying it*.

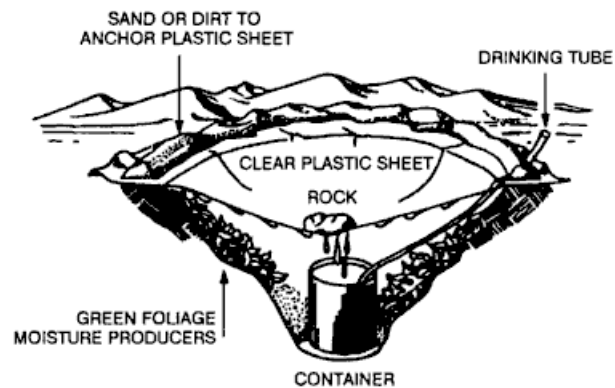
There are four techniques useful for obtaining water in the wild: obtaining water from natural catches, getting water from plants, constructing a solar still, and collecting moisture from dew.

The easiest, and yet potentially most hazardous technique involves obtaining water from **natural catches**. Any landscape feature that holds or channels water is considered a natural catch. This category includes rivers, lakes, ponds, and streams. The safest by far are streams, yet contamination of surface water sources is so widespread that water obtained from any of the sources should be purified -- preferably by boiling for at least five minutes. That length of time is necessary to kill all of the biological contaminants, but remember that boiling does not destroy chemical pollutants. Suspended particles can be removed by straining the water through a filter of clean sand, non-poisonous grasses, or cloth.

Lowland catches can also provide water. Look for signs that would indicate the presence of underground water such as seepage between rocks, or lots of green growth. Dig a hole until water begins to seep into it and gather the liquid by soaking it up with a rag or dried grass. This can be strained or purified as above. The work will go more smoothly and efficiently if you draw water from more than one hole at a time.

Plants also provide water and usually do not contain the pollutants that natural catches can harbor. However, since most vegetative matter doesn’t have enough available water to serve as a complete survival source, plants are best used to obtain temporary “quick relief” emergency water. Thistle has been called “survival celery” by some, because it can be a refreshing watery snack similar to celery after the thorns are peeled off the young stems. Some hardwood trees such as walnut, birch, maple, hickory, and sycamore can serve as sources of water in the early spring if the cambium layer is tapped as syrup makers do -- by boring a 1/4 to 1/2 inch hole into the trunk with a knife or sharp rock. Insert a hollow reed and collect the thin sap in a cup. Drinking large amounts can cause an upset stomach or cramps due to the high sugar content, so be cautious.

A **solar still** is a device that will produce water even in a desert. The materials required are a 5x5' sheet of clear or slightly milky plastic, a container and a 6' piece of plastic tubing. First, a pit is dug in the ground that is about four feet across and three feet deep. (Try to locate the solar still in a damp area, gully or river basin to increase the still's productivity.) The sides of the pit are lined with non-poisonous vegetation and the container is placed in the bottom of the pit. Lay the tube in place so that one end rests all the way in the cup and the rest of the line runs up-and-out the sides of the pit. Next, cover the pit with the sheet of plastic, securing the edges all the way around. The plastic should form a cone with 45° angled sides. Place a stone in the center of the plastic directly over and no more than three inches above the container. The solar still works by creating a greenhouse under the plastic. Ground water evaporates and collects on the sheet until droplets form, run down the plastic, and fall off into the cup. When the container is full you can suck the water out through the tubing and won't have to break down the still every time you need a drink. A good solar still in a damp area should keep collecting water for quite a few days. Be careful to use only edible plants as many poisons will evaporate and run down into the container more rapidly than water.



Collecting **dew** is probably the simplest, safest, and most overlooked way to collect potable water in a survival situation. The only equipment needed is a rag or piece of clothing or a handful of dried, non-toxic grass. Just wipe moisture from the landscape and wring the liquid into a container or your mouth. Collect condensed droplets from grass, rocks, leaves, even sand. You have to get up early and work hard, but the method is very effective. Two persons once were able to collect 20 gallons of water in two hours using this technique.

Water can be simply and safely obtained in nearly any survival situation -- provided you follow the necessary precautions. Whenever you examine a newfound water supply ask yourself, "Would I stake my life on this water?" -- because that's what you'll do if you drink it.

Shelter Building

If you have a good shelter you may be able to get by surprisingly well even without a fire. A "good" shelter is one that meets the following requirements:

1. *A shelter must give you complete protection from the elements.* It should be able to ward off violent storms, hot sun, high winds, frost, and dampness.
2. *A shelter must be able to keep you warm and dry even if you do not have blankets, coats, sleeping bags, or heavy clothing.* (People in survival situations often find themselves equipped with only the clothes on their backs.)
3. *A shelter should provide a warm, dry work area as well as a sleeping compartment* so that you can handle important survival chores without being exposed to the weather.
4. *A shelter should give a sense of security.* It ought to be a sanctuary -- a place where you can find rest.

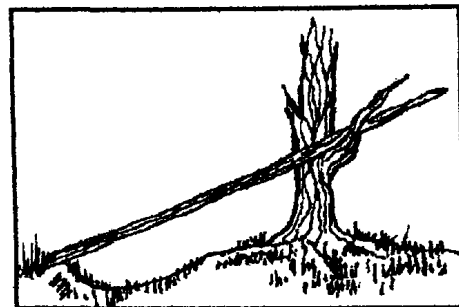
Shelter Location

Where you locate your shelter is as important as the type of shelter you build. The best constructed hut set up in a poor site will not provide adequate protection. Avoid locations that do not have adequate drainage or are not protected from high winds. Inspect the area to make sure there are no old snags, dead limbs, or rock overhangs that could fall through your shelter in a high wind. It's a good idea to find a location that can be easily seen by searchers. Since natural shelters are hard to detect even in a clearing, do whatever you can to mark the shelter clearly as well.

Constructing the Shelter

An excellent shelter, which can be easily constructed, is the leaf hut. First, select a proper site and find some object --such as a stump, rising ground, the fork of a tree, a log, or large rock -- that can support a sturdy ridgepole. Place one end of the ridgepole on the support and the other end of the ground.

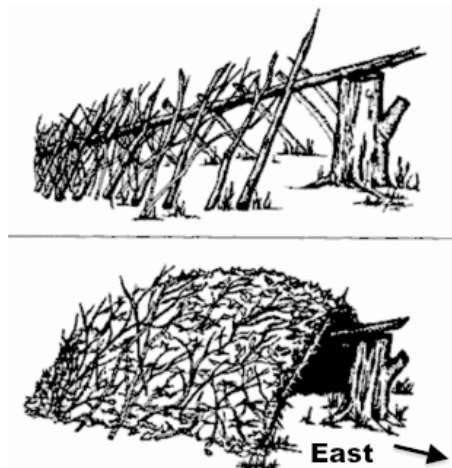
Next, gather branches and lean them against the sides of this triangle so that they lean at a 45° angle against the ridgepole. Leave a gap in the eastern side of the framework, toward the hut's high end, for your doorway.



The door facing the east catches the early morning's sunlight for warmth. Additionally, since most weather systems travel from west to east, the wind will normally strike the back of your shelter. Now, collect brush and add

that to your shelter's skeleton until the entire frame is covered by a huge wooden web thick enough to prevent leaves and other debris from falling through.

Gather up leaves, grasses, ferns, pine needles, green boughs or whatever is available. Pile the material to a thickness of 2½ feet on the sides and top of the shelter's frame. A leaf hut with 2½ foot-thick walls will keep you warm and dry in temperatures just below zero. Finally, complete the outside of the shelter by laying more brush, sticks and poles over the shelter to hold the covering in place and keep the walls secure even in a high wind. The sleeping area of the hut is finished by stuffing the lower end with leaves and other soft debris. Place only a light carpet of foliage on the floor of the rest of the hut so you'll have usable work area and a place to store kindling, food, and so forth.



To lie down in the shelter's sleeping area, work your way into the packed bedding feet- first so your head protrudes slightly into the work area. This shelter works even when constructed in a rainstorm with damp materials because a leaf hut contains many air spaces, which give it good insulating qualities. Your shelter will be damp, but you will still be warm and alive. If you have to spend a night in the shelter without a fire, stack a pile of leaves in the doorway. Leave a big enough opening to allow fresh oxygen into the hut. Lack of oxygen can be deadly.

If you can build a fire, be sure to keep it a minimum of 6-10 feet away from your shelter. Sparks from the fire can cause the shelter to burn. ***Never build a fire in a leaf hut.*** The fireplace should be constructed in front of your shelter's doorway so that when sitting in the doorway your back is protected from the wind by your shelter and you are warmed in front by your fire. You can increase the amount of warmth directed toward your shelter by backing the fire with a horseshoe-shaped reflector made of stones.

Another highly functional shelter is a lean-to, which can be built to stand by itself or constructed against an already existing rock, tree, or log. The size and shape of the lean-to will depend on the needs of the group (again, careful thought and planning are important), but generally speaking, the opening of the lean-to should be as long as your body. You can be very comfortable sleeping beside a fire that is as long as your body is tall. Either shelter, when well-constructed, will serve as an excellent "temporary home."

Distress Signaling

In a lost or stranded situation, after having taken care of fire, water, and shelter needs, the next thing to do is begin signaling for help. Anything done three successive times is the international signal for help. Three gunshots, three flashes, or three signal fires set in a row are examples. There are many ways to signal and, again, common sense plays the most important part.

In the daytime, green wood on a fire will create a lot of smoke, which could be seen from above. At night brightness is the most important. Other ways to signal are flashing with an object which reflects the sun (*foil, mirror, glasses, knife blade, etc.*) stomping out the words "HELP" or "SOS" in the snow, or writing "HELP" or "SOS" with wood in an open meadow. If it becomes absolutely necessary to leave your campsite, always leave behind a message (written, if possible) as to when you left the camp, which direction you are heading and whether you are injured or not. This message should be left in a safe, but obvious place.

Finding Food

Take stock of the available food and make it last as long as possible. Remember that every bit of work done requires more food and water, and also eating increases thirst, so if the water supply is limited food consumption should be reduced.

It is best to learn to live off the land whenever possible and supplement the natural foods with any rations you may have with you, thus stretching the rations over many days. With few exceptions, all animals are edible when freshly killed. Animals provide the greatest food value per pound. Anything that creeps, crawls, swims or flies is a possible source of food. Also, there are thousands of edible plants and even without extensive knowledge of specific edible varieties, a little knowledge can go far toward determining which plants & parts of plants are safe to eat and which are not. The following simple outline gives enough information to possibly live off the land indefinitely.

Plants for food

A. Many plants have one or more parts that have considerable food or thirst-quenching value. Look for:

1. The underground part - tubers, roots, bulbs
2. Stems and leaves - the shoots, stems, leaves and bark of most plants can be eaten.
3. Flower parts
4. Fruits - seeds, nuts, fleshy fruits, seedpods

B. If possible, use only the plants you already know are safe. Only do the following if it is absolutely necessary. Before eating large quantities of any kind of unknown plant it should be tested for edibility.

The edibility rules are:

1. If at all possible, get rid of any disagreeable taste by boiling the plant in water for 5-15 minutes. Cooking usually makes the food safer, more palatable and more digestible.
 2. After the food has been prepared the way it will be eaten, take a tiny amount and hold it in the mouth for a minimum of five minutes. If by this time no burning sensation occurs, swallow it. Wait eight hours. If no ill effects (nausea, cramps, diarrhea) occurs after this time, eat a teaspoonful and wait another eight hours. After this amount of time, if no ill effects have shown up, the plant may be considered edible.
- C. The following is a list of some of the edible plants that can be found around the Calvin Crest grounds.
1. **Sugar pine, ponderosa pine:** needles may be eaten raw or made into tea; pine nuts can be eaten raw; sap can be used as a laxative or sweetener; the inner later of the bark can be eaten raw, cooked or dried & ground into flour.
 2. **Blackberry:** berries; leaves good for tea.
 3. **Manzanita:** berries can be eaten raw or ground into a meal as porridge or drink; leaves useful for relief of bronchitis.
 4. **Wild strawberries:** berries; leaves are good for tea.
 5. **Soap plant:** the bulb can be eaten only after baking; Indians used as a fish poison, glue, soap, and the root fibers were used for brushes.
 6. **Gooseberry:** prickly berry good for jams or eaten raw (carefully).
 7. **Clover:** bread made from seeds and dried blossoms; tea from dried leaves good for bronchitis, asthma, coughs.
 8. **Miner's lettuce:** leaves eaten raw, like lettuce.
 9. **Dandelion:** young greens cooked; natural coffee from roots; juice good for vitamin deficiencies.
 10. **Mallow:** tea good for coughs; button-like seeds edible and nutty.
 11. **Fern:** young fiddle heads good cooked (although recent studies have shown they may be carcinogenic in large doses), however, the mature plant is poisonous when the fronds have spores.
 12. **Acorn:** must be leached to remove bitter taste; makes good flour.
 13. **Wild rose:** rose hips (*fruit*) can be eaten raw or made into a tea and are a good source of Vitamin C, calcium, phosphorus, and iron. They also make a good jam.
 14. **Wild onions:** eaten the same as green onions from garden.
 15. **Mushrooms:** only when there is no doubt that the variety chosen is not poisonous. Mistakes can be deadly!
 16. **Brodiaea:** the bulb can be cooked and eaten.

17. **Cattail:** nearly every part, including: the rhizomes (*underground stems*), young white stems that come of the rhizomes, the heart (where mature stem meets the rhizomes), the flower stalks before pollen is produced, and young leaves can be cooked and eaten.
18. **Elderberry:** berries are edible raw or as jam or wine.

Animals for Food

People do eat grasshoppers, hairless caterpillars, wood-boring beetle larvae and pupae, ant eggs, and termites. Such insects are high in fat content and should be cooked until dried.

Most warm-blooded, hairy animals are wary and hard to catch. To hunt them requires skill and patience. Always be alert for signs of animals such as tracks, trampled underbrush, or droppings. The best hunting grounds for survival food can be found along shores of ponds, streams and lakes, margins of forests, natural meadows, and protected mountain slopes. The best times of day to hunt are in the early morning or at dusk.

Many animals live in holes in the ground or in hollow logs. Shove a long, flexible stick into a hole to determine if it is inhabited. By using a forked stick and quickly twisting it if contact is made with a small animal's body, it is possible to entangle enough fur in the small fork to pull the animal out of the hole.

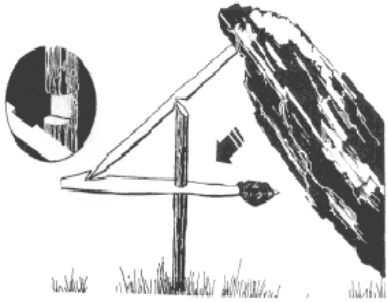
All snakes are edible when properly prepared. A forked stick should be used to catch snakes. This is done by jabbing the fork over the snake's body just behind the head. (*Avoid poisonous snakes.*)

Don't overlook small birds and nests. All bird eggs are edible when fresh. Birds should be caught at night when they are roosting.

Snaring of small game is useful during periods of food shortages. Snares should be set in game trails or frequently used runways, which can be recognized by fresh tracks and droppings. All snares and traps should be simple in construction and should be set out just before darkness. They should be checked early in the morning to remove any animals caught.

The following are: a snare and a trap and their respective uses. Traps should be placed where the trail is narrow. Arrange pickets, brush or other obstacles in such a manner as to force the animal to pass through the snare. Be sure that the loop is large enough for the head to pass through, but not so large that the body will get through. Disturb natural surroundings as little as possible.

The twitch-up snare is a noose attached to a sapling. It jerks the animal up into the air. Use a sapling long enough to keep any caught animal out of reach of other animals.



The deadfall with a figure-4 trigger is one trap that usually catches game. If upright guide posts for the deadfall are used, be sure the fall log slides smoothly.

The killing of animals for food is not pleasant to contemplate, but may prove necessary for survival purposes. A good survival rule is to not pass up any reasonable food source if you are in need. There are dead individuals who, through ignorance or fastidiousness, did.

BASIC PRINCIPALS OF SURVIVAL FIRST AID

It is important for the students to understand that what is being taught in this unit is not first aid, but rather a few very basic principles which, if used properly, can make the difference between life and death for a seriously injured person.

First, every effort should be made to prevent accidents on the trail because even a minor injury can present a serious problem, especially if you are alone. If an injury does occur, the most medically qualified person should take charge and administer only as much first aid as he knows he is qualified to give. Often, a well-meaning, but misinformed, first aider causes further damage to the injured person.

A person who has **no first aid training** should **do no more than the following:**

1. Make the injured person as comfortable as possible. (*In case of a possible neck or back injury, never move the injured person, as movement can result in permanent paralysis or death.*)
2. Take steps to prevent, or lessen shock. Shock almost always occurs after a major injury and can be treated by having the person lie down, making him/her comfortable, and keeping him/her warm.
3. Keep the injured person's morale high.
4. Obtain help.

Only when it is a matter of maintaining life should the untrained person do more than the above. In this case, the following ABC formula can help that person know what to do and in what order to do it.

A stands for airway. First check the airway for blockage. Any foreign material should be removed and the head tilted backward to keep the tongue from falling back and re-blocking the passage.

B stands for breathing. If the airway is clear and the injured person is still not breathing normally, that breathing must be restored immediately. Mouth-to-mouth resuscitation should be used.

C stands for circulation. To stop bleeding, apply pressure directly to the wound or use the fingers on a pressure point between the wound and the heart.

In the event of a serious or traumatic injury the following actions could be taken by the properly trained person:

Treat for shock: Symptoms are blue lips and fingernails, clammy hands and body. If the face is red, elevate the head. If the face is blue or white, lower the head and raise the feet. Keep the patient warm, be cheerful and reassured.

Broken bones: Keep the patient still. Immobilize the limb completely with some kind of splint that will support the joints above and below the broken bone(s).

Frost bite. Thaw only when professional medical help is available. Do not thaw and then begin traveling a long distance as extreme pain, infection, and further damage to the frozen part are likely to occur. Thaw frostbitten area slowly with warm water or wrap with dry clothing. Place frostbitten area under armpits or other such joints for warmth.

Remember to:

- Cleanse a wound thoroughly, using soap, boiled water, and antiseptic if you have it.
- Keep the patient (or self) at rest.
- Purify all water.
- Try for a remedy by carefully experimenting with your problem only if you are sure no help is available.
- Use your head and think out the situation and the possible results of your action or inaction. Then act wisely!

Act wisely, use common sense, and try to remain calm. These are the best tools of all in a survival situation.

SURVIVAL - LESSON PLAN

I. INTRODUCTION

- A. Leave the dining hall and hike down the road to the lakeside worship area (Vespers Benches on map). Pass out Survival Questionnaires (Appendix A) to all students and give them the following instructions:
 1. Take your questionnaire and go off alone into the immediate area (boundaries between lakeside and dirt roads around perimeter of the lakeside campfire). No partners or groups. Allow students 5-7 minutes to go over the questionnaires before calling them back.
 2. Read, and mentally answer, the questions. Use your imagination. Think about how you would feel, what you would do if you really were lost or stranded. Be prepared to share your thoughts with the rest of the class in a discussion.
 3. Come back together as a group when the whistle is blown.
- B. Conduct a discussion based on the questionnaires. Allow this time to be a brainstorming session and use it to lead to the next point.
- C. Teach the students the acronym "S.T.O.P." and what it means. Ask students why a lost or stranded person should Stop? Think? Observe? Plan? Discuss each aspect individually. **These are extremely important concepts.**
- D. In this discussion atmosphere think about the most important needs of lost or stranded persons. Again, a golden opportunity to brainstorm. (*Try to get students to think about water, shelter, fire, signaling, food.*) Briefly touch on each area and discuss what factors determine which needs are most important. Each topic will be further emphasized later in the lesson plan.

II. SURVIVAL TRAIL EDIBLE PLANTS

Leave the lakeside campfire area and hike across the dam to the beginning of the Survival Trail (opposite the island). As you walk along the first section of the trail you will notice 4X4 posts with numbers on them. The first six numbered markers correspond to various edible plants found at Calvin Crest. At each post have the students closely examine the plant being pointed out. Note the overall size, shape, structure of leaves, flowers, fruit (depends on season) and any other identifying characteristics. Emphasize that although it is more important to know how to conduct the edibility test than to be able to identify

every plant species seen, knowing specific plants and what part(s) are edible greatly simplifies matters for the lost or stranded person. (Allow 15-20 minutes along this section.)

NOTE: About 30-40 feet after post #4 (*bracken fern*) the Survival Trail turns away from the trail that goes along the base of the dam by making a 90° right-hand turn. Immediately after making this turn look to your left for post #5 (*cattails and currants*). Many more cattails are visible along the northeast shore of the lake above the dam.

After examining the horsetails (post #6) teach the students the edibility test. Emphasize the importance of taking time to go through each step of the process to assure the safety of the plant that will be tested. Again, note that although the edibility test is one way to be sure that a plant is safe to eat, being able to accurately identify certain edible plants will save much time and effort in a survival situation.

III. CREEK CROSSING

At post #7 you must make a choice about whether or not to cross the creek on the large cedar log. Ultimately, you the teacher, need to make that decision. But, here again, is a good opportunity to involve the students in the decision-making process. Ask the students whether or not it would be wise to cross the log in a survival situation. Why? Why not? What possible consequences may arise? What alternatives do they have to crossing the log? If they decide to cross the log, discuss how they could safely do so,

Some important points to consider:

1. If the log is wet, it is slippery: **DO NOT** allow anyone to cross it.
2. Crossing the log could be extremely frightening for one or more of your students. You, the teacher, should set an example by crossing the creek upstream from the log, thus, avoiding a student being labeled a “chicken” by other students.
3. If the decision is made to cross the log, only allow one person at a time on the log. The student is to walk along the center of the top of the log, not near an edge. **Absolutely no running or horsing around!** The cabin leader should be at one end of the log, the teacher at the other end, to make sure guidelines are followed. (7-10 minutes)

IV. SHELTER BUILDING

Shortly after crossing the cedar log the class will arrive at POST #8.

Activity #1 - Shelter Building

Have the students do the “Shelter Building” activity as follows:

Activity Overview

In this activity the students will learn how to build a shelter that will protect them from the elements in a survival situation.

Focus Questions

1. How big should a shelter be?
2. Which way should the door face?
3. Where should a shelter be built?
4. What materials can be used to build a shelter?

Main Ideas

1. Your shelter should be just long enough to lay in and just tall enough to sit up in. This will take care of their survival needs for the shelter. If the shelter is much bigger than this, the occupants body heat will not be enough to keep it warm. (Remember, you can NOT have a fire inside one of these shelters.)
2. Your door should be relatively small and facing towards the East (out of the wind and will allow the morning sunlight to shine in).
3. Your shelter should be built on relatively high land (not in a low spot) to avoid water pooling in your shelter. It is recommended that you also use an existing stump or rock as the main support of the structure.
4. Use whatever materials you have available to you. We recommend a long, sturdy stick to use as a ridgeline, smaller sticks / branches for the framework, and branches with foliage for the covering (incense cedar works well for this).

Activity Organizer

Objectives

By the end of this activity the students should be able to:

1. Construct a shelter that is the right size for their needs.
2. Understand why it is important to face their door to the East.
3. Pick a site for their shelter that will be safe and protect them from the elements.
4. Find appropriate materials to build a shelter out of.

Materials

Branches / sticks

Leaves / pine needles

Other natural things they find in the vicinity to use in shelter building

Time Required

45 minutes

Location

At post #8 on the Survival Trail.

What To Do

1. Review/ discuss the need for building a shelter properly for protection from the elements.
2. Examine the model of the leaf hut structure at the shelter-building site. Review the important features: location, ridgepole, thickness and slope of the sides, door location, overall size of structure, materials, framework, and fire danger.
3. Explain to the students that they will have an opportunity to construct shelters using the model as a guideline. **Emphasize safety** in working with the materials (be very careful of peoples' eyes, be aware of both ends of the stick you are carrying, do one thing at a time, do not have anyone in the shelter when you are adding materials to the outside, etc...) Divide the students into 2 or 3 groups of equal size. Give the groups 20 - 30 minutes to work together to build a shelter (1 / group).
4. Have students develop a plan:
 - A. Pick a location - avoid low areas where water will flow/ collect, avoid dead branches overhead, try to be near resources (food/water/warmth), in a sheltered area, yet visible from the air if possible.
 - B. Main support for structure (stump, fork in tree, large rock)
 - C. Ridge line (some sort of pole)
 - D. Framework (branches, large sticks)
 - E. Insulation (pine needles, leaves)
 - F. Doorway (facing East)
 - G. Size (Only 1-2 persons should be able to fit inside)
5. Call all groups back together when time is up. Then take the entire class around to each of the shelters. Let each group give the class a "home tour" of their shelter.

- A. Have 1 representative from each shelter group tell the class about their shelter.
1. Why they picked this location?
 2. How did they build it?
 3. How well did they work as a team?
 4. What do they like about their shelter?
 5. What would they like to improve about their shelter?
 6. What did they learn?
- B. Give time for the other groups to ask questions and give **constructive** criticism.
- C. Repeat at each shelter.
- D. Explain to students that all of their shelters must be taken down and the materials scattered so that the next class will have the same challenge.

PLEASE DO NOT TAKE DOWN THE MODEL SHELTER!

Leave the shelter building area by going to post #8, then turn to the right, (uphill & away from the creek), and go out into the open area where you will find post #9. Just beyond the post are 4 depressions in the hillside that are to be used for the fire building.

Activity #2 - Fire Building

Have the students do the “Fire Building” activity as follows:

Activity Overview

In this activity the students will learn how they can build and start a fire and completely put it out in a survival situation.

Focus Questions

1. What are the three types of materials you need to gather to build a fire?
2. What are ways of starting a fire?
3. How can you be sure your fire is completely out? And why is this important?

Main Ideas

1. You need to gather tinder, kindling, and fuel wood to build a successful fire.
2. It is possible to start a fire using a match, flint & steel, a magnifying glass, or friction.

3. You can be sure your fire is out if you have drowned it, and then are able to pick up the pieces without burning your fingers. If the fire still has embers it can start a forest fire, so be very sure it is completely out.

Activity Organizer

Objectives

By the end of this activity the students should be able to:

1. Identify and collect the three types of materials you need to gather to build a fire.
2. Explain at least three ways of starting a fire.
3. Demonstrate and explain how they can be sure their fire is completely out, and why is this important.

Materials

Matches
Water cans full of water
Wood of various sizes

Time Required

30 minutes

Location

At post # 9 on the Survival Trail.

What To Do

1. Review/discuss the value of fire (warmth, boiling/purifying water, signaling)
2. Review/discuss the materials needed to successfully start and tend a fire.
(Matches or other fire starter, tinder, kindling, fuel wood, water [**to put the fire out!**])
3. Review/discuss how to start a fire (fire starter down low, windward side of fuel, dry fuel (wood), start small, gather all the materials before you start the fire, be deliberate and careful).
4. Split class into 4 groups.
5. At the base of the nearby ponderosa pine (between post #8 and #9) are cans for getting water. If there is water in the creek, have students go to the creek near the shelter building area, or to the point where the trail crosses the creek as an alternative to crossing the big log, to fill up the cans. If there is not sufficient water in the creek, extra water will be provided at the nearby water station.

6. Remind them to:
 - A. Develop a plan, work together.
 - B. Gather all their materials before starting the fire.
 - C. Let you know when they are ready.
7. When the group has shown you that they are ready, give them one match, tell them that if they can successfully start and maintain their fire, they will survive. (Teamwork, cooperative encouragement are essential to success! **People who blame each other and argue with one another do not survive in real life situations.**)
8. If a group fails to light their fire on the first try, give them another match, and instruct them to have a second student try. Use the fewest matches possible!
9. After the fires have been started and admired, they must all be put out completely! (Don't let the students build too large of a fire, as this will make it much more difficult to ensure that the fire is completely put out.)

Fires must be drowned with water to be sure they are completely out. After the students are confident that their fire has been completely extinguished, have them pick up the charred sticks and check each one carefully before discarding them into the burn pile slightly uphill from the fire building site. *If the students complain of burning their fingers, then the fire is not completely out!*

We do not want to start any forest fires.
Please be absolutely certain that all fires are completely out!

For the next activity, stay in the fire building area. This next activity teaches direction finding. Please refer back to the basic information section of the unit (pg. 4-5) where you will find descriptions of the stick and shadow and the watch methods of finding directions.

Activity #3 - Direction Finding

Have the students do the “Direction Finding” activity as follows:

Activity Overview

In this activity students will learn two methods to find the cardinal directions in a survival situation, and why they are important to know.

Focus Questions

1. Why is it important to know the cardinal directions (N, S, E,W) in a survival situation?
2. What are the methods you can use to find north, south east, and west if you do not have a compass?

Main Ideas

1. It is important to know the cardinal directions in a long term survival situation, because they will help you determine which way to travel (from this side of the Sierra Crest you would always travel west to find help). In a short term situation it would be important to know them to determine where to place your door on your shelter.
2. You can determine the cardinal directions in the daytime by the stick & shadow method or by using the watch method. At night you can determine north by using the north star.

Activity Organizer

Objectives

By the end of this activity the students should be able to demonstrate their ability to determine the cardinal directions in daylight or at night.

Materials

A watch (the clock will provide a good model for demonstration purposes)

A few small “marker” sticks

A stick ~4 feet in length

Time Required

15 - 20 minutes

Location

At post #9.

What To Do

1. Using the same four groups you had for fire building, have each group get a pole from the tree where the water cans were and set up the “stick/ shadow” method. Mark end of each shadow.
2. While you are waiting for the shadows to move, get the clock from the box at the base of the pine. Explain and demonstrate how to find directions using a watch (you use the clock to show it, so everyone can see, but explain that they can use their watch to do this in a survival situation).
3. Allow enough time (preferably at least 15 minutes) so that the shadows have opportunity for appreciable movement. Then have groups mark the end of the shadows. Draw a line from the first marker stick to the second. This is the west - east line (first marker is west, second is east). Ask students how they could determine the north - south line.
4. Explain that direction can be determined at night using the “big dipper”. Show them the diagram (Appendix B); again have them explain how knowing where north is would help them find the other cardinal directions.
5. Ask why it is important to be able to determine direction. For example, if you were lost / stranded in the Sierra Nevada mountains, which way would be the best direction to go? And why? The answer is West, if you are on this side of the Sierra Crest, as it is towards the central valley (towns, people, and help!).

Signaling

If time permits, in this same general area you can make an SOS (write “BOB” instead) signal. The entire group can work together to spell out “BOB” using branches and logs. The letters should be 15-30 feet long and lain flat on the ground to be easily visible from the air. Because this is just a practice signal we recommend you write “BOB” instead of “SOS” so planes will not mistake your practice sign for an actual distress signal. In a real survival situation you would, of course, be writing the letters S.O.S.

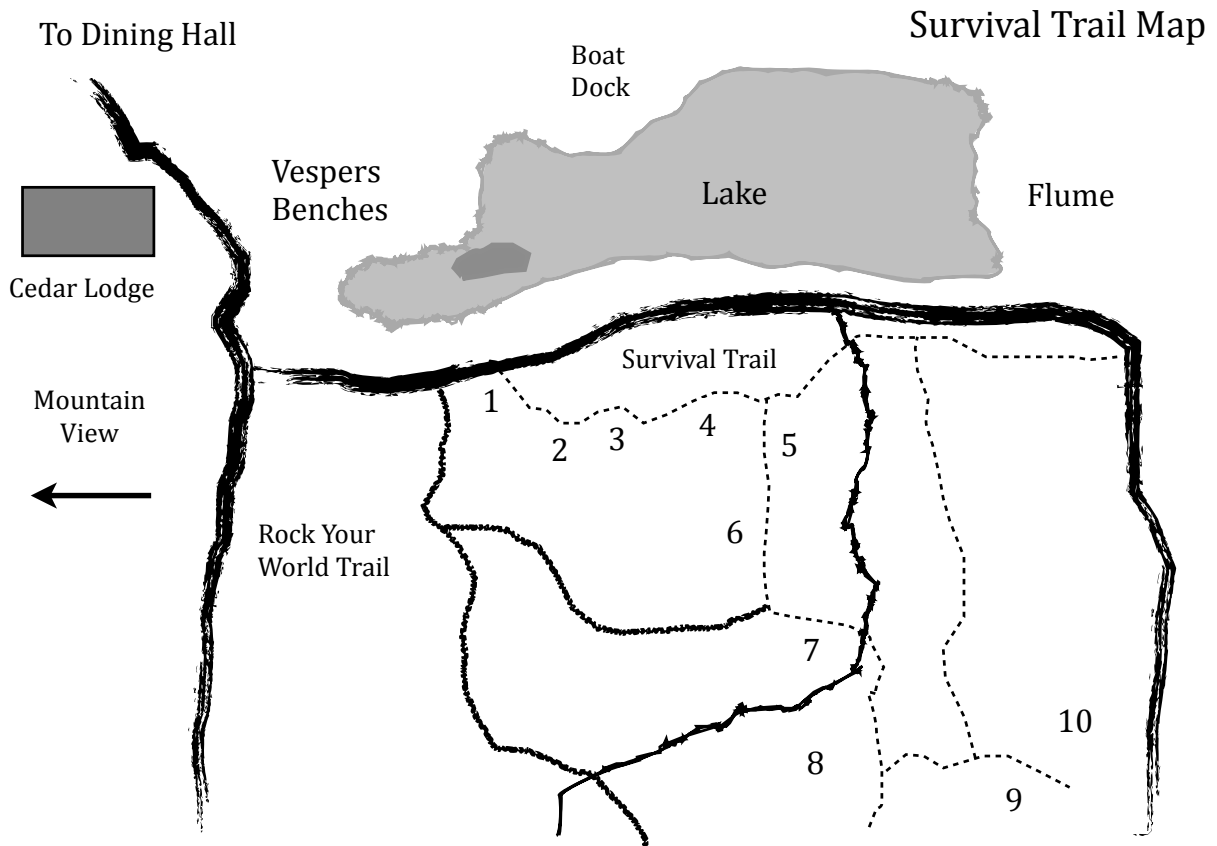
As with all of these activities, make sure you dismantle your sign and spread out the materials, so the next group can have the same challenge.

Survival Trail Markers

- 1: A. **Black Oak:** Deciduous tree with several trunks. Acorns in the fall. Leach to rid of tannic acid, makes mush.
B. **Lichens:** Most lichens are edible. Wolf lichen, found in this area, is not thought to be edible.
C. **Sugar Pine:** Pine nuts, inner bark, and tea made from pine needles
D. **Ponderosa Pine:** Pine nuts (very small).
2. A. **Rose bush:** Rose hips (orange-brown fruits, also in late summer, early fall) is in the foreground. (Thorny shrub)
B. **Elderberry:** Tall shrub in background with purple “grape-like” clusters of fruit in season (late summer).
C. **Thimbleberry:** On the ground to the left of the rose and elderberry. Large leaves, berries ripe in late summer.
3. A. **Blackberry:** Dense vines with black berries and sharp thorns on it. Fruit in late summer, early fall.
B. **Gooseberry:** Lower thorny shrub with red, thorny berries. Ripe in late summer.
C. **Wild strawberries:** Very low, ground-hugging small strawberry plant. Single small berry on each plant.
4. A. **Bracken Fern:** Ferns edible in early spring when in the “fiddlehead” stage, but not when the fronds have opened up and are bearing spores. Poisonous at that time. *Recent research has established that bracken is carcinogenic to humans. It is included because of its long history of human consumption worldwide.*
B. **Chinquapin:** Nuts contained in spiny burrs. Sweet raw or cooked.
C. **Wild roses:** Very small roses at base of chinquapin. Same nutritional value as larger roses, but on smaller scale.
5. A. **Cattail:** Marshy plant with tall main stem and long parallel veined leaves. Underground rhizomes, young stems, pollen, flower head, new shoots, heart (where rhizome connects to main stem) all edible, usually cooked.
B. **Currant:** Woody shrub with purplish berries. High in vitamin C, phosphorus and iron. Ripe in late summer.
6. A. **Horsetails:** Look like tall green segmented drinking straws. Useful as sand-paper due to high silica content, not edible, but useful working with wood.
7. **Log Crossing:** Optional to cross the log or walk down to the creek and cross there. Be careful to only have one person at a time cross the log. **(No one crosses wet log!)**
8. **Shelter Building:** View the model, discuss requirements, have teams construct their own shelters. Be sure they dismantle shelters when done. Work carefully.

9. **Fire Building:** Be sure to build the fires on bare ground in the designated pits, and put them out completely before leaving (use the water cans and water from the creek).
Direction Finding: use the poles (stick/shadow method), clock (hour hand and the sun method), and the Big Dipper Chart provided.
Distress Signaling: Use downed branches, etc. in the immediate area to construct the signal markers

Survival Map



Appendix A: Survival Questionnaire

1. Have you ever been lost? How did it feel? What happened?
2. If you've been lost, what might you have done to avoid getting lost in the first place?
3. What would you do if you found yourself lost or stranded now? Be specific - develop a plan of action.
4. What things do you need to have with you in order to survive an emergency?
5. What do you think is your worst enemy in a survival situation? Why?

Appendix B: Finding North At Night: Polaris in Relation to the Big and Little Dippers

